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PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

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PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

1.

FINANCIAL POLICY AND CORPORATE STRATEGY**QUESTIONS FROM ICAI STUDY MATERIAL****1. Explain the Interface of Financial Policy and Strategic Management****[ALSO ASKED IN MAY 2018 EXAM FOR 4 MARKS]****Answer:**

The interface of strategic management and financial policy will be clearly understood if we appreciate the fact that the starting point of an organization is money and the end point of that organization is also money. No organization can run an existing business and promote a new expansion project without a suitable internally mobilized financial base or both i.e. internally and externally mobilized financial base.

Sources of finance and capital structure are the most important dimensions of a strategic plan. The need for fund mobilization to support the expansion activity of firm is very vital for any organization. The generation of funds may arise out of ownership capital and or borrowed capital. A company may issue equity shares and/or preference shares for mobilizing ownership capital and debentures to raise borrowed capital. Public deposits, for a fixed time period, have also become a major source of short and medium term finance. Organizations may offer higher rates of interest than banking institutions to attract investors and raise fund. The overdraft, cash credits, bill discounting, bank loan and trade credit are the other sources of short term finance.

Along with the mobilization of funds, policy makers should decide on the capital structure to indicate the desired mix of equity capital and debt capital. There are some norms for debt equity ratio which need to be followed for minimizing the risks of excessive loans. For instance, in case of public sector organizations, the norm is 1:1 ratio and for private sector firms, the norm is 2:1 ratio. However this ratio in its ideal form varies from industry to industry. It also depends on the planning mode of the organization. For capital intensive industries, the proportion of debt to equity is much higher. Similar is the case for high cost projects in priority sectors and for projects in under developed regions.

Another important dimension of strategic management and financial policy interface is the investment and fund allocation decisions. A planner has to frame policies for regulating investments in fixed assets and for restraining of current assets. Investment proposals mooted by different business units may be divided into three groups. One type of proposal will be for addition of a new product by the firm. Another type of proposal will be to increase the level of operation of an existing product through either an increase in capacity in the existing plant or setting up of another plant

CHAPTER 1 – FINANCIAL POLICY AND CORPORATE STRATEGY

for meeting additional capacity requirement. The last is for cost reduction and efficient utilization of resources through a new approach and/or closer monitoring of the different critical activities. Now, given these three types of proposals a planner should evaluate each one of them by making within group comparison in the light of capital budgeting exercise. In fact, project evaluation and project selection are the two most important jobs under fund allocation. Planner's task is to make the best possible allocation under resource constraints.

Dividend policy is yet another area for making financial policy decisions affecting the strategic performance of the company. A close interface is needed to frame the policy to be beneficial for all. Dividend policy decision deals with the extent of earnings to be distributed as dividend and the extent of earnings to be retained for future expansion scheme of the firm. From the point of view of long term funding of business growth, dividend can be considered as that part of total earnings, which cannot be profitably utilized by the company. Stability of the dividend payment is a desirable consideration that can have a positive impact on share prices. The alternative policy of paying a constant percentage of the net earnings may be preferable from the point of view of both flexibility of the firm and ability of the firm. It also gives a message of lesser risk for the investors. Yet some other companies follow a different alternative. They pay a minimum dividend per share and additional dividend when earnings are higher than the normal earnings. In actual practice, investment opportunities and financial needs of the firm and the shareholders preference for dividend against capital gains resulting out of share are to be taken into consideration for arriving at the right dividend policy. Alternatives like cash dividend and stock dividend are also to be examined while working out an ideal dividend policy that supports and promotes the corporate strategy of the company.

Thus, the financial policy of a company cannot be worked out in isolation of other functional policies. It has a wider appeal and closer link with the overall organizational performance and direction of growth. These policies being related to external awareness about the firm, especially the awareness of the investors about the firm, in respect of its internal performance. There is always a process of evaluation active in the minds of the current and future stake holders of the company. As a result preference and patronage for the company depends significantly on the financial policy framework. Hence, attention of the corporate planners must be drawn while framing the financial policies not at a later stage but during the stage of corporate planning itself. The nature of interdependence is the crucial factor to be studied and modelled by using an in depth analytical approach. This is a very difficult task compared to usual cause and effect study because corporate strategy is the cause and financial policy is the effect and sometimes financial policy is the cause and corporate strategy is the effect.

2. Write a short note on Balancing Financial Goals vis-a-vis Sustainable Growth.

[ALSO ASKED IN MTP → AUGUST 2018 & APRIL 2019 → 4 MARKS]

Answer:

The concept of sustainable growth can be helpful for planning healthy corporate growth. This concept forces managers to consider the financial consequences of sales increases and to set sales growth goals that are consistent with the operating and financial policies of the firm. Often, a conflict can arise if growth objectives are not consistent with the value of the organization's

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

sustainable growth. Question concerning right distribution of resources may take a difficult shape if we take into consideration the rightness not for the current stakeholders but for the future stakeholders also. To take an illustration, let us refer to fuel industry where resources are limited in quantity and a judicious use of resources is needed to cater to the need of the future customers along with the need of the present customers. One may have noticed the save fuel campaign, a demarketing campaign that deviates from the usual approach of sales growth strategy and preaches for conservation of fuel for their use across generation. This is an example of stable growth strategy adopted by the oil industry as a whole under resource constraints and the long run objective of survival over years. Incremental growth strategy, profit strategy and pause strategy are other variants of stable growth strategy.

Sustainable growth is important to enterprise long-term development. Too fast or too slow growth will go against enterprise growth and development, so financial should play important role in enterprise development, adopt suitable financial policy initiative to make sure enterprise growth speed close to sustainable growth ratio and have sustainable healthy development.

The sustainable growth rate (SGR), concept by Robert C. Higgins, of a firm is the maximum rate of growth in sales that can be achieved, given the firm's profitability, asset utilization, and desired dividend payout and debt (financial leverage) ratios. The sustainable growth rate is a measure of how much a firm can grow without borrowing more money. After the firm has passed this rate, it must borrow funds from another source to facilitate growth. Variables typically include the net profit margin on new and existing revenues; the asset turnover ratio, which is the ratio of sales revenues to total assets; the assets to beginning of period equity ratio; and the retention rate, which is defined as the fraction of earnings retained in the business.

SGR = ROE x (1- Dividend payment ratio)

Sustainable growth models assume that the business wants to: 1) maintain a target capital structure without issuing new equity; 2) maintain a target dividend payment ratio; and 3) increase sales as rapidly as market conditions allow. Since the asset to beginning of period equity ratio is constant and the firm's only source of new equity is retained earnings, sales and assets cannot grow any faster than the retained earnings plus the additional debt that the retained earnings can support. The sustainable growth rate is consistent with the observed evidence that most corporations are reluctant to issue new equity. If, however, the firm is willing to issue additional equity, there is in principle no financial constraint on its growth rate. Indeed, the sustainable growth rate formula is directly predicted on return on equity.

CHAPTER 3: SECURITY ANALYSIS

2.

RISK MANAGEMENT

QUESTIONS FROM ICAI STUDY MATERIAL

1. Explain the significance of VAR.

Answer:

VAR can be applied

- (a) to measure the maximum possible loss on any portfolio or a trading position.
- (b) as a benchmark for performance measurement of any operation or trading.
- (c) to fix limits for individuals dealing in front office of a treasury department.
- (d) to enable the management to decide the trading strategies.
- (e) as a tool for Asset and Liability Management especially in banks.

2. The Financial Risk can be viewed from different perspective. Explain.

OR

Explain Financial Risk from the point of view of Stakeholder, Company and the Government.

[ALSO ASKED IN MTP → MARCH 2018 & OCTOBER 2018 → 4 MARKS]

Answer:

The financial risk can be evaluated from different point of views as follows:

- (a) From stakeholder's point of view: Major stakeholders of a business are equity shareholders and they view financial gearing i.e. ratio of debt in capital structure of company as risk since in event of winding up of a company they will be least prioritized.

Even for a lender, existing gearing is also a risk since company having high gearing faces more risk in default of payment of interest and principal repayment.

- (b) From Company's point of view: From company's point of view if a company borrows excessively or lend to someone who defaults, then it can be forced to go into liquidation.
- (c) From Government's point of view: From Government's point of view, the financial risk can be viewed as failure of any bank or (like Lehman Brothers) down grading of any financial institution

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

leading to spread of distrust among society at large. Even this risk also includes willful defaulters. This can also be extended to sovereign debt crisis.

3. Consider a portfolio consisting of a Rs. 200,00,000 investment in share XYZ and a Rs. 200,00,000 investment in share ABC. The daily standard deviation of both shares is 1% and that the coefficient of correlation between them is 0.3. You are required to determine the 10-day 99% value at risk for the portfolio?

Answer:

The standard deviation of the daily change in the investment in each asset is Rs. 2,00,000 i.e. 2 lakhs. The variance of the portfolio's daily change is

$$V = 2^2 + 2^2 + 2 \times 0.3 \times 2 \times 2 = 10.4$$

$$\sigma \text{ (Standard Deviation)} = \sqrt{10.4} = \text{Rs. 3.22 lakhs}$$

Accordingly, the standard deviation of the 10-day change is

$$\text{Rs. 3.22 lakhs} \times \sqrt{10} = \text{Rs. 10.18 lakh}$$

From the Normal Table we see that z score for 1% is 2.33. This means that 1% of a normal distribution lies more than 2.33 standard deviations below the mean. The 10-day 99 percent value at risk is therefore

$$2.33 \times \text{Rs. 10.18 lakh} = \text{Rs. 23.72 lakh}$$

PAST EXAMINATION & MTP QUESTIONS

4. Neel holds Rs. 1 crore shares of XY Ltd. whose market price standard deviation is 2% per day. Assuming 252 trading days in a year, determine maximum loss level over the period of 1 trading day and 10 trading days with 99% confidence level. Assuming share prices are normally for level of 99%, the equivalent Z score from Normal table of Cumulative Area shall be 2.33.

[MAY 2018 → 4 MARKS]

Answer:

Assuming share prices are normally distributed, for level of 99%, the equivalent Z score from Normal table of Cumulative Area is 2.33.

CHAPTER 3:
SECURITY ANALYSIS

Volatility in terms of rupees is:
2% of Rs. 1 Crore = Rs. 2 lakh

The maximum loss for 1 day at 99% Confidence Level is
Rs. 2 lakh x 2.33 = Rs. 4.66 lakh,
and expected maximum loss for 10 trading days shall be:
 $\sqrt{10} \times \text{Rs. 4.66 lakh} = 14.73 \text{ lakhs or } 14.74 \text{ lakhs}$

5. How different stakeholders view the financial risk?

[NOV 2018 → 4 MARKS]

Answer:

The financial risk can be viewed by different stakeholders as follows:

- (i) **From shareholder's and lender's point of view:** Major stakeholders of a business are equity shareholders and they view financial gearing i.e. ratio of debt in capital structure of company as risk since in the event of winding up of a company they will be least be given priority.

Even for a lender, existing gearing is also a risk since company having high gearing faces more risk in default of payment of interest and principal repayment.

- (ii) **From Company's point of view:** From company's point of view if a company borrows excessively or lend to someone who defaults, then it can be forced to go into liquidation.

- (iii) **From Government's point of view:** From Government's point of view, the financial risk can be viewed as failure of any bank (like Lehman Brothers) or down grading of any financial institution leading to spread of distrust among society at large. Even this risk also includes willful defaulters. This can also be extended to sovereign debt crisis.

6. List the main applications of Value At Risk (VAR).

[MAY 2019 → 4 MARKS]

Answer:

Applications of Value at Risk (VAR)

VAR can be applied

- to measure the maximum possible loss on any portfolio or a trading position.
- as a benchmark for performance measurement of any operation or trading.
- to fix limits for individuals dealing in front office of a treasury department.
- to enable the management to decide the trading strategies.
- as a tool for Asset and Liability Management especially in banks.

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

7. Explain features of Value at Risk (VAR).

[MTP → APRIL 2018 & AUGUST 2018 → 4 MARKS]

Answer:

Explanation of four features of VAR are as below:

- (i) **Components of Calculations:** VAR calculation is based on following three components:
 - (a) Time Period
 - (b) Confidence Level – Generally 95% and 99%
 - (c) Loss in percentage or in amount
- (ii) **Statistical Method:** It is a type of statistical tool based on Standard Deviation.
- (iii) **Time Horizon:** VAR can be applied for different time horizons say one day, one week, one month and so on.
- (iv) **Probability:** Assuming the values are normally attributed, probability of maximum loss can be predicted.
- (v) **Control Risk:** Risk can be controlled by setting limits for maximum loss.
- (vi) **Z Score:** Z Score indicates how many standard Deviations is away from Mean value of a population. When it is multiplied with Standard Deviation it provides VAR.

8. Briefly explain Counter Party Risk and the various techniques to manage this risk.

[MTP → OCTOBER 2019 → 4 MARKS]

Answer:

The various hints that may provide counter party risk are as follows:

- (a) Failure to obtain necessary resources to complete the project or transaction undertaken.
- (b) Any regulatory restrictions from the Government.
- (c) Hostile action of foreign government.
- (d) Let down by third party.
- (e) Have become insolvent.

The various techniques to manage this type of risk are as follows:

- (1) Carrying out Due Diligence before dealing with any third party.
- (2) Do not over commit to a single entity or group or connected entities.
- (3) Know your exposure limits.
- (4) Review the limits and procedure for credit approval regularly.
- (5) Rapid action in the event of any likelihood of defaults.
- (6) Use of performance guarantee, insurance or other instruments.

CHAPTER 3: SECURITY ANALYSIS

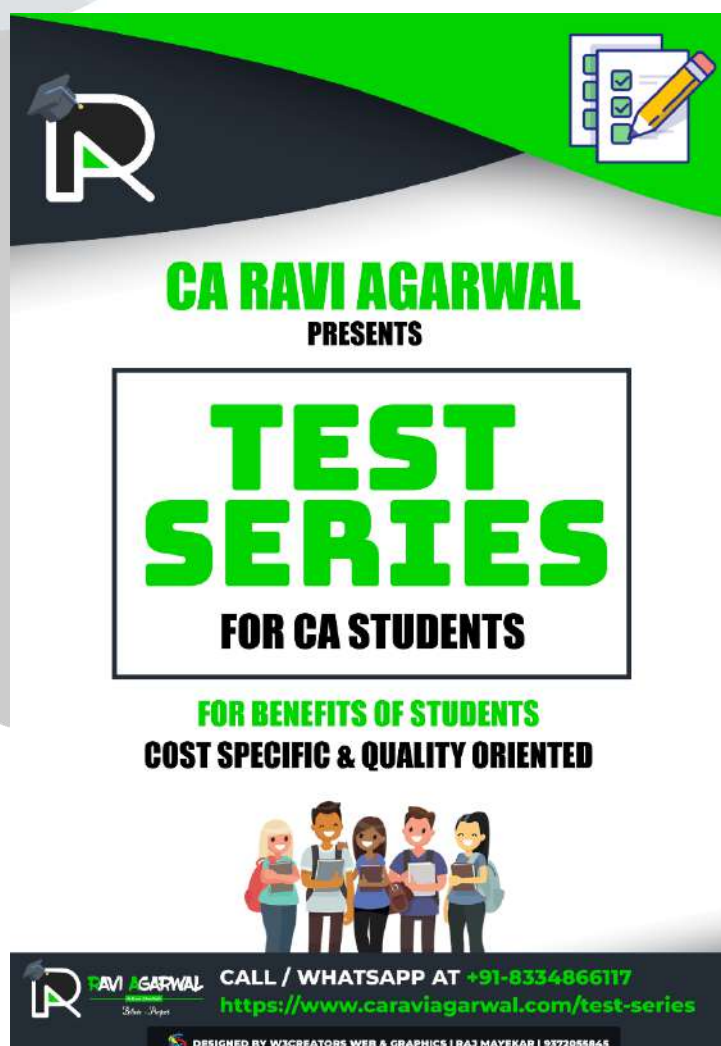
9. Explain some of the parameters to identify the currency risk.

[MTP → OCTOBER 2019 → 4 MARKS]

Answer:

Some of the parameters to identify the currency risk are as follows:

- (1) Government Action: The Government action of any country has visual impact in its currency. For example, the UK Govt. decision to divorce from European Union i.e. Brexit brought the pound to its lowest since 1980's.
- (2) Nominal Interest Rate: As per interest rate parity (IRP) the currency exchange rate depends on the nominal interest of that country.
- (3) Inflation Rate: Purchasing power parity theory impact the value of currency.
- (4) Natural Calamities: Any natural calamity can have negative impact.
- (5) War, Coup, Rebellion etc.: All these actions can have far reaching impact on currency's exchange rates.
- (6) Change of Government: The change of government and its attitude towards foreign investment also helps to identify the currency risk.



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B.

SECURITY ANALYSIS

QUESTIONS FROM ICAI STUDY MATERIAL

1. Explain the Efficient Market Theory in and what are major misconceptions about this theory?

Answer:

Efficient Market Theory was developed by University of Chicago professor Eugen Fama in the 1960s. As per this theory, at any given time, all available price sensitive information is fully reflected in securities' prices. Thus this theory implies that no investor can consistently outperform the market as every stock is appropriately priced based on available information.

Stating otherwise theory states that no one can "beat the market" hence making it impossible for investors to either purchase undervalued stocks or sell stocks for inflated prices as stocks are always traded at their fair value on stock exchanges. Hence it is impossible to outperform the overall market through expert stock selection or market timing and that the only way an investor can possibly obtain higher returns is by purchasing riskier investments.

Misconception about Efficient Market Theory:

Efficient Market Theory implies that market prices factor in all available information and as such it is not possible for any investor to earn consistent long term returns from market operations.

Although price tends to fluctuate they cannot reflect fair value. This is because the future is uncertain. The market springs surprises continually and as prices reflect the surprises they fluctuate.

Inability of institutional portfolio managers to achieve superior investment performance implies that they lack competence in an efficient market. It is not possible to achieve superior investment performance since market efficiency exists due to portfolio managers doing this job well in a competitive setting.

The random movement of stock prices suggests that stock market is irrational. Randomness and irrationality are two different things, if investors are rational and competitive, price changes are bound to be random

CHAPTER 3: SECURITY ANALYSIS

2. Explain Dow Jones theory.

[ALSO ASKED IN MTP → MARCH 2018 → 6 MARKS | MTP → OCTOBER 2018 → 5 MARKS]

Answer:

The Dow Theory is one of the oldest and most famous technical theories. It was originated by Charles Dow, the founder of Dow Jones Company in late nineteenth century. It is a helpful tool for determining the relative strength of the stock market. It can also be used as a barometer of business.

The Dow Theory is based upon the movements of two indices, constructed by Charles Dow, Dow Jones Industrial Average (DJIA) and Dow Jones Transportation Average (DJTA). These averages reflect the aggregate impact of all kinds of information on the market. The movements of the market are divided into three classifications, all going at the same time; the primary movement, the secondary movement, and the daily fluctuations. The primary movement is the main trend of the market, which lasts from one year to 36 months or longer. This trend is commonly called bear or bull market. The secondary movement of the market is shorter in duration than the primary movement, and is opposite in direction. It lasts from two weeks to a month or more. The daily fluctuations are the narrow movements from day-to-day. These fluctuations are not part of the Dow Theory interpretation of the stock market. However, daily movements must be carefully studied, along with primary and secondary movements, as they go to make up the longer movement in the market.

Thus, the Dow Theory's purpose is to determine where the market is and where it is going, although not how far or high. The theory, in practice, states that if the cyclical swings of the stock market averages are successively higher and the successive lows are higher, then the market trend is up and a bullish market exists. Contrarily, if the successive highs and successive lows are lower, then the direction of the market is down and a bearish market exists.

Charles Dow proposed that the primary uptrend would have three moves up, the first one being caused by accumulation of shares by the far-sighted, knowledgeable investors, the second move would be caused by the arrival of the first reports of good earnings by corporations, and the last move up would be caused by widespread report of financial well-being of corporations. The third stage would also see rampant speculation in the market. Towards the end of the third stage, the farsighted investors, realizing that the high earnings levels may not be sustained, would start selling, starting the first move down of a downtrend, and as the non-sustainability of high earnings is confirmed, the second move down would be initiated and then the third move down would result from distress selling in the market.

3. Explain the Elliot Theory of technical analysis.

Answer:

Inspired by the Dow Theory and by observations found throughout nature, Ralph Elliot formulated Elliot Wave Theory in 1934. This theory was based on analysis of 75 years stock price movements

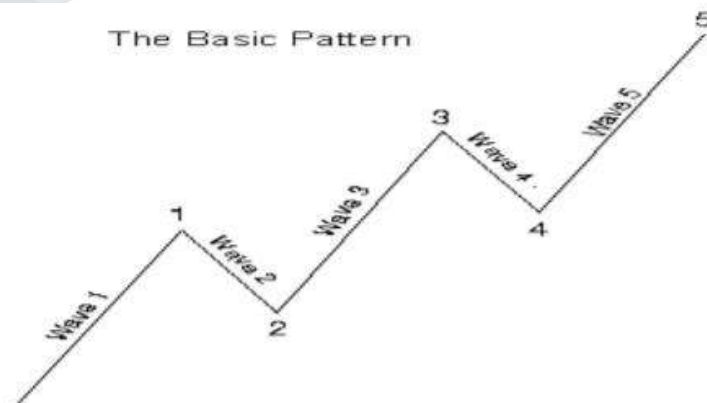
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and charts. From his studies, he defined price movements in terms of waves. Accordingly, this theory was named Elliot Wave Theory. Elliot found that the markets exhibited certain repeated patterns or waves. As per this theory wave is a movement of the market price from one change in the direction to the next change in the same direction. These waves are resulted from buying and selling impulses emerging from the demand and supply pressures on the market. Depending on the demand and supply pressures, waves are generated in the prices.

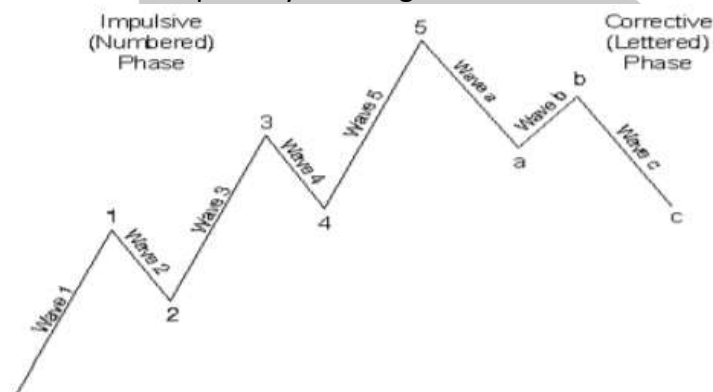
As per this theory, waves can be classified into two parts:-

- (a) **Impulsive Patterns-(Basic Waves)** - In this pattern there will be 3 or 5 waves in a given direction (going upward or downward). These waves shall move in the direction of the basic movement. This movement can indicate bull phase or bear phase.
- (b) **Corrective Patterns- (Reaction Waves)** - These 3 waves are against the basic direction of the basic movement. Correction involves correcting the earlier rise in case of bull market and fall in case of bear market.

As shown in the following diagram waves 1, 3 and 5 are directional movements, which are separated or corrected by wave 2 & 4, termed as corrective movements.



Complete Cycle -As shown in following figure five-wave impulses is following by a three-wave correction (a,b & c) to form a complete cycle of eight waves.



One complete cycle consists of waves made up of two distinct phases, bullish and bearish. On completion of full one cycle i.e. termination of 8 waves movement, the fresh cycle starts with similar impulses arising out of market trading.

CHAPTER 3: SECURITY ANALYSIS

4. Explain the various indicators that can be used to assess the performance of an economy.

OR

Discuss the various techniques used in economic analysis.

[ALSO ASKED IN MTP → APRIL 2019 & OCTOBER 2019 → 5 MARKS / 4 MARKS]

Answer:

Economic analysis is used to forecast national income with its various components that have a bearing on the concerned industry and the company in particular. Gross national product (GNP) is used to measure national income as it reflects the growth rate in economic activities and has been regarded as a forecasting tool for analyzing the overall economy along with its various components during a particular period.

Some of the techniques used for economic analysis are:

(a) Anticipatory Surveys: They help investors to form an opinion about the future state of the economy. It incorporates expert opinion on construction activities, expenditure on plant and machinery, levels of inventory – all having a definite bearing on economic activities. Also future spending habits of consumers are taken into account.

In spite of valuable inputs available through this method, it has certain drawbacks:

- (i) Survey results do not guarantee that intentions surveyed would materialize.
- (ii) They are not regarded as forecasts per se, as there can be a consensus approach by the investor for exercising his opinion.

Continuous monitoring of this practice is called for to make this technique popular.

(b) Barometer/Indicator Approach: Various indicators are used to find out how the economy shall perform in the future. The indicators have been classified as under:

- (i) **Leading Indicators:** They lead the economic activity in terms of their outcome. They relate to the time series data of the variables that reach high/low points in advance of economic activity.
- (ii) **Roughly Coincidental Indicators:** They reach their peaks and troughs at approximately the same in the economy.
- (iii) **Lagging Indicators:** They are time series data of variables that lag behind in their consequences vis-a-vis the economy. They reach their turning points after the economy has reached its own already.

All these approaches suggest direction of change in the aggregate economic activity but nothing about its magnitude. The various measures obtained from such indicators may give conflicting signals about the future direction of the economy. To avoid this limitation, use of diffusion/composite index is suggested whereby combining several indicators into one index to measure the strength/weaknesses in the movement of a particular set of indicators. Computation of diffusion indices is no doubt difficult notwithstanding the fact it does not eliminate irregular movements.

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

Money supply in the economy also affects investment decisions. Rate of change in money supply in the economy affects GNP, corporate profits, interest rates and stock prices. Increase in money supply fuels inflation. As investment in stocks is considered as a hedge against inflation, stock prices go up during inflationary period.

(c) Economic Model Building Approach: In this approach, a precise and clear relationship between dependent and independent variables is determined. GNP model building or sectoral analysis is used in practice through the use of national accounting framework. The steps used are as follows:

- (i) Hypothesize total economic demand by measuring total income (GNP) based on political stability, rate of inflation, changes in economic levels.
- (ii) Forecasting the GNP by estimating levels of various components viz. consumption expenditure, gross private domestic investment, government purchases of goods/services, net exports.
- (iii) After forecasting individual components of GNP, add them up to obtain the forecasted GNP.
- (iv) Comparison is made of total GNP thus arrived at with that from an independent agency for the forecast of GNP and then the overall forecast is tested for consistency. This is carried out for ensuring that both the total forecast and the component wise forecast fit together in a reasonable manner.

5. Closing values of BSE Sensex from 6th to 17th day of the month of January of the year 200X were as follows:

Days	Date	Day	Sensex
1	6	THU	14522
2	7	FRI	14925
3	8	SAT	No Trading
4	9	SUN	No Trading
5	10	MON	15222
6	11	TUE	16000
7	12	WED	16400
8	13	THU	17000
9	14	FRI	No Trading
10	15	SAT	No Trading
11	16	SUN	No Trading
12	17	MON	18000

CHAPTER 3: SECURITY ANALYSIS

Calculate Exponential Moving Average (EMA) of Sensex during the above period. The previous day exponential moving average of Sensex can be assumed as 15,000. The value of exponent for 31 days EMA is 0.062.

Give detailed analysis on the basis of your calculations.

[ALSO ASKED IN MTP → MARCH 2018 → 7 MARKS]

Answer:

Date	1 Sensex	2 EMA for Previous day	3 1-2	4 3×0.062	5 EMA 2 ± 4
6	14522	15000	(478)	(29.636)	14970.364
7	14925	14970.364	(45.364)	(2.812)	14967.55
10	15222	14967.55	254.45	15.776	14983.32
11	16000	14983.32	1016.68	63.034	15046.354
12	16400	15046.354	1353.646	83.926	15130.28
13	17000	15130.28	1869.72	115.922	15246.202
17	18000	15246.202	2753.798	170.735	15416.937

Conclusion – The market is bullish. The market is likely to remain bullish for short term to medium term if other factors remain the same. On the basis of this indicator (EMA) the investors/brokers can take long position.

6. The closing value of Sensex for the month of October, 2007 is given below:

Date Closing	Sensex Value
1.10.07	2800
3.10.07	2780
4.10.07	2795
5.10.07	2830
8.10.07	2760
9.10.07	2790
10.10.07	2880
11.10.07	2960
12.10.07	2990
15.10.07	3200
16.10.07	3300
17.10.07	3450

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19.10.07	3360
22.10.07	3290
23.10.07	3360
24.10.07	3340
25.10.07	3290
29.10.07	3240
30.10.07	3140
31.10.07	3260

You are required to test the weak form of efficient market hypothesis by applying the run test at 5% and 10% level of significance.

Following value can be used :

Value of t at 5% is 2.101 at 18 degrees of freedom

Value of t at 10% is 1.734 at 18 degrees of freedom

Value of t at 5% is 2.086 at 20 degrees of freedom.

Value of t at 10% is 1.725 at 20 degrees of freedom.

[ALSO ASKED IN MTP → OCTOBER 2018 → 10 MARKS]

Answer:

Date	Closing Sensex	Sign of Price Change
1.10.07	2800	
3.10.07	2780	-
4.10.07	2795	+
5.10.07	2830	+
8.10.07	2760	-
9.10.07	2790	+
10.10.07	2880	+
11.10.07	2960	+
12.10.07	2990	+
15.10.07	3200	+
16.10.07	3300	+
17.10.07	3450	+
19.10.07	3360	-
22.10.07	3290	-
23.10.07	3360	+
24.10.07	3340	-

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25.10.07	3290	-
29.10.07	3240	-
30.10.07	3140	-
31.10.07	3260	+

Total of sign of price changes (r) = 8

No of Positive changes = $n_1 = 11$

No. of Negative changes = $n_2 = 8$

$$\mu_r = \frac{2n_1n_2}{n_1 + n_2} + 1$$

$$\mu = \frac{2 \times 11 \times 8}{11 + 8} + 1 = 176/19 + 1 = 10.26$$

$$\hat{\sigma}_r = \sqrt{\frac{2n_1n_2(2n_1n_2 - n_1 - n_2)}{(n_1 + n_2)^2(n_1 + n_2 - 1)}}$$

$$\hat{\sigma}_r = \sqrt{\frac{(2 \times 11 \times 8)(2 \times 11 \times 8 - 11 - 8)}{(11 + 8)^2(11 + 8 - 1)}} = \sqrt{\frac{176 \times 157}{(19)^2(18)}} = \sqrt{4.252} = 2.06$$

Since too few runs in the case would indicate that the movement of prices is not random. We employ a two- tailed test the randomness of prices.

Test at 5% level of significance at 18 degrees of freedom using t- table

The lower limit

$$= \mu - t \times \hat{\sigma}_r = 10.26 - 2.101 \times 2.06 = 5.932$$

Upper limit

$$= \mu + t \times \hat{\sigma}_r = 10.26 + 2.101 \times 2.06 = 14.588$$

At 10% level of significance at 18 degrees of freedom

Lower limit

$$= 10.26 - 1.734 \times 2.06 = 6.688$$

Upper limit

$$= 10.26 + 1.734 \times 2.06 = 13.832$$

As seen r lies between these limits. Hence, the market exhibits weak form of efficiency.

*For a sample of size n, the t distribution will have n-1 degrees of freedom.

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PAST EXAMINATION QUESTIONS

7. Closing values of BSE Sensex from 6th to 17th day of the month of January of the year 200 X were as follows:

Days	Date	Day	Sense x
1	6	THU	29522
2	7	FRI	29925
3	8	SAT	No Trading
4	9	SUN	No Trading
5	10	MON	30222
6	11	TUE	31000
7	12	WED	31400
8	13	THU	32000
9	14	FRI	No Trading
10	15	SAT	No Trading
11	16	SUN	No Trading
12	17	MON	33000

Compute Exponential Moving Average (EMA) of Sensex during the above period. The 30 days simple moving average of Sensex can be assumed as 30,000. The value of exponent for 30 days EMA is 0.062.

Provide detailed analysis on the basis of your calculations.

[MAY 2018 → 8 MARKS]

Answer:

Date	1 Sensex	2 EMA for Previous day	3 1-2	4 3×0.062	5 EMA 2 ± 4
6	29522	30000	(478)	(29.636)	29970.364
7	29925	29970.364	(45.364)	(2.812)	29967.55
10	30222	29967.55	254.45	15.776	29983.32
11	31000	29983.32	1016.68	63.034	30046.354
12	31400	30046.354	1353.646	83.926	30130.28
13	32000	30130.28	1869.72	115.922	30246.202
17	33000	30246.202	2753.798	170.735	30416.937

Conclusion – The market is bullish. The market is likely to remain bullish for short term to medium term if other factors remain the same. On the basis of this indicator (EMA) the investors/brokers can take long position.

CHAPTER 3: SECURITY ANALYSIS

8. Describe the concept of 'Evaluation of Technical Analysis'

[MTP → MARCH 2019 → 4 MARKS]

Answer:

Evaluation of Technical Analysis

Technical Analysis has several supporters as well several critics. The advocates of technical analysis offer the following interrelated argument in their favour:

- (a) Under influence of crowd psychology trend persist for some time. Tools of technical analysis help in identifying these trends early and help in investment decision making.
- (b) Shift in demand and supply are gradual rather than instantaneous. Technical analysis helps in detecting this shift rather early and hence provides clues to future price movements.
- (c) Fundamental information about a company is observed and assimilated by the market over a period of time. Hence price movement tends to continue more or less in same direction till the information is fully assimilated in the stock price.

Detractors of technical analysis believe that it is an useless exercise; their arguments are as follows:

- (a) Most technical analysts are not able to offer a convincing explanation for the tools employed by them.
- (b) Empirical evidence in support of random walk hypothesis cast its shadow over the usefulness of technical analysis.
- (c) By the time an uptrend and down trend may have been signaled by technical analysis it may already have taken place.
- (d) Ultimately technical analysis must be self-defeating proposition. With more and more people employing it, the value of such analysis tends to decline.

In a nutshell, it may be concluded that in a rational, well ordered and efficient market, technical analysis may not work very well. However with imperfection, inefficiency and irrationalities that characterizes the real world market, technical analysis may be helpful. If technical analysis is used in conjunction with fundamental analysis, it might be useful in providing proper guidance to investment decision makers.

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4.

SECURITY VALUATION

QUESTIONS FROM ICAI STUDY MATERIAL

1. Write short notes on Zero coupon bonds.

Answer:

As name indicates these bonds do not pay interest during the life of the bonds. Instead, zero coupon bonds are issued at discounted price to their face value, which is the amount a bond will be worth when it matures or comes due. When a zero coupon bond matures, the investor will receive one lump sum (face value) equal to the initial investment plus interest that has been accrued on the investment made. The maturity dates on zero coupon bonds are usually long term. These maturity dates allow an investor for a long range planning. Zero coupon bonds issued by banks, government and private sector companies. However, bonds issued by corporate sector carry a potentially higher degree of risk, depending on the financial strength of the issuer and longer maturity period, but they also provide an opportunity to achieve a higher return.

2. A company has a book value per share of Rs. 137.80. Its return on equity is 15% and it follows a policy of retaining 60% of its earnings. If the Opportunity Cost of Capital is 18%, what is the price of the share today?

Answer:

The company earnings and dividend per share after a year are expected to be:

$$\text{EPS} = \text{Rs. } 137.8 \times 0.15 = \text{Rs. } 20.67$$

$$\text{Dividend} = 0.40 \times 20.67 = \text{Rs. } 8.27$$

The growth in dividend would be:

$$g = 0.6 \times 0.15 = 0.09$$

Alternative Solution:

However, in case a student follows Walter's approach as against continuous growth model given in previous solution the answer of the question works out to be different. This can be shown as follow:

Given data:

Book value per share = Rs. 137.80

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Return on equity = 15%

Dividend Payout = 40%

Cost of capital = 18%

$$\begin{aligned}\therefore \text{EPS} &= \text{Rs. } 137.80 \times 15\% \\ &= \text{Rs. } 20.67\end{aligned}$$

$$\therefore \text{Dividend} = \text{Rs. } 20.67 \times 40\% = \text{Rs. } 8.27$$

Walter's approach showing relationship between dividend and share price can be expressed by the following formula

$$V_c = \frac{D + \frac{R_a}{R_c}(E - D)}{R_c}$$

Where,

V_c = Market Price of the ordinary share of the company.

R_a = Return on internal retention i.e. the rate company earns on retained profits.

R_c = Capitalisation rate i.e. the rate expected by investors by way of return from particular category of shares.

E = Earnings per share.

D = Dividend per share.

Hence,

$$\begin{aligned}V_c &= \frac{8.27 + \frac{.15}{.18}(20.67 - 8.27)}{.18} = \frac{18.60}{.18} \\ &= ₹ 103.35\end{aligned}$$

3. ABC Limited's shares are currently selling at Rs. 13 per share. There are 10,00,000 shares outstanding. The firm is planning to raise Rs. 20 lakhs to Finance a new project.

Required:

What are the ex-right price of shares and the value of a right, if

- (i) The firm offers one right share for every two shares held.
- (ii) The firm offers one right share for every four shares held.
- (iii) How does the shareholders' wealth change from (i) to (ii)? How does right issue increases shareholders' wealth?

Answer:

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- (i) Number of shares to be issued : 5,00,000

Subscription price Rs. 20,00,000 / 5,00,000 = Rs. 4

Ex-right Price = (1,30,00,000 + 20,00,000) / 15,00,000 = Rs. 10

Value of a Right = Rs. 10 – Rs. 4 = Rs. 6

Value of a Right Per Share Basis = (10 – 4) / 2 = Rs. 3

- (ii) Subscription price Rs. 20,00,000 / 2,50,000 = Rs. 8

Ex-right Price = (1,30,00,000 + 20,00,000) / 12,50,000 = Rs. 12

Value of a Right = 12 - 8

Value of a Right Per Share = (12 – 8) / 4

- (iii) Calculation of effect of right issue on wealth of Shareholder's wealth who is holding, say 100 shares.

- (a) When firm offers one share for two shares held.

Value of Shares after right issue (150 X Rs. 10)	Rs. 1,500
Less: Amount paid to acquire right shares (50XRs.4)	<u>Rs. 200</u>
	<u>Rs. 1,300</u>

- (b) When firm offers one share for every four shares held.

Value of Shares after right issue (125 X Rs. 12)	Rs. 1,500
Less: Amount paid to acquire right shares (25XRs.8)	<u>Rs. 200</u>
	<u>Rs. 1,300</u>

- (c) Wealth of Shareholders before Right Issue Rs. 1,300

Thus, there will be no change in the wealth of shareholders from (i) and (ii).

4. On the basis of the following information:

Current dividend (Do) = Rs. 2.50

Discount rate (k) = 10.5%

Growth rate (g) = 2%

- (i) Calculate the present value of stock of ABC Ltd.
 (ii) Is its stock overvalued if stock price is Rs. 35, ROE = 9% and EPS = Rs. 2.25? Show detailed calculation.

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Answer:

- (i) **Present Value of the stock of ABC Ltd. Is:-**

$$V_0 = \frac{2.50(1.02)}{0.105 - 0.02} = ₹30/-.$$

- (ii) **Value of stock under the PE Multiple Approach**

Particulars	
Actual Stock Price	₹ 35.00
Return on equity	9%
EPS	₹ 2.25
PE Multiple (1/Return on Equity) = 1/9%	11.11
Market Price per Share	₹ 25.00

Since, Actual Stock Price is higher, hence it is overvalued.

- (iii) **Value of the Stock under the Earnings Growth Model**

Particulars	
Actual Stock Price	₹ 35.00
Return on equity	9%
EPS	₹ 2.25
Growth Rate	2%
Market Price per Share $[EPS \times (1+g)] / (K_e - g)$	₹ 32.79
$= ₹ 2.25 \times 1.02 / 0.07$	

Since, Actual Stock Price is higher, hence it is overvalued.

5. Piyush Loonker and Associates presently pay a dividend of Re. 1.00 per share and has a share price of Rs. 20.00.

- (i) If this dividend were expected to grow at a rate of 12% per annum forever, what is the firm's expected or required return on equity using a dividend-discount model approach?
- (ii) Instead of this situation in part (i), suppose that the dividends were expected to grow at a rate of 20% per annum for 5 years and 10% per year thereafter. Now what is the firm's expected, or required, return on equity?

[ALSO ASKED IN RTP → NOV 2018]

Answer:

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(i) **Firm's Expected or Required Return On Equity**
(Using a dividend discount model approach)

According to Dividend discount model approach the firm's expected or required return on equity is computed as follows:

$$K_e = \frac{D_1}{P_0} + g$$

Where,

K_e = Cost of equity share capital or (Firm's expected or required return on equity share capital)

D_1 = Expected dividend at the end of year 1

P_0 = Current market price of the share.

g = Expected growth rate of dividend.

Now, $D_1 = D_0 (1 + g)$ or ₹ 1 (1 + 0.12) or ₹ 1.12, $P_0 = ₹ 20$ and $g = 12\%$ per annum

$$\text{Therefore, } K_e = \frac{₹ 1.12}{₹ 20} + 12\%$$

Or, $K_e = ₹ 17.6\%$

(ii) **Firm's Expected or Required Return on Equity**

(If dividends were expected to grow at a rate of 20% per annum for 5 years and 10% per year thereafter)

Since in this situation if dividends are expected to grow at a super normal growth rate g_s , for n years and thereafter, at a normal, perpetual growth rate of g_n beginning in the year $n + 1$, then the cost of equity can be determined by using the following formula:

$$P_0 = \sum_{t=1}^n \frac{\text{Div}_0 (1 + g_s)^t}{(1 + K_e)^t} + \frac{\text{Div}_{n+1}}{K_e - g_n} \times \frac{1}{(1 + K_e)^n}$$

Where,

g_s = Rate of growth in earlier years.

g_n = Rate of constant growth in later years.

P_0 = Discounted value of dividend stream.

K_e = Firm's expected, required return on equity (cost of equity capital).

Now,

$g_s = 20\%$ for 5 years, $g_n = 10\%$

Therefore,

$$P_0 = \sum_{t=1}^n \frac{D_0 (1 + 0.20)^t}{(1 + K_e)^t} + \frac{\text{Div}_{5+1}}{K_e - 0.10} \times \frac{1}{(1 + K_e)^t}$$

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$$P_0 = \frac{1.20}{(1+)^1} + \frac{1.44}{(1+)^2} + \frac{1.73}{(1+)^3} + \frac{2.07}{(1+)^4} + \frac{2.49}{(1+)^5} + \frac{2.49(1+0.10)}{-0.10} \times \frac{1}{(1+)^5}$$

$$\text{or } P_0 = ₹ 1.20 (PVF_1, K_e) + ₹ 1.44 (PVF_2, K_e) + ₹ 1.73 (PVF_3, K_e) + ₹ 2.07$$

$$(PVF_4, K_e) + ₹ 2.49 (PVF_5, K_e) + \frac{Rs. 2.74 (PVF_5, K_e)}{K_e - 0.10}$$

By trial and error we are required to find out K_e

Now, assume $K_e = 18\%$ then we will have

$$P_0 = ₹ 1.20 (0.8475) + ₹ 1.44 (0.7182) + ₹ 1.73 (0.6086) + ₹ 2.07 (0.5158) + ₹ 2.49 (0.4371) + ₹ 2.74 (0.4371) \times \frac{1}{0.18 - 0.10}$$

$$= ₹ 1.017 + ₹ 1.034 + ₹ 1.053 + ₹ 1.068 + ₹ 1.09 + ₹ 14.97 = ₹ 20.23$$

Since the present value of dividend stream is more than required it indicates that K_e is greater than 18%.

Now, assume $K_e = 19\%$ we will have

$$P_0 = ₹ 1.20 (0.8403) + ₹ 1.44 (0.7061) + ₹ 1.73 (0.5934) + ₹ 2.07 (0.4986) + ₹ 2.49 (0.4190) + ₹ 2.74 (0.4190) \times \frac{1}{0.19 - 0.10}$$

$$= ₹ 1.008 + ₹ 1.017 + ₹ 1.026 + ₹ 1.032 + ₹ 1.043 + ₹ 12.76$$

$$= ₹ 17.89$$

Since the market price of share (expected value of dividend stream) is ₹ 20. Therefore, the discount rate is closer to 18% than it is to 19%, we can get the exact rate by interpolation by using the following formula:

$$K_e = LR + \frac{NPV \text{ at LR}}{NPV \text{ at LR} - NPV \text{ at HR}} \times \Delta r$$

Where,

LR = Lower Rate

NPV at LR = Present value of share at LR

NPV at HR = Present value of share at Higher Rate

Δr = Difference in rates

$$K = 18\% + \frac{(\text{₹ } 20.23 - \text{₹ } 20)}{\text{₹ } 20.23 - \text{₹ } 17.89} \times 1\%$$

$$= 18\% + \frac{₹ 0.23}{₹ 2.34} \times 1\% = 18\% + 0.10\% = 18.10\%$$

Therefore, the firm's expected, or required, return on equity is 18.10%. At this rate the present discounted value of dividend stream is equal to the market price of the share.

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6. Capital structure of Sun Ltd., as at 31.3.2003 was as under:

	(₹ in lakhs)
Equity share capital	80
8% Preference share capital	40
12% Debentures	64
Reserves	32

Sun Ltd., earns a profit of Rs. 32 lakhs annually on an average before deduction of incometax, which works out to 35%, and interest on debentures.

Normal return on equity shares of companies similarly placed is 9.6% provided:

- (a) Profit after tax covers fixed interest and fixed dividends at least 3 times.
- (b) Capital gearing ratio is 0.75.
- (c) Yield on share is calculated at 50% of profits distributed and at 5% on undistributed profits.

Sun Ltd., has been regularly paying equity dividend of 8%.

ANALYZE the value per equity share of the company assuming the risk premium as:

(A) 1% for every one time of difference for Interest and Fixed Dividend Coverage.

(B) 2% for every one time of difference for Capital Gearing Ratio.

[ALSO ASKED IN MTP → OCTOBER 2018 → 10 MARKS]

Answer:

(a) Calculation of Profit after tax (PAT)

	₹
Profit before interest and tax (PBIT)	32,00,000
Less: Debenture interest (₹ 64,00,000 × 12/100)	<u>7,68,000</u>
Profit before tax (PBT)	24,32,000
Less: Tax @ 35%	<u>8,51,200</u>
Profit after tax (PAT)	15,80,800
Less: Preference Dividend	
(₹ 40,00,000 × 8/100)	3,20,000
Equity Dividend (₹ 80,00,000 × 8/100)	<u>6,40,000</u>
Retained earnings (Undistributed profit)	<u>6,20,800</u>

Calculation of Interest and Fixed Dividend Coverage

$$\begin{aligned}
 &= \frac{\text{PAT} + \text{Debenture interest}}{\text{Debenture interest} + \text{Preference dividend}} \quad \text{or} \quad \frac{\text{PAT} + \text{Debenture Interest Net of Tax}}{\text{Debenture interest} + \text{Preference dividend}} \\
 &= \frac{15,80,800 + 7,68,000}{7,68,000 + 3,20,000} \quad \text{or} \quad \frac{15,80,800 + 4,99,200}{7,68,000 + 3,20,000} \\
 &= \frac{23,48,800}{10,88,000} \quad \text{or} \quad \frac{20,80,000}{10,88,000} = 2.16 \text{ times or } 1.91 \text{ times}
 \end{aligned}$$

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(b) Calculation of Capital Gearing Ratio

$$\text{Capital Gearing Ratio} = \frac{\text{Fixed interest bearing funds}}{\text{Equity shareholders' funds}}$$

$$= \frac{\text{Preference Share Capital} + \text{Debentures}}{\text{Equity Share Capital} + \text{Reserves}} = \frac{40,00,000 + 64,00,000}{80,00,000 + 32,00,000} = \frac{1,04,00,000}{1,12,00,000} = 0.93$$

(c) Calculation of Yield on Equity Shares:

Yield on equity shares is calculated at 50% of profits distributed and 5% on undistributed profits:

	(₹)
50% on distributed profits (₹ 6,40,000 × 50/100)	3,20,000
5% on undistributed profits (₹ 6,20,800 × 5/100)	<u>31,040</u>
Yield on equity shares	<u>3,51,040</u>

$$\begin{aligned} \text{Yield on equity shares \%} &= \frac{\text{Yield on shares}}{\text{Equity share capital}} \times 100 \\ &= \frac{3,51,040}{80,00,000} \times 100 = 4.39\% \text{ or } 4.388\% \end{aligned}$$

Calculation of Expected Yield on Equity shares

Note: There is a scope for assumptions regarding the rates (in terms of percentage for every one time of difference between Sun Ltd. and Industry Average) of risk premium involved with respect to Interest and Fixed Dividend Coverage and Capital Gearing Ratio. The below solution has been worked out by assuming the risk premium as:

- (i) 1% for every one time of difference for Interest and Fixed Dividend Coverage.
- (ii) 2% for every one time of difference for Capital Gearing Ratio.
 - (a) Interest and fixed dividend coverage of Sun Ltd. is 2.16 times but the industry average is 3 times. Therefore, risk premium is added to Sun Ltd. Shares @ 1% for every 1 time of difference.

$$\text{Risk Premium} = 3.00 - 2.16 (1\%) = 0.84 (1\%) = 0.84\%$$
 - (b) Capital Gearing ratio of Sun Ltd. is 0.93 but the industry average is 0.75 times. Therefore, risk premium is added to Sun Ltd. shares @ 2% for every 1 time of difference.

$$\begin{aligned} \text{Risk Premium} &= (0.75 - 0.93) (2\%) \\ &= 0.18 (2\%) = 0.36\% \end{aligned}$$

	(%)
Normal return expected	9.60
Add: Risk premium for low interest and fixed dividend coverage	0.84
Add: Risk premium for high interest gearing ratio	<u>0.36</u>
	<u>10.80</u>

Value of Equity Share

$$= \frac{\text{Actual yield}}{\text{Expected yield}} \times \text{Paid-up value of share} = \frac{4.39}{10.80} \times 100 = ₹ 40.65$$

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7. A Company pays a dividend of Rs. 2.00 per share with a growth rate of 7%. The risk free rate is 9% and the market rate of return is 13%. The Company has a beta factor of 1.50. However, due to a decision of the Finance Manager, beta is likely to increase to 1.75. Find out the present as well as the likely value of the share after the decision.

Answer:

In order to find out the value of a share with constant growth model, the value of K_e should be ascertained with the help of 'CAPM' model as follows:

$$K_e = R_f + \beta (K_m - R_f)$$

Where,

K_e = Cost of equity

R_f = Risk free rate of return

β = Portfolio Beta i.e. market sensitivity index

K_m = Expected return on market portfolio

By substituting the figures, we get

$$K_e = 0.09 + 1.5 (0.13 - 0.09) = 0.15 \text{ or } 15\%$$

and the value of the share as per constant growth model is

$$P_0 = \frac{D_1}{(k_e - g)}$$

Where,

P_0 = Price of a share

D_1 = Dividend at the end of the year 1

K_e = Cost of equity

G = growth

$$P_0 = \frac{2.00}{(k_e - g)}$$

$$P_0 = \frac{2.00}{0.15 - 0.07} = ₹ 25.00$$

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Alternatively it can also be found as follows:

$$\frac{2.00 (1.07)}{0.15 - 0.07} = ₹ 26.75$$

However, if the decision of finance manager is implemented, the beta (β) factor is likely to increase to 1.75 therefore, K_e would be

$$\begin{aligned} K_e &= R_f + \beta (K_m - R_f) \\ &= 0.09 + 1.75 (0.13 - 0.09) = 0.16 \text{ or } 16\% \end{aligned}$$

The value of share is

$$P_0 = \frac{D_1}{(k_e - g)}$$

$$P_0 = \frac{2.00}{0.16 - 0.07} = ₹ 22.22$$

Alternatively it can also be found as follows:

$$\frac{2.00 (1.07)}{0.16 - 0.07} = ₹ 23.78$$

- 8. Shares of Voyage Ltd. are being quoted at a price-earning ratio of 8 times. The company retains 45% of its earnings which are Rs. 5 per share.**

You are required to compute

- (1) The cost of equity to the company if the market expects a growth rate of 15% p.a.**
- (2) If the anticipated growth rate is 16% per annum, calculate the indicative market price with the same cost of capital.**
- (3) If the company's cost of capital is 20% p.a. & the anticipated growth rate is 19% p.a., calculate the market price per share.**

Answer:

(1) Cost of Capital

Retained earnings (45%)	₹ 5 per share
Dividend (55%)	₹ 6.11 per share
EPS (100%)	₹ 11.11 per share
P/E Ratio	8 times
Market price	₹ 11.11 × 8 = ₹ 88.88
Cost of equity capital	
$= \left(\frac{\text{Div}}{\text{Price}} \times 100 \right) + \text{Growth \%} = \frac{₹ 6.11}{₹ 88.88} \times 100 + 15\% = 21.87\%$	

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$$\begin{aligned}
 (2) \quad \text{Market Price} &= \left(\frac{\text{Dividend}}{\text{Cost of Capital(\%)} - \text{Growth Rate(\%)}} \right) \\
 &= \frac{₹ 6.11}{(21.87-16)\%} = ₹ 104.08 \text{ per share} \\
 (3) \quad \text{Market Price} &= \frac{₹ 6.11}{(20-19)\%} = ₹ 611.00 \text{ per share}
 \end{aligned}$$

Alternative Solution

As in the question the sentence "The company retains 45% of its earnings which are ₹ 5 per share" amenable to two interpretations i.e. one is ₹ 5 as retained earnings (45%) and another is ₹ 5 is EPS (100%). Alternative solution is as follows:

(1) Cost of capital

EPS (100%)	₹ 5 per share
Retained earnings (45%)	₹ 2.25 per share
Dividend (55%)	₹ 2.75 per share
P/E Ratio	8 times
Market Price	₹ 5 × 8 = ₹ 40
Cost of equity capital	

$$= \left(\frac{\text{Div}}{\text{Price}} \times 100 \right) + \text{Growth \%} = \frac{₹ 2.75}{₹ 40.00} \times 100 + 15\% = 21.87\%$$

$$\begin{aligned}
 (2) \quad \text{Market Price} &= \left(\frac{\text{Dividend}}{\text{Cost of Capital(\%)} - \text{Growth Rate(\%)}} \right) = \frac{₹ 2.75}{(21.87 - 16)\%} \\
 &= ₹ 46.85 \text{ per share}
 \end{aligned}$$

$$(3) \quad \text{Market Price} = \frac{₹ 2.75}{(20-19)\%} = ₹ 275.00 \text{ per share}$$

9. M/s X Ltd. has paid a dividend of Rs. 2.5 per share on a face value of Rs. 10 in the financial year ending on 31st March, 2009. The details are as follows:

Current market price of share Rs. 60
 Growth rate of earnings and dividends 10%
 Beta of share 0.75
 Average market return 15%
 Risk free rate of return 9%

Calculate the intrinsic value of the share.

Answer:

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$$\text{Intrinsic Value } P_0 = \frac{D_1}{k - g}$$

Using CAPM

$$k = R_f + \beta (R_m - R_f)$$

R_f = Risk Free Rate

β = Beta of Security

R_m = Market Return

$$= 9\% + 0.75 (15\% - 9\%) = 13.5\%$$

$$P = \frac{2.5 \times 1.1}{0.135 - 0.10} = \frac{2.75}{0.035} = ₹ 78.57$$

10. Saranam Ltd. has issued convertible debentures with coupon rate 12%. Each debenture has an option to convert to 20 equity shares at any time until the date of maturity. Debentures will be redeemed at Rs. 100 on maturity of 5 years. An investor generally requires a rate of return of 8% p.a. on a 5-year security. As an investor when will you exercise conversion for given market prices of the equity share of (i) Rs. 4, (ii) Rs. 5 and (iii) Rs. 6.

Cumulative PV factor for 8% for 5 years : 3.993

PV factor for 8% for year 5 : 0.681

Answer:

If Debentures are not converted its value is as under: -

	PVF @ 8 %	₹
Interest - ₹ 12 for 5 years	3.993	47.916
Redemption - ₹ 100 in 5 th year	0.681	<u>68.100</u>
		<u>116.016</u>

Value of equity shares:-

Market Price	No.	Total
₹ 4	20	₹ 80
₹ 5	20	₹ 100
₹ 6	20	₹ 120

Hence, unless the market price is ₹ 6 conversion should not be exercised.

11. ABC Ltd. has Rs. 300 million, 12 per cent bonds outstanding with six years remaining to maturity. Since interest rates are falling, ABC Ltd. is contemplating of refunding these bonds with a Rs. 300 million issue of 6 year bonds carrying a coupon rate of 10 per cent. Issue cost of the new bond will be Rs. 6 million and the call premium is 4 per cent. Rs. 9 million being the unamortized portion of issue cost of old bonds can be written off no

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sooner the old bonds are called off. Marginal tax rate of ABC Ltd. is 30 per cent. You are required to analyse the bond refunding decision.

Answer:

1. Calculation of initial outlay:-

	Rs. (million)
a. Face value	300
Add:-Call premium	<u>12</u>
Cost of calling old bonds	312

- b. Gross proceed of new issue 300
Less: Issue costs 6 Net proceeds of new issue 294

- c. Tax savings on call premium and unamortized cost $0.30 (12 + 9) 6.3$
∴ Initial outlay = Rs. 312 million – Rs. 294 million – Rs. 6.3 million = Rs. 11.7 million

2. Calculation of net present value of refunding the bond:-

Saving in annual interest expenses	Rs. (million)
$[300 \times (0.12 - 0.10)]$	6.00
Less:- Tax saving on interest and amortization	
$0.30 \times [6 + (9-6)/6]$	<u>1.95</u>
Annual net cash saving	<u>4.05</u>
PVIFA (7%, 6 years)	4.766
∴ Present value of net annual cash saving	Rs. 19.30 million
Less:- Initial outlay	<u>Rs. 11.70 million</u>
Net present value of refunding the bond	<u>Rs. 7.60 million</u>

Decision: The bonds should be refunded

PAST EXAMINATION, MTP & RTP QUESTIONS

12.

- a) The risk free rate of return is 5%. The expected rate of return on the market portfolio is 11%. The expected rate of growth in dividend of X Ltd. is 8%. The last dividend paid was Rs. 2.00 per share. The beta of X Ltd. equity stock is 1.5.

(i) What is the present price of the equity stock of X Ltd.?

(ii) How would the price change when:

- The inflation premium increases by 3%
- The expected growth rate decreases by 3% and

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- The beta decreases to 1.3.

[MAY 2018 → 4 MARKS]

- b) The risk-free rate of return R_f is 9 percent. The expected rate of return on the market portfolio R_m is 13 percent. The expected rate of growth for the dividend of Platinum Ltd. is 7 percent. The last dividend paid on the equity stock of firm A was Rs. 2.00. The beta of Platinum Ltd. equity stock is 1.2.

(i) Calculate the equilibrium price of the equity stock of Platinum Ltd.?

(ii) Also, calculate the equilibrium price when

- The inflation premium increases by 2 percent?
- The expected growth rate increases by 3 percent?
- The beta of Platinum Ltd. equity rises to 1.3?

[MTP → MARCH 2018 → 8 MARKS]

Answer:

a)

(i) Equilibrium price of Equity using CAPM

$$= 5\% + 1.5(11\% - 5\%)$$

$$= 5\% + 9\% = 14\%$$

$$P = \frac{D_1}{k_e - g} = \frac{2.00(1.08)}{0.14 - 0.08} = \frac{2.16}{0.06} = ₹ 36$$

(ii) New Equilibrium price of Equity using CAPM (assuming 3% on 5% is inflation increase)

$$= 5.15\% + 1.3(11\% - 5.15\%)$$

$$= 5.15\% + 7.61\% = 12.76\%$$

$$P = \frac{D_1}{k_e - g} = \frac{2.00(1.05)}{0.1276 - 0.05} = ₹ 27.06$$

Alternatively, it can also be computed as follows, assuming it is 3% in addition to 5%

$$= 8\% + 1.3(11\% - 8\%)$$

$$= 8\% + 3.9\% = 11.9\%$$

$$P = \frac{D_1}{k_e - g} = \frac{2.00(1.05)}{0.119 - 0.05} = ₹ 30.43$$

Alternatively, if all the factors are taken separately then solution of this part will be as follows:

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- (i) **Inflation Premium increase by 3%.**

This raises R_x to 17%. Hence, new equilibrium price will be:

$$= \frac{2.00(1.08)}{0.17 - 0.08} = ₹ 24$$

- (ii) **Expected Growth rate decrease by 3%.**

Hence, revised growth rate stand at 5%:

$$= \frac{2.00(1.05)}{0.14 - 0.05} = ₹ 23.33$$

- (iii) **Beta decreases to 1.3.**

Hence, revised cost of equity shall be:

$$= 5\% + 1.3(11\% - 5\%)$$

$$= 5\% + 7.8\% = 12.8\%$$

As a result New Equilibrium price shall be:

$$P = \frac{D_1}{k_e - g} = \frac{2.00(1.08)}{0.128 - 0.08} = ₹ 45$$

b)

- (i) **Equilibrium price of Equity using CAPM**

$$= 9\% + 1.2(13\% - 9\%)$$

$$= 9\% + 4.8\% = 13.8\%$$

$$P = \frac{D_1}{k_e - g} = \frac{2.00(1.07)}{0.138 - 0.07} = \frac{2.14}{0.068} = ₹ 31.47$$

- (ii) **New Equilibrium price of Equity using CAPM**

$$= 9.18\% + 1.3(13\% - 9.18\%)$$

$$= 9.18\% + 4.966\% = 14.146\%$$

$$P = \frac{D_1}{k_e - g} = \frac{2.00(1.10)}{0.14146 - 0.10} = \frac{2.20}{0.04146} = ₹ 53.06$$

Alternatively, it can also be computed as follows:

$$= 11\% + 1.3(15\% - 8\%)$$

$$= 11\% + 5.2\% = 16.20\%$$

$$P = \frac{D_1}{k_e - g} = \frac{2.00(1.10)}{0.162 - 0.10} = ₹ 35.48$$

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Alternatively, if all the factors are taken separately then solution will be as follows:

- (i) Inflation Premium increase by 3%. This raises R_x to 15.80%. Hence, new equilibrium price will be:

$$= \frac{2.00(1.07)}{0.158 - 0.07} = \text{Rs. } 24.32$$

- (ii) Expected Growth rate decrease by 3%. Hence, revised growth rate stands at 10%:

$$= \frac{2.00(1.10)}{0.138 - 0.10} = \text{Rs. } 57.89$$

- (iii) Beta decreases to 1.3. Hence, revised cost of equity shall be:

$$= 9\% + 1.3(13\% - 9\%)$$

$$= 9\% + 5.2\% = 14.2\%$$

As a result, New Equilibrium price shall be:

$$P = \frac{D_1}{k_e - g} = \frac{2.00(1.07)}{0.142 - 0.07} = \text{Rs. } 29.72$$

13. Tangent Ltd. is considering calling Rs. 3 crores of 30 years, Rs. 1,000 bond issued 5 years ago with a coupon interest rate of 14 per cent. The bonds have a call price of Rs. 1,150 and had initially collected proceeds of Rs. 2.91 crores since a discount of Rs. 30 per bond was offered. The initial floating cost was Rs. 3,90,000. The Company intends to sell Rs. 3 crores of 12 per cent coupon rate, 25 years bonds to raise funds for retiring the old bonds. It proposes to sell the new bonds at their par value of Rs. 1,000. The estimated floatation cost is Rs. 4,25,000. The company is paying 40% tax and its after tax cost of debt is 8 per cent. As the new bonds must first be sold and then their proceeds to be used to retire the old bonds, the company expects a two months period of overlapping interest during which interest must be paid on both the old and the new bonds. You are required to evaluate the bond retiring decision. [PVIFA 8%, 25 = 10.675]

[NOV 2018 → 8 MARKS]

Answer:

NPV for bond refunding

	₹
PV of annual cash flow savings (W.N. 2)	
(3,49,600 × PVIFA 8%, 25) i.e. 10.675	37,31,980
Less: Initial investment (W.N. 1)	31,15,000
NPV	<u>6,16,980</u>

Recommendation: Refunding of bonds is recommended as NPV is positive.

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Working Notes:

(1) Initial investment:

(a) Call premium		
Before tax $(1,150 - 1,000) \times 30,000$	45,00,000	
Less tax @ 40%	<u>18,00,000</u>	
After tax cost of call prem.		27,00,000
(b) Floatation cost		4,25,000
(c) Overlapping interest		
Before tax $(0.14 \times 2/12 \times 3 \text{ crores})$	7,00,000	
Less tax @ 40%	<u>2,80,000</u>	4,20,000
(d) Tax saving on unamortised discount on old bond $(25/30 \times 9,00,000 \times 0.4)$ (3,00,000)		
(e) Tax savings from unamortised floatation		
Cost of old bond $25/30 \times 3,90,000 \times 0.4$	<u>(1,30,000)</u>	
	<u>31,15,000</u>	

(2) Annual cash flow savings:

(a) Old bond		
(i) Interest cost $(0.14 \times 3 \text{ crores})$	42,00,000	
Less tax @ 40%	<u>16,80,000</u>	25,20,000
(ii) Tax savings from amortisation of discount $(9,00,000/30 \times 0.4)$		(12,000)
(iii) Tax savings from amortisation of floatation cost $(3,90,000/30 \times 0.4)$		<u>(5,200)</u>
Annual after tax cost payment under old Bond (A)		<u>25,02,800</u>
(b) New bond		
(i) Interest cost before tax $(0.12 \times 3 \text{ crores})$	36,00,000	
Less tax @ 40%	<u>14,40,000</u>	
After tax interest		21,60,000
(ii) Tax savings from amortisation of floatation cost $(0.4 \times 4,25,000/25)$		<u>(6,800)</u>
Annual after tax payment under new Bond (B)		<u>21,53,200</u>
Annual Cash Flow Saving (A) – (B)		<u>3,49,600</u>

14. Shares of Volga Ltd. are being quoted at a price-earning ratio of 8 times. The company retains 50% of its Earnings Per Share. The Company's EPS is Rs. 10.

You are required to determine:

(1) the cost of equity to the company if the market expects a growth rate of 15% p.a.

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- (2) the indicative market price with the same cost of capital and if the anticipated growth rate is 16% p.a.
(3) the market price per share if the company's cost of capital is 20% p.a. and the anticipated growth rate is 18% p.a.

[NOV 2018 → 8 MARKS]

Answer:

(1) Cost of Capital

Retained earnings (50%)	₹ 5 per share
Dividend (50%)	₹ 5 per share
EPS (100%)	₹ 10 per share (given)
P/E Ratio	8 times (given)
Market price	₹ 10 × 8 = ₹ 80 per share
Cost of equity capital	

$$= \left(\frac{\text{Div}}{\text{Price}} \times 100 \right) + \text{Growth \%} = \frac{₹ 5}{₹ 80} \times 100 + 15\% = 21.25\%$$

$$(2) \text{ Market Price} = \left(\frac{\text{Dividend}}{\text{Cost of Capital(\%)} - \text{Growth Rate(\%)}} \right)$$

$$= \frac{₹ 5}{(21.25 - 16)\%} = ₹ 95.24 \text{ per share}$$

$$(3) \text{ Market Price} = \frac{₹ 5}{(20 - 18)\%} = ₹ 250 \text{ per share}$$

Alternatively, if candidates have assumed the given figure of EPS as of last year then answer will be as follows:

(1) Cost of Capital

Retained earnings (50%)	₹ 5 per share
Dividend (50%)	₹ 5 per share
EPS (100%)	₹ 10 per share (given)
P/E Ratio	8 times (given)
Market price	₹ 10 × 8 = ₹ 80 per share
Cost of equity capital	

$$= \left(\frac{\text{Div}}{\text{Price}} \times 100 \right) + \text{Growth \%} = \frac{₹ 5(1.15)}{₹ 80} \times 100 + 15\% = 22.19\%$$

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$$(2) \text{ Market Price} = \left(\frac{\text{Dividend}}{\text{Cost of Capital}(\%) - \text{Growth Rate}(\%)} \right)$$

$$= \frac{₹ 5.75}{(22.19 - 16)\%} = ₹ 92.89 \text{ per share}$$

$$(3) \text{ Market Price} = \frac{₹ 5(1.18)}{(20 - 18)\%} = ₹ 295 \text{ per share}$$

15. Following details are available for X Ltd.

Income Statement for the year ended 31st March, 2018

Particulars	Amount
Sales	40,000
Gross Profit	12,000
Administrative Expenses	6,000
Profit Before tax	6,000
Tax @ 30%	1,800
Profit After Tax	4,200

Balance sheet as on 31st March, 2018

Particulars	Amount
Fixed Assets	10,000
Current Assets	6,000
Total Assets	16,000
Equity Share Capital	15,000
Sundry Creditors	1,000
Total Liabilities	16,000

The Company is contemplating for new sales strategy as follows :

- (i) Sales to grow at 30% per year for next four years.
- (ii) Assets turnover ratio, net profit ratio and tax rate will remain the same.
- (iii) Depreciation will be 15% of value of net fixed assets at the beginning of the year.
- (iv) Required rate of return for the company is 15%

Evaluate the viability of new strategy.

[NOV 2018 → 12 MARKS]

Answer:

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Projected Balance Sheet					
	Year 1	Year 2	Year 3	Year 4	Year 5
Fixed Assets (25% of Sales)	13,000	16,900	21,970	28,561.00	28,561.00
Current Assets (15% of Sales)	7,800	10,140	13,182	17,136.60	17,136.60
Total Assets	20,800	27,040	35,152	45,697.60	45,697.60
Equity (37.5% of sales)	19,500	25,350	32,955	42,841.50	42,841.50
Sundry Creditors (2.5% of Sales)	1,300	1,690	2,197	2,856.10	2,856.10
Total Liabilities	20,800	27,040	35,152	45,697.60	45,697.60

Projected Cash Flows:-

	Year 1	Year 2	Year 3	Year 4	Year 5
Sales	52,000	67,600	87,880.00	1,14,244.00	1,14,244.00
PBT (15% of sales)	7,800	10,140	13,182.00	17,136.60	17,136.60
PAT (10.5% of sales)	5,460	7,098	9,227.40	11,995.62	11,995.62
Depreciation	1,500	1,950	2,535.00	3,295.50	4,284.15
Addition to Fixed Assets	4,500	5,850	7,605.00	9,886.50	4,284.15
Increase in Net Current Assets	1,500	1,950	2,535.00	3,295.50	-
Operating cash flow	960	1,248	1,622.40	2,109.12	11,995.62

Projected Cash Flows:-

Present value of Projected Cash Flows:-

Cash Flows	PVF at 15%	PV
960	0.870	835.20
1248	0.756	943.49
1622.40	0.658	1067.54
2109.12	0.572	<u>1206.42</u>
		4,052.65

Residual Value = $11,995.62 / 0.15 = 79,970.80$
 Present value of Residual value = $79,970.80 \times \text{PVF} (15\%, 4)$
 = $79,970.80 \times 0.572 = 45,743.30$
 Total shareholders' value = $45,743.30 + 4,052.65 = 49,795.95$
 Pre-strategy value = $4200 / 0.15 = 28,000$
 $\therefore$ Value of strategy = $49,795.95 - 28,000 = 21,795.95$

Conclusion: The strategy is financially viable.

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16. The following data are available for three bonds A, B and C. These bonds are used by a bond portfolio manager to fund an outflow scheduled in 6 years. Current yield is 9%. All bonds have face value of Rs.100 each and will be redeemed at par. Interest is payable annually.

Bond	Maturity (Years)	Coupon rate
A	10	10%
B	8	11%
C	5	9%

- (i) Calculate the duration of each bond.
- (ii) The bond portfolio manager has been asked to keep 45% of the portfolio money in Bond A. Calculate the percentage amount to be invested in bonds B and C that need to be purchased to immunise the portfolio.
- (iii) After the portfolio has been formulated, an interest rate change occurs, increasing the yield to 11%. The new duration of these bonds are: Bond A = 7.15 Years, Bond B = 6.03 Years and Bond C = 4.27 years.

Is the portfolio still immunized? Why or why not?

- (iv) Determine the new percentage of B and C bonds that are needed to immunize the portfolio. Bond A remaining at 45% of the portfolio.

Present values be used as follows :

Present Values	t_1	t_2	t_3	t_4	t_5
$PVIF_{0.09, t}$	0.917	0.842	0.772	0.708	0.650

Present Values	t_6	t_7	t_8	T_9	t_{10}
$PVIF_{0.09, t}$	0.596	0.547	0.502	0.460	0.4224

[NOV 2018 → 12 MARKS]

Answer:

- (i) Calculation of Bond Duration

Bond A

Year	Cash flow	P.V. @ 9%		Proportion of bond value	Proportion of bond value x time (years)
1	10	0.917	9.17	0.086	0.086
2	10	0.842	8.42	0.079	0.158
3	10	0.772	7.72	0.073	0.219
4	10	0.708	7.08	0.067	0.268
5	10	0.650	6.50	0.061	0.305
6	10	0.596	5.96	0.056	0.336
7	10	0.547	5.47	0.051	0.357

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8	10	0.502	5.02	0.047	0.376
9	10	0.460	4.60	0.043	0.387
10	110	0.4224	46.46	0.437	4.370
			106.40	1.000	6.862

Duration of the bond is 6.862 years or 6.86 year

Bond B

Year	Cash flow	P.V. @ 9%		Proportion of bond value	Proportion of bond value x time (years)
1	11	0.917	10.087	0.091	0.091
2	11	0.842	9.262	0.083	0.166
3	11	0.772	8.492	0.076	0.228
4	11	0.708	7.788	0.070	0.280
5	11	0.650	7.150	0.064	0.320
6	11	0.596	6.556	0.059	0.354
7	11	0.547	6.017	0.054	0.378
8	111	0.502	55.772	0.502	4.016
			111.224	1.000	5.833

Duration of the bond B is 5.833 years or 5.84 years

Bond C

Year	Cash flow	P.V. @ 9%		Proportion of bond value	Proportion of bond value x time (years)
1	9	0.917	8.253	0.082	0.082
2	9	0.842	7.578	0.076	0.152
3	9	0.772	6.948	0.069	0.207
4	9	0.708	6.372	0.064	0.256
5	109	0.650	70.850	0.709	3.545
			100.00	1.000	4.242

Duration of the bond C is 4.242 years or 4.24 years

(ii) Amount of Investment required in Bond B and C

Period required to be immunized	6.000 Year
Less: Period covered from Bond A	3.087 Year
To be immunized from B and C	<u>2.913 Year</u>

Let proportion of investment in Bond B and C is b and c respectively then

$$\begin{aligned} b + c &= 0.55 & (1) \\ 5.883b + 4.242c &= 2.913 & (2) \end{aligned}$$

On solving these equations, the value of b and c comes 0.3534 or 0.3621 and 0.1966 or 0.1879 respectively and accordingly, the % of investment of B and C is 35.34% or 36.21% and 19.66 % or 18.79% respectively.

(iii) With revised yield the Revised Duration of Bond stands

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$$0.45 \times 7.15 + 0.36 \times 6.03 + 0.19 \times 4.27 = 6.20 \text{ year}$$

No portfolio is not immunized as the duration of the portfolio has been increased from 6 years to 6.20 years.

(iv) New percentage of B and C bonds that are needed to immunize the portfolio.

Period required to be immunized	6.0000 Year
Less: Period covered from Bond A	<u>3.2175 Year</u>
To be immunized from B and C	<u>2.7825 Year</u>

Let proportion of investment in Bond B and C is b and c respectively, then

$$\begin{aligned} b + c &= 0.55 \\ 6.03b + 4.27c &= 2.7825 \\ b &= 0.2466 \end{aligned}$$

On solving these equations, the value of b and c comes 0.2466 and 0.3034 respectively and accordingly, the % of investment of B and C is 24.66% or 25% and 30.34 % or 30.00% respectively.

17. The shares of G Ltd. are currently being traded at Rs. 46. The company published its results for the year ended 31st March 2019 and declared a dividend of Rs. 5. The company made a return of 15% on its capital and expects that to be the norm in which it operates. G Ltd. Also expects the dividends to grow at 10% for the first three years and thereafter at 5%.

You are required to advise whether the share of the company is being traded at a premium or discount.

PVIF @ 15% for the next 3 years is 0.870, 0.756 and 0.658 respectively.

[MAY 2019 → 8 MARKS]

Answer:

Expected dividend for next three years

$$\begin{aligned} \text{Year 1 (D1)} &= 5 (1.1) = 5.5 \\ \text{Year 2 (D2)} &= 5.5 (1.1) = 6.05 \\ \text{Year 3 (D3)} &= 6.05 (1.1) = 6.655 \end{aligned}$$

Required Rate (Ke) = 15%

$$\begin{aligned} \text{Present Value of Dividends} &= 5.5 (0.870) + 6.05 (0.756) + 6.655 (0.658) \\ &= 4.785 + 4.574 + 4.379 \end{aligned}$$

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$$= 13.74$$

Now, PV at growth rate of 5%

$$\begin{aligned} P_3 &= \frac{D_4}{K_e - g} \\ &= \frac{6.655(1.05)}{0.15 - 0.05} = \frac{6.988}{0.1} = 69.88 \end{aligned}$$

$$\text{Therefore, } P_0 = 69.88 \times 0.658 = 45.98$$

Now, adding the PV of dividend at two different growth rates, we get,
 $13.74 + 45.98 = 59.72$

Hence, it is clear that shares are being traded at discount i.e. undervalued because intrinsic value of share is more than the market price.

18. ABB Ltd. has a surplus cash balance of Rs. 180 lakhs and wants to distribute 50% of it to the equity shareholders. The company decides to buyback equity shares. The company estimates that its equity share price after re-purchase is likely to be 15% above the buyback price. if the buyback route is taken.

Other information is as under:

- 1. Number of equity shares outstanding at present (Face value Rs. 10 each) is Rs. 20 lakhs.**
- 2. The current EPS is Rs. 5.**

You are required to calculate the following:

- I. The price at which the equity shares can be re-purchased, if market capitalization of the company should be Rs. 400 lakhs after buy back.**
- II. Number of equity shares that can be re-purchased.**
- III. The impact of equity shares re-purchase on the EPS, assuming that the net income remains unchanged.**

[MAY 2019 → 8 MARKS]

Answer:

- (i) Let P be the buyback price decided by ABB Ltd.**

$$\begin{aligned} \text{Market Capitalisation after Buyback} \\ 400 \text{ lakhs} &= 1.15P (\text{Original Shares} - \text{Shares Bought Back}) \end{aligned}$$

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$$= 1.15P \left(20 \text{ lakhs} - \frac{50\% \text{ of } 180 \text{ lakhs}}{P} \right)$$

$$= 23 \text{ lakhs} \times P - 90 \text{ lakhs} \times 1.15$$

$$= 23 \text{ lakhs } P - 130.50 \text{ lakhs}$$

Again, $23 \text{ lakhs } P - 130.50 \text{ lakhs}$

or $23 \text{ lakhs } P = 400 \text{ lakhs} + 130.50 \text{ lakhs}$

or $P = \frac{503.50}{23} = ₹ 21.89 \text{ per share}$

- (ii) Number of Shares to be Bought Back :-
Rs. 90 lakhs/ 21.89 = 4.111 lakhs (Approx.) or 411147 shares
- (iii) Shares after buyback
= 20 lakhs – 4.111 lakhs = 15.889 lakhs
or 20,00,000 – 4,11,147 = 15,88,853 shares
∴ EPS = 5 x 20 lakhs/ 15.889 lakhs = Rs. 6.29
Thus, EPS of ABB Ltd., increases to Rs. 6.29.
So, EPS of ABB Ltd. is increased by Rs. 1.29 (6.29 – 5.00)

19. Following financial information's are available of XP Ltd. for the year 2018:

Equity Share Capital (₹ 10 each)	₹ 200 Lakh
Reserves and Surplus	₹ 600 Lakh
10% Debentures (₹ 100 each)	₹ 350 Lakh
Total Assets	₹ 1200 Lakh
Assets Turnover Ratio	2 times
Tax Rate	30%
Operating Margin	10%
Dividend Payout Ratio	20%
Current Market Price per Equity Share	₹ 28
Required Rate of Return of Investors	18%

You are required to:

- Prepare Income Statement for the year 2018.
- Determine its Sustainable Growth Rate.
- Determine the fair price of the company's share using Dividend Discount Model.
- Give your opinion on investment in the company's share at current price.

[MAY 2019 → 8 MARKS]

Answer:

CHAPTER 4:
SECURITY VALUATION

Workings:

Asset turnover ratio	= 2 times
Total Assets	= Rs. 1200 lakh
Turnover Rs. 1200 lakhs × 2	= Rs. 2400 lakhs
Interest on Debentures	= 350 lakh × 10% = 35 lakhs
Operating Margin	= 10%
Hence operating cost	= (1 - 0.10) 2400 lakhs = Rs. 2160 lakhs
Dividend Payout	= 20%
Tax rate	= 30%

(i) **Income statement**

	(₹ Lakhs)
Sale	2400
Operating Exp	<u>2160</u>
EBIT	240
Interest	<u>35</u>
EBT	205
Tax @ 30%	<u>61.5</u>
EAT	143.5
Dividend @ 20%	<u>28.7</u>
Retained Earnings	<u>114.8</u>

(ii) SGR = Return on Equity (1- Dividend Payout Ratio)
= ROE (1-b)

$$ROE = \frac{PAT}{NW} \text{ and NW} = \text{Rs. 200 lakh} + \text{Rs. 600 lakh} = \text{Rs. 800 lakh}$$

$$ROE = \frac{\text{Rs. 143.5 lakhs}}{\text{Rs. 800 lakhs}} \times 100 = 17.94\%$$

$$SGR = 0.1794 (1 - 0.20) = 14.35\% \text{ or } \frac{0.1794 \times 0.80}{1 - 0.1794 \times 0.80} = \frac{0.14352}{0.85648} = 16.76\%$$

(iii) Calculation of fair price of share using dividend discount model

$$P_0 = \frac{D_0 (1+g)}{k_e - g}$$

$$\text{Dividends} = \frac{\text{₹ 28.7 lakhs}}{20 \text{ lakhs}} = \text{₹ 1.435}$$

$$\text{Growth Rate} = 14.35\% \text{ or } 16.76\%$$

$$\text{Hence } P_0 = \frac{\text{₹ 1.435}(1+0.1435)}{0.18-0.1435} = \frac{\text{₹ 1.64}}{0.0365} = \text{₹ 44.93 or 44.96}$$

$$\text{or } \frac{1.435(1+0.1676)}{0.18-0.1676} = \frac{\text{₹ 1.676}}{0.0124} = \text{₹ 135.16 or 135.12}$$

(iv) Since the current market price of share is ₹ 28, the share is undervalued. Hence, the investor should invest in the company.

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

20. SAM Ltd. has just paid a dividend of Rs. 2 per share and it is expected to grow @ 6% p.a. After paying dividend, the Board declared to take up a project by retaining the next three annual dividends. It is expected that this project is of same risk as the existing projects. The results of this project will start coming from the 4th year onward from now. The dividends will then be Rs. 2.50 per share and will grow @ 7% p.a.

An investor has 1,000 shares in SAM Ltd. and wants a receipt of atleast Rs. 2,000 p.a. from this investment.

Evaluate whether the market value of the share is affected by the decision of the Board. Evaluate also as to how the investor can maintain his target receipt from the investment for first 3 years and improved income thereafter, given that the cost of capital of the firm is 8%

[MTP → MARCH 2018 → 7 MARKS | RTP → MAY 2018]

Answer:

$$\begin{aligned} \text{Value of share at present} &= \frac{D_1}{k_e - g} \\ &= \frac{2(1.06)}{0.08 - 0.06} = ₹ 106 \end{aligned}$$

However, if the Board implement its decision, no dividend would be payable for 3 years and the dividend for year 4 would be ₹ 2.50 and growing at 7% p.a. The price of the share, in this case, now would be:

$$P_0 = \frac{2.50}{0.08 - 0.07} \times \frac{1}{(1 + 0.08)^3} = ₹ 198.46$$

So, the price of the share is expected to increase from ₹ 106 to ₹ 198.45 after the announcement of the project. The investor can take up this situation as follows:

Expected market price after 3 years	$= \frac{2.50}{0.08 - 0.07}$	₹ 250.00
Expected market price after 2 years	$\frac{2.50}{0.08 - 0.07} \times \frac{1}{(1 + 0.08)}$	₹ 231.48
Expected market price after 1 years	$\frac{2.50}{0.08 - 0.07} \times \frac{1}{(1 + 0.08)^2}$	₹ 214.33

In order to maintain his receipt at ₹ 2,000 for first 3 year, he would sell

10 shares in first year @ ₹ 214.33 for	₹ 2,143.30
9 shares in second year @ ₹ 231.48 for	₹ 2,083.32
8 shares in third year @ ₹ 250 for	₹ 2,000.00

CHAPTER 4:
SECURITY VALUATION

At the end of 3rd year, he would be having 973 shares valued @ ₹ 250 each i.e. ₹ 2,43,250. On these 973 shares, his dividend income for year 4 would be @ ₹ 2.50 i.e. ₹ 2,432.50.

So, if the project is taken up by the company, the investor would be able to maintain his receipt of at least ₹ 2,000 for first three years and would be getting increased income thereafter.

21. A hypothetical company ABC Ltd. issued a 10% Debenture (Face Value of Rs. 1000) of the duration of 10 years is currently trading at Rs. 850 per debenture. The bond is convertible into 50 equity shares being currently quoted at Rs. 17 per share.

Calculate the spread of yield of the above bond from this comparable bond, if equivalent yield of the same is 11.80%.

The relevant present value table is as follows.

Present Values	t ₁	t ₂	t ₃	t ₄	t ₅	t ₆	t ₇	t ₈	t ₉	t ₁₀
PVIF _{0.11, t}	0.901	0.812	0.731	0.659	0.593	0.535	0.482	0.434	0.391	0.352
PVIF _{0.13, t}	0.885	0.783	0.693	0.613	0.543	0.480	0.425	0.376	0.333	0.295

[MTP → MARCH 2018 / APRIL 2019 → 5 MARKS / 7 MARKS | RTP → NOV 2019]

Answer:

Conversion Price = Rs. 50 x 17 = Rs. 850

Intrinsic Value = Rs. 850

Accordingly the yield (r) on the bond shall be :

Rs. 850 = Rs. 100 PVAF (r, 10) + Rs. 1000 PVF (r, 10)

Let us discount the cash flows by 11%

850 = 100 PVAF (11%, 10) + 1000 PVF (11%, 10)

850 = 100 x 5.889 + 1000 x 0.295

= 90.90

Let us discount the cash flows by 11%

850 = 100 PVAF (11%, 10) + 1000 PVF (11%, 10)

850 = 100 x 5.889 + 1000 x 0.352

= 90.90

Now let us discount the cash flows by 13%

850 = 100 PVAF (13%, 10) + 1000 PVF (13%, 10)

850 = 100 x 5.426 + 1000 x 0.295

= -12.40

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

Accordingly, IRR

$$11\% + \frac{90.90}{90.90 - (-12.40)} \times (13\% - 11\%)$$

$$11\% + \frac{90.90}{103.30} \times (13\% - 11\%)$$

$$= 12.76\%$$

The spread from comparable bond = 12.76% - 11.80% = 0.96%

22. Abhishek Ltd. has a surplus cash of Rs.90 lakhs and wants to distribute 30% of it to the shareholders. The Company decides to buyback shares. The Finance Manager of the Company estimates that its share price after re-purchase is likely to be 10% above the buyback price; if the buyback route is taken. The number of shares outstanding at present is 10 lakhs and the current EPS is Rs.3.

Evaluate:

- (i) The price at which the shares can be repurchased, if the market capitalization of the company should be Rs.200 lakhs after buyback. (4 Marks)
- (ii) The number of shares that can be re-purchased. (1 Mark)
- (iii) The impact of share re-purchase on the EPS, assuming the net income is same. (2 Marks)

[MTP → APRIL 2018]

Answer:

Calculation of Number of GDR to be issued and Cost of GDR to Odessa Ltd

Net Issue Size = \$15 million

$$\text{Gross Issue} = \frac{\$15 \text{ million}}{0.98} = \$15.306 \text{ million}$$

Issue Price per GDR in Rs. (300 x 3 x 90%) Rs. 810

Issue Price per GDR in \$ (Rs. 810/ Rs. 60) \$13.50

Dividend Per GDR (D_1) = Rs. 2* x 3 = Rs. 6

* Assumed to be on based on Face Value of Rs. 10 each share.

Net Proceeds Per GDR = Rs. 810 x 0.98 = Rs. 793.80

(a) Number of GDR to be issued

$$\frac{\$15.306 \text{ million}}{\$13.50} = 1.1338 \text{ million}$$

(b) Cost of GDR to Odessa Ltd.

$$k_e = \frac{6.00}{793.80} + 0.20 = 20.76\%$$

CHAPTER 4: SECURITY VALUATION

23. ABC Ltd. issued 9%, 5 year bonds of Rs. 1,000/- each having a maturity of 3 years. The present rate of interest is 12% for one year tenure. It is expected that Forward rate of interest for one year tenure is going to fall by 75 basis points and further by 50 basis points for every next year in further for the same tenure. This bond has a beta value of 1.02 and is more popular in the market due to less credit risk.

Calculate

- (i) Intrinsic value of bond (4 Marks)
- (ii) Expected price of bond in the market (1 Mark)

[MTP → APRIL 2018]

Answer:

(i) Calculation of Intrinsic value of Bond

PV of Interest + PV of Maturity Value of Bond

Forward rate of interests

1st Year 12%

2nd Year 11.25%

3rd Year 10.75%

$$\text{PV of interest} = \frac{\text{Rs.90}}{(1+0.12)} + \frac{\text{Rs.90}}{(1+0.12)(1+0.1125)} + \frac{\text{Rs.90}}{(1+0.12)(1+0.1125)(1+0.1075)} = \text{Rs. 217.81}$$

$$\text{PV of Maturity Value of Bond} = \frac{\text{Rs.1000}}{(1+0.12)(1+0.1125)(1+0.1075)} = \text{Rs. 724.67}$$

$$\text{Intrinsic value of Bond} = \text{Rs. 217.81} + \text{Rs. 724.67} = \text{Rs. 942.48}$$

(ii) Calculation of Expected Price in the bond market

Expected Price = Intrinsic Value x Beta Value

$$= \text{Rs. 942.48} \times 1.02 = \text{Rs. 961.33}$$

24. Mr. A will need Rs. 1,00,000 after two years for which he wants to make one time necessary investment now. He has a choice of two types of bonds. Their details are as below:

	Bond X	Bond Y
Face value	Rs. 1,000	Rs. 1,000
Coupon	7% payable annually	8% payable annually
Years to maturity	1	4
Current price	Rs. 972.73	Rs. 936.52
Current yield	10%	10%

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

Advice Mr. A whether he should invest all his money in one type of bond or he should buy both the bonds and, if so, in which quantity? Assume that there will not be any call risk or default risk.

[MTP → AUGUST 2018 → 6 MARKS]

Answer:

Duration of Bond X

Year	Cash flow	P.V. @ 10%		Proportion of bond value	Proportion of bond value x time (years)
1	1070	.909	972.63	1.000	1.000

Duration of the Bond is 1 year

Duration of Bond Y

Year	Cash flow	P.V. @ 10%		Proportion of bond value	Proportion of bond value x time (years)
1	80	.909	72.72	0.077	0.077
2	80	.826	66.08	0.071	0.142
3	80	.751	60.08	0.064	0.192
4	1080	.683	<u>737.64</u>	<u>0.788</u>	<u>3.152</u>
			<u>936.52</u>	<u>1.000</u>	<u>3.563</u>

Duration of the Bond is 3.563 years

Let x_1 be the investment in Bond X and therefore investment in Bond Y shall be $(1 - x_1)$. Since the required duration is 2 year the proportion of investment in each of these two securities shall be computed as follows:

$$2 = x_1 + (1 - x_1) 3.563$$

$$x_1 = 0.61$$

Accordingly, the proportion of investment shall be 61% in Bond X and 39% in Bond Y respectively.

Amount of investment

Bond X	Bond Y
PV of Rs. 1,00,000 for 2 years @ 10% x 61%	PV of Rs. 1,00,000 for 2 years @ 10% x 39%
= Rs. 1,00,000 (0.826) x 61%	= Rs. 1,00,000 (0.826) x 39%
= Rs. 50,386	= Rs. 32,214
No. of Bonds to be purchased	No. of Bonds to be purchased
= Rs. 50,386/Rs. 972.73 = 51.79 i.e. approx. 52 bonds	= Rs. 32,214/Rs. 936.52 = 34.40 i.e. approx. 34 bonds

Note: The investor has to keep the money invested for two years. Therefore, the investor can invest in both the bonds with the assumption that Bond X will be reinvested for another one year on same returns.

25. GHI Ltd., AAA rated company has issued, fully convertible bonds on the following terms, a year ago

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Face value of bond	Rs. 1000
Coupon (interest rate)	8.5%
Time to Maturity (remaining)	3 years
Interest Payment	Annual, at the end of year
Principal Repayment	At the end of bond maturity
Conversion ratio (Number of shares per bond)	25
Current market price per share	Rs. 45
Market price of convertible bond	Rs. 1175

AAA rated company can issue plain vanilla bonds without conversion option at an interest rate of 9.5%.

Required: Calculate as of today:

- Straight Value of bond.
- Conversion Value of the bond.
- Conversion Premium.
- Percentage of downside risk.
- Conversion Parity Price.

t	1	2	3
PVIF _{0.095, t}	0.9132	0.8340	0.7617

[MTP → AUGUST 2018 → 8 MARKS]

Answer:

- Straight Value of Bond

$$\text{Rs. } 85 \times 0.9132 + \text{Rs. } 85 \times 0.8340 + \text{Rs. } 1085 \times 0.7617 = \text{Rs. } 974.96$$

- Conversion Value

$$\begin{aligned} &\text{Conversion Ratio} \times \text{Market Price of Equity Share} \\ &= \text{Rs. } 45 \times 25 = \text{Rs. } 1,125 \end{aligned}$$

- Conversion Premium

$$\text{Conversion Premium} = \text{Market Conversion Price} - \text{Market Price of Equity Share}$$

$$= \frac{\text{Rs. } 1,175}{25} - \text{Rs. } 45 = \text{Rs. } 2$$

$$\text{or } = \text{Rs. } 1,175 - \text{Rs. } 45 \times 25 = \text{Rs. } 50$$

$$\text{or } \frac{\text{Rs. } 1,175 - \text{Rs. } 1,125}{\text{Rs. } 1,125} = 4.47\%$$

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

(iv) Percentage of Downside Risk

$$= \frac{\text{Rs. } 1,175 - \text{Rs. } 974.96}{\text{Rs. } 974.96} \times 100 = 20.52\% \text{ or } \frac{\text{Rs. } 1,175 - \text{Rs. } 974.96}{\text{Rs. } 1,175} = 17.02\%$$

(v) Conversion Parity Price

$$\frac{\text{Bond Price}}{\text{No. of Share on Conversion}} = \frac{\text{Rs. } 1,175}{25} = \text{Rs. } 47$$

26. Mr. A is thinking of buying shares at Rs. 500 each having face value of Rs. 100. He is expecting a bonus at the ratio of 1:5 during the fourth year. Annual expected dividend is 20% and the same rate is expected to be maintained on the expanded capital base. He intends to sell the shares at the end of seventh year at an expected price of Rs. 900 each. Incidental expenses for purchase and sale of shares are estimated to be 5% of the market price. He expects a minimum return of 12% per annum.

Recommend whether Mr. A should buy the shares? If so, what maximum price should he pay for each share? Assume no tax on dividend income and capital gain

[MTP → APRIL 2019 → 6 MARKS | RTP → NOV 2019]

Answer:

P.V. of dividend stream and sales proceeds

Year	Divd. /Sale	PVF (12%)	PV (Rs.)
1	Rs. 20/-	0.893	17.86
2	Rs. 20/-	0.797	15.94
3	Rs. 20/-	0.712	14.24
4	Rs. 24/-	0.636	15.26
5	Rs. 24/-	0.567	13.61
6	Rs. 24/-	0.507	12.17
7	Rs. 24/-	0.452	10.85
7	Rs. 1026/- (Rs. 900 x 1.2 x 0.95)	0.452	463.75
			Rs. 563.68
	Less : Cost of Share (Rs. 500 x 1.05)		Rs. 525.00
	Net gain		Rs. 38.68

Since Mr. A is gaining Rs. 38.68 per share, he should buy the share.

Maximum price Mr. A should be ready to pay is Rs. 563.68 which will include incidental expenses.

So the maximum price should be Rs. 563.68 x 100/105 = Rs. 536.84

CHAPTER 4: SECURITY VALUATION

27. The following data is available for a bond:

Face Value	Rs. 1,000
Coupon Rate	11%
Years to Maturity	6
Redemption Value	Rs. 1,000
Yield to Maturity	15%

(Round-off your answers to 3 decimals)

Calculate the following in respect of the bond:

- (i) Current Market Price.
- (ii) Duration of the Bond.
- (iii) Volatility of the Bond.
- (iv) Expected market price if increase in required yield is by 100 basis points.
- (v) Expected market price if decrease in required yield is by 75 basis points.

[MTP → APRIL 2019 → 8 MARKS]

Answer:

- (i) Calculation of Market price:

$$TM = \frac{\text{Coupon interest} + \left(\frac{\text{Discount or premium}}{\text{Years left}} \right)}{\frac{\text{Face Value} + \text{Market value}}{2}}$$

Discount or premium – YTM is more than coupon rate, market price is less than Face Value i.e. at discount.

Let x be the market price

$$0.15 = \frac{110 + \left\{ \frac{(1,000 - x)}{6} \right\}}{\frac{1,000 + x}{2}}$$

$$x = \text{Rs. } 834.48$$

Alternatively, it can also be calculated using Tabular Method.

- (ii) Duration

Year	Cash flow	P.V. @ 15%		Proportion of bond value	Proportion of bond value x time (years)
1	110	.870	95.70	0.113	0.113
2	110	.756	83.16	0.098	0.196
3	110	.658	72.38	0.085	0.255
4	110	.572	62.92	0.074	0.296

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

5	110	.497	54.67	0.064	0.320
6	1110	.432	<u>479.52</u>	<u>0.565</u>	<u>3.39</u>
			<u>848.35</u>	<u>1.000</u>	<u>4.570</u>

Duration of the Bond is 4.570 years

(iii) Volatility

$$\text{Volatility of the bond} = \frac{\text{Duration}}{(1 + \text{yields})} = \frac{4.570}{1.15} = 3.974$$

(iv) The expected market price if increase in required yield is by 100 basis points.

$$= \text{Rs. } 834.48 \times 1.00 (3.974/100) = \text{Rs. } 33.162$$

Hence expected market price is Rs. 834.48 – Rs. 33.162 = Rs. 801.318

Alternatively, this can also be calculated as follows:

$$\text{Rs. } 848.35 \times 100 (3.794/100) = 33.71$$

Hence, expected market price is 848.48 – 33.71 = 814.77

Thus, the market price will decrease.

(v) The expected market price if decrease in required yield is by 75 basis points.

$$= \text{Rs. } 834.48 \times 0.75 (3.974/100) = \text{Rs. } 24.87$$

Hence expected market price is Rs. 834.48 + Rs. 24.87 = Rs. 859.35

Alternatively, this can also be calculated as follows:

$$848.35 \times 0.75 (3.974/100) = 25.29$$

Hence, expected market price = 848.35 – 25.29 = Rs. 823.06

Thus, the market price will increase.

28. ABC Co. is considering a new sales strategy that will be valid for the next 4 years. They want to know the value of the new strategy. Following information relating to the year which has just ended, is available:

Income Statement	Rs.
Sales	20,000
Gross margin (20%)	4,000
Administration, Selling & distribution expense (10%)	2,000
PBT	2,000
Tax (30%)	600
PAT	1,400
Balance Sheet Information	
Fixed Assets	8,000
Current Assets	4,000
Equity	12,000

If it adopts the new strategy, sales will grow at the rate of 20% per year for three years. The gross margin ratio, Assets turnover ratio, the Capital structure and the income tax rate will remain unchanged.

CHAPTER 4:
SECURITY VALUATION

Depreciation would be at 10% of net fixed assets at the beginning of the year.

The Company's target rate of return is 15%.

Calculate the incremental value due to adoption of the strategy.

[MTP → APRIL 2019 → 8 MARKS | RTP → MAY 2020]

Answer:

Projected Balance Sheet				
	Year 1	Year 2	Year 3	Year 4
Fixed Assets (40% of Sales)	9,600	11,520	13,824	13,824
Current Assets (20% of Sales)	4,800	5,760	6,912	6,912
Total Assets	14,400	17,280	20,736	20,736
Equity	14,400	17,280	20,736	20,736

Projected Cash Flows:-

	Year 1	Year 2	Year 3	Year 4
Sales	24,000	28,800	34,560	34,560
PBT (10% of sale)	2,400	2,880	3,456	3,456
PAT (70%)	1,680	2,016	2,419.20	2,419.20
Depreciation	800	960	1,152	1,382
Addition to Fixed Assets	2,400	2,880	3,456	1,382
Increase in Current Assets	800	960	1,152	-
Operating cash flow (FCFF)	(720)	(864)	(1,036.80)	2,419.20

Projected Cash Flows:-

Present value of Projected Cash Flows:-

Cash Flows	PVF at 15%	PV
-720	0.870	-626.40
-864	0.756	-653.18
-1,036.80	0.658	-682.21
		-1,961.79

Residual Value - $2419.20/0.15 = 16,128$

Present value of Residual value = $16128/(1.15)^3$
= $16128/1.521 = 10603.55$

Total shareholders' value = $10,603.55 - 1,961.79 = 8,641.76$

Pre strategy value = $1,400 / 0.15 = 9,333.33$

∴ Value of strategy = $8,641.76 - 9,333.33 = -691.57$

Conclusion: The strategy is not financially viable

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

29.X Limited, just declared a dividend of Rs. 14.00 per share. Mr. B is planning to purchase the share of X Limited, anticipating increase in growth rate from 8% to 9%, which will continue for three years. He also expects the market price of this share to be Rs. 360.00 after three years.

You are required to calculate:

- the maximum amount Mr. B should pay for shares, if he requires a rate of return of 13% per annum.
- the maximum price Mr. B will be willing to pay for share, if he is of the opinion that the 9% growth can be maintained indefinitely and require 13% rate of return per annum.
- the price of share at the end of three years, if 9% growth rate is achieved and assuming other conditions remaining same as in (ii) above.

Calculate rupee amount up to two decimal points.

	Year-1	Year-2	Year-3
FVIF @ 9%	1.090	1.188	1.295
FVIF @ 13%	1.130	1.277	1.443
PVIF @ 13%	0.885	0.783	0.693

[MTP → OCTOBER 2019 → 7 MARKS]

Answer:

- (i) Expected dividend for next 3 years.

$$\text{Year 1 (D}_1\text{)} \quad \text{Rs. 14.00 (1.09)} = \text{Rs. 15.26}$$

$$\text{Year 2 (D}_2\text{)} \quad \text{Rs. 14.00 (1.09)}^2 = \text{Rs. 16.63}$$

$$\text{Year 3 (D}_3\text{)} \quad \text{Rs. 14.00 (1.09)}^3 = \text{Rs. 18.13}$$

$$\text{Required rate of return} = 13\% (\text{Ke})$$

$$\text{Market price of share after 3 years} = (\text{P}_3) = \text{Rs. 360}$$

The present value of share

$$P_0 = \frac{D_1}{(1+ke)} + \frac{D_2}{(1+ke)^2} + \frac{D_3}{(1+ke)^3} + \frac{P_3}{(1+ke)^3}$$

$$P_0 = \frac{15.26}{(1+0.13)} + \frac{16.63}{(1+0.13)^2} + \frac{18.13}{(1+0.13)^3} + \frac{360}{(1+0.13)^3}$$

$$P_0 = 15.26(0.885) + 16.63(0.783) + 18.13(0.693) + 360(0.693)$$

$$P_0 = 13.50 + 13.02 + 12.56 + 249.48$$

CHAPTER 4:
SECURITY VALUATION

$$P_0 = \text{Rs. } 288.56$$

- (ii) If growth rate 9% is achieved for indefinite period, then maximum price of share should Mr. A willing be to pay is

$$P_0 = \frac{D_1}{(k_e - g)} = \frac{\text{₹ } 15.26}{0.13 - 0.09} = \frac{\text{₹ } 15.26}{0.04} = \text{Rs. } 381.50$$

- (iii) Assuming that conditions mentioned above remain same, the price expected after 3 years will be:

$$P_3 = \frac{D_4}{k_e - g} = \frac{D_3(1.09)}{0.13 - 0.09} = \frac{18.13 \times 1.09}{0.04} = \frac{19.76}{0.04} = \text{Rs. } 494$$

30. XL Ispat Ltd. has made an issue of 14 per cent non-convertible debentures on January 1, 2007. These debentures have a face value of Rs. 100 and is currently traded in the market at a price of Rs. 90. Interest on these NCDs will be paid through post-dated cheques dated June 30 and December 31.

Interest payments for the first 3 years will be paid in advance through postdated cheques while for the last 2 years post-dated cheques will be issued at the third year. The bond is redeemable at par on December 31, 2011 at the end of 5 years.

Required:

- (i) **CALCULATE** the current yield and YTM of the bond.
(ii) **CALCULATE** the duration of the NCD.
(iii) **CALCULATE** the realized yield on the NCD assuming that intermediate coupon payments are, not available for reinvestment calculate.

[RTP → MAY 2018]

Answer:

(i) Current yield = $\frac{\text{₹ } 7}{\text{₹ } 90} \times \frac{12}{6} = 0.1555$ or 15.55%

YTM can be determined from the following equation

$$7 \times \text{PVIFA}(\text{YTM}, 10) + 100 \times \text{PVIF}(\text{YTM}, 10) = 90$$

Let us discount the cash flows using two discount rates 7.50% and 9% as follows:

Year	Cash Flows	PVF@7.50%	PV@7.50%	PVF@9%	PV@9%
0	-90	1	-90	1	-90
1	7	0.930	6.51	0.917	6.419
2	7	0.865	6.055	0.842	5.894
3	7	0.805	5.635	0.772	5.404
4	7	0.749	5.243	0.708	4.956
5	7	0.697	4.879	0.650	4.550
6	7	0.648	4.536	0.596	4.172

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7	7	0.603	4.221	0.547	3.829
8	7	0.561	3.927	0.502	3.514
9	7	0.522	3.654	0.460	3.220
10	107	0.485	51.90	0.422	45.154
			6.560		-2.888

Now we use interpolation formula

$$7.50\% + \frac{6.560}{6.560 - (-2.888)} \times 1.50\%$$

$$7.50\% + \frac{6.560}{9.448} \times 1.50\% = 7.50\% + 1.041\%$$

YTM = 8.541% say 8.54%

Note: Students can also compute the YTM using rates other than 15% and 18%.

(ii) The duration can be calculated as follows:

Year	Cash Flow	PVF@ 8.54%	PV @ 8.54%	Proportion of NCD value	Proportion of NCD value × time
1	7	0.921	6.447	0.0717	0.0717
2	7	0.849	5.943	0.0661	0.1322
3	7	0.782	5.474	0.0608	0.1824
4	7	0.721	5.047	0.0561	0.2244
5	7	0.664	4.648	0.0517	0.2585
6	7	0.612	4.284	0.0476	0.2856
7	7	0.563	3.941	0.0438	0.3066
8	7	0.519	3.633	0.0404	0.3232
9	7	0.478	3.346	0.0372	0.3348
10	107	0.441	47.187	0.5246	5.2460
			89.95		7.3654

Duration = 7.3654 half years i.e. 3.683 years.

(iii) Realized Yield can be calculated as follows:

$$\frac{(7 \times 10) + 100}{(1 + R)^{10}} = 90$$

$$(1 + R)^{10} = \frac{170}{90}$$

$$R = \left(\frac{170}{90} \right)^{1/10} - 1 = 0.06380 \text{ or } 6.380\% \text{ for half yearly and } 12.76\% \text{ annually.}$$

31. ABC Limited's shares are currently selling at Rs. 13 per share. There are 10,00,000 shares outstanding. The firm is planning to raise Rs. 20 lakhs to Finance a new project.

CHAPTER 4:
SECURITY VALUATION

- (i) CALCULATE the ex-right price of shares and the value of a right, if the firm offers one right share for every two shares held.
- (ii) CALCULATE the ex-right price of shares and the value of a right, if the firm offers one right share for every four shares held.
- (iii) ANALYSE how does the shareholders' wealth change from (i) to (ii) above and right issue increases shareholders' wealth?

[RTP → NOV 2018]

Answer:

- (i) Number of shares to be issued: 5,00,000

Subscription price ₹ 20,00,000 / 5,00,000 = ₹ 4

$$\text{Ex-right Price} = \frac{\text{₹ } 1,30,00,000 + \text{₹ } 20,00,000}{15,00,000} = \text{₹ } 10$$

$$\text{Value of right} = \frac{\text{₹ } 10 - \text{₹ } 4}{2} = 3$$

$$\text{Or} \quad = \text{₹ } 10 - \text{₹ } 4 = \text{₹ } 6$$

- (ii) Subscription price ₹ 20,00,000 / 2,50,000 = ₹ 8

$$\text{Ex-right Price} = \frac{\text{₹ } 1,30,00,000 + \text{₹ } 20,00,000}{12,50,000} = \text{₹ } 12$$

$$\text{Value of right} = \frac{\text{₹ } 12 - \text{₹ } 8}{4} = \text{₹ } 1$$

$$\text{Or} \quad = \text{₹ } 12 - \text{₹ } 8 = \text{₹ } 4$$

- (iii) The effect of right issue on wealth of Shareholder's wealth who is holding, say 100 shares.

- (a) When firm offers one share for two shares held.

Value of Shares after right issue (150 X ₹ 10) ₹ 1,500

Less: Amount paid to acquire right shares (50X₹4) ₹ 200

₹1,300

- (b) When firm offers one share for every four shares held.

Value of Shares after right issue (125 X ₹ 12) ₹ 1,500

Less: Amount paid to acquire right shares (25X₹8) ₹ 200

₹1,300

- (c) Wealth of Shareholders before Right Issue

₹1,300

Thus, there will be no change in the wealth of shareholders from (i) and (ii).

32. Based on the credit rating of bonds, Mr. Z has decided to apply the following discount rates for valuing bonds:

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Credit Rating

AAA

AA

A

Discount Rate

364 day T bill rate + 3% spread

AAA + 2% spread

AAA + 3% spread

He is considering to invest in AA rated, Rs. 1,000 face value bond currently selling at Rs. 1,025.86. The bond has five years to maturity and the coupon rate on the bond is 15% p.a. payable annually. The next interest payment is due one year from today and the bond is redeemable at par. (Assume the 364 day T-bill rate to be 9%).

You are required to calculate the intrinsic value of the bond for Mr. Z. Should he invest in the bond? Also calculate the current yield and the Yield to Maturity (YTM) of the bond.

[RTP → MAY 2019]

Answer:

The appropriate discount rate for valuing the bond for Mr. Z is:

$$R = 9\% + 3\% + 2\% = 14\%$$

Time	CF	PVIF 14% PV (CF)	PV (CF)
1	150	0.877	131.55
2	150	0.769	115.35
3	150	0.675	101.25
4	150	0.592	88.80
5	1150	0.519	596.85
Σ PV (CF) i.e. $P_0 =$			1033.80

Since, the current market value is less than the intrinsic value; Mr. Z should buy the bond. Current yield = Annual Interest / Price = $150 / 1025.86 = 14.62\%$

The YTM of the bond is calculated as follows:

@15%

$$P = 150 \times PVIFA_{15\%, 4} + 1150 \times PVIF_{15\%, 5}$$

$$= 150 \times 2.855 + 1150 \times 0.497 = 428.25 + 571.55 = 999.80$$

@14%

As found in sub part (a) $P_0 = 1033.80$

By interpolation we get,

$$= 14\% + \frac{7.94}{7.94 - (-26.06)} \times (15\% - 14\%) = 14\% + \frac{7.94}{34}\%$$

$$YTM = 14.23\%$$

33. Seawell Corporation, a manufacturer of do-it-yourself hardware and housewares, reported earnings per share of € 2.10 in 2013, on which it paid dividends per share of

CHAPTER 4:
SECURITY VALUATION

€0.69. Earnings are expected to grow 15% a year from 2004 to 2008, during this period the dividend payout ratio is expected to remain unchanged. After 2018, the earnings growth rate is expected to drop to a stable rate of 6%, and the payout ratio is expected to increase to 65% of earnings. The firm has a beta of 1.40 currently, and is expected to have a beta of 1.10 after 2018. The market risk premium is 5.5%. The Treasury bond rate is 6.25%.

- (a) What is the expected price of the stock at the end of 2018?
(b) What is the value of the stock, using the two-stage dividend discount model?

[RTP → MAY 2019]

Answer:

The expected rate of return on equity after 2018 = $0.0625 + 1.10(0.055) = 12.3\%$

The dividends from 2013 onwards can be estimated as:

Year	2013	2014	2015	2016	2017	2018	2019
Earnings Per Share (€)	2.1	2.415	2.78	3.19	3.67	4.22	4.48
Dividends Per Share (€)	0.69	0.794	0.913	1.048	1.206	1.387	2.91

- a. The price as of 2018 = $€2.91 / (0.123 - 0.06) = €46.19$
b. The required rate of return upto 2018 = $0.0625 + 1.4(0.055) = 13.95\%$. The dividends upto 2018 are discounted using this rate as follow:

Year	PV of Dividend
2014	$0.794 / 1.1395 = 0.70$
2015	$0.913 / (1.1395)^2 = 0.70$
2016	$1.048 / (1.1395)^3 = 0.70$
2017	$1.206 / (1.1395)^4 = 0.72$
2018	$1.387 / (1.1395)^5 = 0.72$
Total	3.54

The current price = $€3.54 + €46.19 / (1.1395)^5 = €27.58$.

34. M/s Agfa Industries is planning to issue a debenture series on the following terms:

Face value	Rs. 100
Term of maturity	10 years
Yearly coupon rate	
Years	
1 – 4	9%
5 – 8	10%
9 – 10	14%

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The current market rate on similar debentures is 15 per cent per annum. The Company proposes to price the issue in such a manner that it can yield 16 per cent compounded rate of return to the investors. The Company also proposes to redeem the debentures at 5 per cent premium on maturity. Determine the issue price of the debentures.

[RTP → MAY 2020]

Answer:

The issue price of the debentures will be the sum of present value of interest payments during 10 years of its maturity and present value of redemption value of debenture.

Years	Cash out flow (₹)	PVIF @ 16%	PV
1	9	.862	7.758
2	9	.743	6.687
3	9	.641	5.769
4	9	.552	4.968
5	10	.476	4.76
6	10	.410	4.10
7	10	.354	3.54
8	10	.305	3.05
9	14	.263	3.682
10	14 + 105 = 119	.227	<u>3.178 + 23.835</u> 71.327

Thus the debentures should be priced at ₹ 71.327

CHAPTER 5: PORTFOLIO MANAGEMENT

5.

PORTFOLIO MANAGEMENT

ILLUSTRATIONS & QUESTIONS FROM ICAI STUDY MATERIAL

1. A company's beta is 1.40. The market return is 14%. The risk free rate is 10% (i) What is the expected return based on CAPM (ii) If the risk premium on the market goes up by 2.5% points, what would be the revised expected return on this stock?

Answer:

- (i) Computation of expected return based on CAPM

$$R_j = R_f + \beta (R_m - R_f) = 10\% + 1.40 (14\% - 10\%) = 10\% + 5.6\% = 15.6\%$$

- (ii) Computation of risk premium if the market goes up by 2.5 points

The return from the market goes up by 2.5% i.e. $14\% + 2.5\% = 16.5\%$

Expected Return based on CAPM is given by

$$R_j = 10\% + 1.40 (16.5\% - 10\%) = 10\% + 1.40 \times 6.5\% = 10\% + 9.1\% = 19.1\%$$

2. The risk premium for the market is 10%. Assuming Beta values of 0, 0.25, 0.42, 1.00 and 1.67. Compute the risk premium on Security K.

Answer:

Market Risk Premium is 10%

β Value of K	Risk Premium of K
0.00	0%
0.25	2.50%
0.42	4.20%
1.00	10.00%
1.67	16.70%

3. Treasury Bills give a return of 5%. Market Return is 13% (i) What is the market risk premium (ii) Compute the β Value and required returns for the following combination of investments.

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Treasury Bill	100	70	30	0
Market	0	30	70	100

Answer:

Risk Premium $R_m - R_f = 13\% - 5\% = 8\%$

β is the weighted average investing in portfolio consisting of market $\beta = 1$ and treasury bills ($\beta = 0$)

Portfolio	Treasury Bills: Market	β	$R_j = R_f + \beta \times (R_m - R_f)$
1	100:0	0	$5\% + 0(13\% - 5\%) = 5\%$
2	70:30	$0.7(0) + 0.3(1) = 0.3$	$5\% + 0.3(13\% - 5\%) = 7.40\%$
3	30:70	$0.3(0) + 0.7(1) = 0.7$	$5\% + 0.7(13\% - 5\%) = 10.60\%$
4	0:100	1	$5\% + 1.0(13\% - 5\%) = 13\%$

4. Pearl Ltd. expects that considering the current market prices, the equity share holders should get a return of at least 15.50% while the current return on the market is 12%. RBI has closed the latest auction for Rs. 2500 crores of 182 day bills for the lowest bid of 4.3% although there were bidders at a higher rate of 4.6% also for lots of less than Rs. 10 crores. What is Pearl Ltd's Beta?

Answer:

Determining Risk free rate: Two risk free rates are given. The aggressive approach would be to consider 4.6% while the conservative approach would be to take 4.3%. If we take the moderate value then the simple average of the two i.e. 4.45% would be considered

Application of CAPM

$$R_j = R_f + \beta (R_m - R_f)$$

$$15.50\% = 4.45\% + \beta (12\% - 4.45\%)$$

$$\beta = \frac{15.50\% - 4.45\%}{12\% - 4.45\%} = \frac{11.05}{7.55}$$

$$= 1.464$$

5. The following information is available with respect of Jaykay Ltd.

Year	Jay Kay Limited		Market		Return on Govt. Bonds
	Average Share Price (₹)	DPS (₹)	Average Index	Dividend Yield (%)	
2002	242	20	1812	4	6
2003	279	25	1950	5	5
2004	305	30	2258	6	4
2005	322	35	2220	7	5

**CHAPTER 5:
PORTFOLIO MANAGEMENT**

Compute Beta Value of the company as at the end of 2005. What is your observation?

Answer:

Computation of Beta Value

Calculation of Returns

$$\text{Returns} = \frac{D_1 + (P_1 - P_0)}{P_0} \times 100$$

Year	Returns
2002 – 2003	$\frac{25 + (279 - 242)}{242} \times 100 = 25.62\%$
2003 – 2004	$\frac{30 + (305 - 279)}{279} \times 100 = 20.07\%$
2004 – 2005	$\frac{35 + (322 - 305)}{305} \times 100 = 17.05\%$

Calculation of Returns from market Index

Year	% of Index Appreciation	Dividend Yield %	Total Return %
2002 – 2003	$\frac{1950 - 1812}{1812} \times 100 = 7.62\%$	5%	12.62%
2003 – 2004	$\frac{2258 - 1950}{1950} \times 100 = 15.79\%$	6%	21.79%
2004 – 2005	$\frac{2220 - 2258}{2258} \times 100 = (-)1.68\%$	7%	5.32%

Computation of Beta

Year	X	Y	XY	Y ²
2002-2003	25.62	12.62	323.32	159.26
2003-2004	20.07	21.79	437.33	474.80
2004-2005	17.05	5.32	90.71	28.30
	62.74	39.73	851.36	662.36

$$\bar{X} = \frac{62.74}{3} = 20.91, \bar{Y} = \frac{39.73}{3} = 13.24$$

$$\begin{aligned} \beta &= \frac{\sum XY - n\bar{X}\bar{Y}}{\sum Y^2 - n\bar{Y}^2} \\ &= \frac{851.36 - 3(20.91)(13.24)}{662.36 - 3(13.24)^2} \\ &= \frac{851.36 - 830.55}{662.36 - 525.89} = \frac{20.81}{136.47} = 0.15 \end{aligned}$$

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6. The expected returns and Beta of three stocks are given below

Stock	A	B	C
Expected Return (%)	18	11	15
Beta Factor	1.7	0.6	1.2

If the risk free rate is 9% and the expected rate of return on the market portfolio is 14% which of the above stocks are over, under or correctly valued in the market? What shall be the strategy?

Answer:

Required Rate of Return is given by

$$R_j = R_f + \beta (R_m - R_f)$$

For Stock A, $R_j = 9 + 1.7 (14 - 9) = 17.50\%$
 Stock B, $R_j = 9 + 0.6 (14 - 9) = 12.00\%$
 Stock C, $R_j = 9 + 1.2 (14 - 9) = 15.00\%$

Required Return %	Expected Return %	Valuation	Decision
17.50%	18.00%	Under Valued	Buy
12.00%	11.00%	Over Valued	Sell
15.00%	15.00%	Correctly Valued	Hold

7. Information about return on an investment is as follows:

(a) Risk free rate 10% (b) Market Return is 15% (c) Beta is 1.2

- What would be the return from this investment?
- If the projected return is 18%, is the investment rightly valued?
- What is your strategy?

Answer:

Required rate of Return as per CAPM is given by

$$\begin{aligned} R_j &= R_f + \beta (R_m - R_f) \\ &= 10 + 1.2 (15 - 10) = 16\% \end{aligned}$$

If projected return is 18%, the stock is undervalued as CAPM < Expected Return. The Decision should be BUY.

CHAPTER 5: PORTFOLIO MANAGEMENT

8. The following details are given for X and Y companies' stocks and the Bombay Sensex for a period of one year. Calculate the systematic and unsystematic risk for the companies' stocks. If equal amount of money is allocated for the stocks what would be the portfolio risk?

	X Stock	Y Stock	Sensex
Average return	0.15	0.25	0.06
Variance of return	6.30	5.86	2.25
β	0.71	0.685	
Correlation Co-efficient	0.424		
Co-efficient of determination (r^2)	0.18		

Answer:

The co-efficient of determination (r^2) gives the percentage of the variation in the security's return that is explained by the variation of the market index return. In the X company stock return, 18 per cent of variation is explained by the variation of the index and 82 per cent is not explained by the index.

According to Sharpe, the variance explained by the index is the systematic risk. The unexplained variance or the residual variance is the unsystematic risk.

Company X:

$$\begin{aligned}\text{Systematic risk} &= \beta_i^2 \times \text{Variance of market index} \\ &= (0.71)^2 \times 2.25 = 1.134\end{aligned}$$

$$\begin{aligned}\text{Unsystematic risk } (\epsilon_i^2) &= \text{Total variance of security return} - \text{systematic risk} \\ &= 6.3 - 1.134 \\ &= 5.166 \text{ or} \\ &= \text{Variance of Security Return } (1-r^2) \\ &= 6.3 \times (1-0.18) = 6.3 \times 0.82 = 5.166\end{aligned}$$

$$\begin{aligned}\text{Total risk} &= \beta_i^2 \times \sigma_m^2 + \epsilon_i^2 \\ &= 1.134 + 5.166 = 6.3\end{aligned}$$

Company Y:

$$\begin{aligned}\text{Systematic risk} &= \beta_i^2 \times \sigma_m^2 \\ &= (0.685)^2 \times 2.25 = 1.056\end{aligned}$$

$$\begin{aligned}\text{Unsystematic risk} &= \text{Total variance of the security return} - \text{systematic risk.} \\ &= 5.86 - 1.056 = 4.804\end{aligned}$$

$$\sigma_p^2 = \left[\left(\sum_{i=1}^N X_i \beta_i \right)^2 \sigma_m^2 \right] + \left[\left(\sum_{i=1}^N X_i^2 \epsilon_i^2 \right) \right]$$

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$$\begin{aligned}
 &= [(0.5 \times 0.71 + 0.5 \times 0.685)^2 \times 2.25] + [(0.5)^2(5.166) + (0.5)^2(4.804)] \\
 &= [(0.355 + 0.3425)^2 \times 2.25] + [(1.292 + 1.201)] \\
 &= 1.0946 + 2.493 = 3.5876
 \end{aligned}$$

9. Write short note on factors affecting decision of investment in fixed income securities.

Answer:

Bonds are fixed income avenues. The following factors have to be evaluated in selecting fixed income avenues:

- (a) **Yield to maturity:** The yield to maturity for a fixed income avenues represent the rate of return earned by the investor, if he invests in the fixed income avenues and holds it till its maturity.
- (b) **Risk of Default:** To assess such risk on a bond, one has to look at the credit rating of the bond. If no credit rating is available relevant financial ratios of the firm have to be examined such as debt equity, interest coverage, earning power etc and the general prospect of the industry to which the firm belongs have to be assessed.
- (c) **Tax Shield:** In the past, several fixed income avenues offers tax shields but at present only a few of them do so.
- (d) **Liquidity:** If the fixed income avenues can be converted wholly or substantially into cash at a fairly short notice it possesses a liquidity of a high order.

10. Briefly explain the objectives of “Portfolio Management”.

Answer:

Some of the important objectives of portfolio management are:

- (i) **Security/Safety of Principal:** Security not only involves keeping the principal sum intact but also its purchasing power.
- (ii) **Stability of Income:** To facilitate planning more accurately and systematically the reinvestment or consumption of income.
- (iii) **Capital Growth:** It can be attained by reinvesting in growth securities or through purchase of growth securities.
- (iv) **Marketability** i.e. the ease with which a security can be bought or sold: This is essential for providing flexibility to investment portfolio.
- (v) **Liquidity** i.e. nearness to money: It is desirable for the investor so as to take advantage of attractive opportunities upcoming in the market.
- (vi) **Diversification:** The basic objective of building a portfolio is to reduce the risk of loss of capital and/or income by investing in various types of securities and over a wide range of industries.
- (vii) **Favourable Tax Status:** The effective yield an investor gets from his investment depends on tax to which it is subjected to. By minimising the tax burden, yield can be effectively improved.

CHAPTER 5: PORTFOLIO MANAGEMENT

11. Discuss the Capital Asset Pricing Model (CAPM) and its relevant assumptions.

[ALSO ASKED IN MAY 2018 EXAMS → 4 MARKS]

Answer:

The CAPM distinguishes between risk of holding a single asset and holding a portfolio of assets. There is a trade off between risk and return. Modern portfolio theory concentrates on risk and stresses on risk management rather than on return management. Risk may be security risk involving danger of loss of return from an investment in a single financial or capital asset. Security risk differs from portfolio risk, which is the probability of loss from investment in a portfolio of assets. Portfolio risk is comprised of unsystematic risk and systematic risk. Unsystematic risks can be averted through diversification and is related to random variables. Systematic risk is market related component of portfolio risk. It is commonly measured by regression coefficient Beta or the Beta coefficient. Low Beta reflects low risk and high Beta reflects high risk.

As the unsystematic risk can be diversified by building a portfolio, the relevant risk is the nondiversifiable component of the total risk. As mentioned earlier, it can be measured by using Beta (β) a statistical parameter which measures the market sensitivity of returns. The beta for the market is equal to 1.0. Beta explains the systematic relationship between the return on a security and the return on the market by using a simple linear regression equation. The return on a security is taken as a dependent variable and the return on market is taken as independent variable then $R_j = R_f + \beta (R_m - R_f)$. The beta parameter β in this William Sharpe model represents the slope of the above regression relationship and measures the sensitivity or responsiveness of the security returns to the general market returns. The portfolio beta is merely the weighted average of the betas of individual securities included in the portfolio. Portfolio beta $\beta = \sum \text{proportion of security} \times \text{beta for security}$.

CAPM provides a conceptual framework for evaluating any investment decision where capital is committed with a goal of producing future returns. CAPM is based on certain assumptions to provide conceptual framework for evaluating risk and return. Some of the important assumptions are discussed below:

- (i) **Efficient market:** It is the first assumption of CAPM. Efficient market refers to the existence of competitive market where financial securities and capital assets are bought and sold with full information of risk and return available to all participants. In an efficient market, the price of individual assets will reflect a real or intrinsic value of a share as the market prices will adjust quickly to any new situation, John J. Hampton has remarked in "Financial decision making" that although efficient capital market is not much relevant to capital budgeting decisions, but CAPM would be useful to evaluate capital budgeting proposal because the company can compare risk and return to be obtained by investment in machinery with risk and return from investment in securities.
- (ii) **Rational investment goals:** Investors desire higher return for any acceptable level of risk or the lowest risk for any desired level of return. Such a rational choice is made on logical and consistent ranking of proposals in order of preference for higher good to lower good and this is the scale of the marginal efficiency of capital. Beside, transactive preferences and certainty equivalents are other parameters of rational choice.

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- (iii) Risk aversion in efficient market is adhered to although at times risk seeking behaviour is adopted for gains.
- (iv) CAPM assumes that all assets are divisible and liquid assets.
- (v) Investors are able to borrow freely at a risk less rate of interest i.e. borrowings can fetch equal return by investing in safe Government securities.
- (vi) Securities can be exchanged without payment of brokerage, commissions or taxes and without any transaction cost.
- (vii) Securities or capital assets face no bankruptcy or insolvency.

12. A stock costing Rs. 120 pays no dividends. The possible prices that the stock might sell for at the end of the year with the respective probabilities are:

<u>Price</u>	<u>Probability</u>
115	0.1
120	0.1
125	0.2
130	0.3
135	0.2
140	0.1

Required:

- (i) Calculate the expected return.
- (ii) Calculate the Standard deviation of returns.

Answer:

Here, the probable returns have to be calculated using the formula

$$R = \frac{D}{P_0} + \frac{P_1 - P_0}{P_0}$$

Calculation of Probable Returns

Possible prices (P_1) ₹	$P_1 - P_0$ ₹	$[(P_1 - P_0) / P_0] \times 100$ Return (per cent)
115	-5	-4.17
120	0	0.00
125	5	4.17
130	10	8.33
135	15	12.50
140	20	16.67

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PORTFOLIO MANAGEMENT

Alternatively, it can be calculated as follows:

Calculation of Expected Returns

Possible return X_i	Probability $p(X_i)$	Product $X_i \cdot p(X_i)$
-4.17	0.1	-0.417
0.00	0.1	0.000
4.17	0.2	0.834
8.33	0.3	2.499
12.50	0.2	2.500
16.67	0.1	1.667
		$X = 7.083$

Expected return $X = 7.083$ per

Alternatively, it can also be calculated as follows:

Expected Price = $115 \times 0.1 + 120 \times 0.1 + 125 \times 0.2 + 130 \times 0.3 + 135 \times 0.2 + 140 \times 0.1$
128.50

$$\text{Return} = \frac{128.50 - 120}{120} \times 100 = 7.0833\%$$

Calculation of Standard Deviation of Returns

Probable return X_i	Probability $p(X_i)$	Deviation $(X_i - X)$	Deviation squared $(X_i - X)^2$	Product $(X_i - X)^2 p(X_i)$
-4.17	0.1	-11.253	126.63	12.66
0.00	0.1	-7.083	50.17	5.017
4.17	0.2	-2.913	8.49	1.698
8.33	0.3	1.247	1.56	0.467
12.50	0.2	5.417	29.34	5.869
16.67	0.1	9.587	91.91	9.191
				$\sigma^2 = 34.902$

Variance, $\sigma^2 = 34.902$ per cent

Standard deviation, $\sigma = \sqrt{34.902} = 5.908$ per cent

13. Mr. A is interested to invest Rs. 1,00,000 in the securities market. He selected two securities B and D for this purpose. The risk return profile of these securities are as follows :

Co-efficient of correlation between B and D is 0.15.

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You are required to calculate the portfolio return of the following portfolios of B and D to be considered by A for his investment.

- (i) 100 percent investment in B only;
- (ii) 50 percent of the fund in B and the rest 50 percent in D;
- (iii) 75 percent of the fund in B and the rest 25 percent in D; and
- (iv) 100 percent investment in D only.

Also indicate that which portfolio is best for him from risk as well as return point of view?

Answer:

We have $E_p = W_1E_1 + W_2E_2 + \dots + W_nE_n$

and for standard deviation $\sigma_p^2 = \sum_{i=1}^n \sum_{j=1}^n w_i w_j \sigma_{ij}$

$$\sigma_p^2 = \sum_{i=1}^n \sum_{j=1}^n w_i w_j \rho_{ij} \sigma_i \sigma_j$$

Two asset portfolio

$$\sigma_p^2 = w_1^2 \sigma_1^2 + w_2^2 \sigma_2^2 + 2 w_1 w_2 \sigma_1 \sigma_2 \rho_{12}$$

Substituting the respective values we get,

- (i) All funds invested in B

$$E_p = 12\%$$

$$\sigma_p = 10\%$$

- (ii) 50% of funds in each of B & D

$$E_p = 0.50 \times 12\% + 0.50 \times 20\% = 16\%$$

$$\sigma_p^2 = (0.50)^2 (10\%)^2 + (0.50)^2 (18\%)^2 + 2(0.50)(0.50)(0.15)(10\%)(18\%)$$

$$\sigma_p^2 = 25 + 81 + 13.5 = 119.50$$

$$\sigma_p = 10.93\%$$

- (iii) 75% in B and 25% in D

$$E_p = 0.75 \times 12\% + 0.25 \times 20\% = 14\%$$

$$\sigma_p^2 = (0.75)^2 (10\%)^2 + (0.25)^2 (18\%)^2 + 2(0.75)(0.25)(0.15)(10\%)(18\%)$$

$$\sigma_p^2 = 56.25 + 20.25 + 10.125 = 86.625$$

$$\sigma_p = 9.31\%$$

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(iv) All funds in D

$$E_p = 20\%$$

$$\sigma_p = 18.0\%$$

Portfolio	(i)	(ii)	(iii)	(iv)
Return	12	16	14	20
σ	10	10.93	9.31	18

In the terms of return, we see that portfolio (iv) is the best portfolio. In terms of risk we see that portfolio (iii) is the best portfolio.

14. Consider the following information on two stocks, A and B :

Year	Return on A (%)	Return on B (%)
2006	10	12
2007	16	18

You are required to determine:

- (i) The expected return on a portfolio containing A and B in the proportion of 40% and 60% respectively.
- (ii) The Standard Deviation of return from each of the two stocks.
- (iii) The covariance of returns from the two stocks.
- (iv) Correlation coefficient between the returns of the two stocks.
- (v) The risk of a portfolio containing A and B in the proportion of 40% and 60%

[ALSO ASKED IN RTP → NOV 2019]

Answer:

- (i) Expected return of the portfolio A and B

$$E(A) = (10 + 16) / 2 = 13\%$$

$$E(B) = (12 + 18) / 2 = 15\%$$

$$R_p = \sum_{i=1}^N X_i R_i = 0.4(13) + 0.6(15) = 14.2\%$$

- (ii) Stock A:

$$\text{Variance} = 0.5 (10 - 13)^2 + 0.5 (16 - 13)^2 = 9$$

$$\text{Standard deviation} = \sqrt{9} = 3\%$$

Stock B:

$$\text{Variance} = 0.5 (12 - 15)^2 + 0.5 (18 - 15)^2 = 9$$

$$\text{Standard deviation} = 3\%$$

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- (iii) Covariance of stocks A and B

$$\text{Cov}_{AB} = 0.5 (10 - 13) (12 - 15) + 0.5 (16 - 13) (18 - 15) = 9$$

- (iv) Correlation of coefficient

$$r_{AB} = \frac{\text{Cov}_{AB}}{\sigma_A \sigma_B} = \frac{9}{3 \times 3} = 1$$

- (v) Portfolio Risk

$$\begin{aligned} \sigma_P &= \sqrt{X_A^2 \sigma_A^2 + X_B^2 \sigma_B^2 + 2X_A X_B (\sigma_A \sigma_B \sigma_{AB})} \\ &= \sqrt{(0.4)^2 (3)^2 + (0.6)^2 (3)^2 + 2(0.4)(0.6)(3)(3)(1)} \\ &= \sqrt{1.44 + 3.24 + 4.32} = 3\% \end{aligned}$$

15. Following is the data regarding six securities:

	A	B	C	D	E	F
Return (%)	8	8	12	4	9	8
Risk (Standard deviation)	4	5	12	4	5	6

- (i) Assuming three will have to be selected, state which ones will be picked.
 (ii) Assuming perfect correlation, show whether it is preferable to invest 75% in A and 25% in C or to invest 100% in E

Answer:

- (i) Security A has a return of 8% for a risk of 4, whereas B and F have a higher risk for the same return. Hence, among them A dominates.

For the same degree of risk 4, security D has only a return of 4%. Hence, D is also dominated by A.

Securities C and E remain in reckoning as they have a higher return though with higher degree of risk.

Hence, the ones to be selected are A, C & E.

- (ii) The average values for A and C for a proportion of 3 : 1 will be :

$$\text{Risk} = \frac{(3 \times 4) + (1 \times 12)}{4} = 6\%$$

$$\text{Return} = \frac{(3 \times 8) + (1 \times 12)}{4} = 9\%$$

Therefore:	75% A	E
	25% C	–
Risk	6	5
Return	9%	9%

For the same 9% return the risk is lower in E. Hence, E will be preferable.

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16. The distribution of return of security 'F' and the market portfolio 'P' is given below:

Probability	Return %	
	F	P
0.30	30	-10
0.40	20	20
0.30	0	30

You are required to calculate the expected return of security 'F' and the market portfolio 'P', the covariance between the market portfolio and security and beta for the security

[ALSO ASKED IN RTP → MAY 2020]

Answer:

Security F

Prob(P)	R _f	PxR _f	Deviations of F (R _f – ER _f)	(Deviation) ² of F	(Deviations) ² P _x
0.3	30	9	13	169	50.7
0.4	20	8	3	9	3.6
0.3	0	0	-17	289	86.7
		ER _f =17			<u>Var_f =141</u>

$$\text{STDEV } \sigma_f = \sqrt{141} = 11.87$$

Market Portfolio, P

R _M %	P _M	Exp. Return R _M x P _M	Dev. of P (R _M -ER _M)	(Dev. of P) ²	(Dev.) ² P _M	(Deviation of F) x (Deviation of P)	Dev. of F x Dev. of P) x P
-10	0.3	-3	-24	576	172.8	-312	-93.6
20	0.4	8	6	36	14.4	18	7.2
30	0.3	9	16	256	76.8	-272	-81.6
		ER _M =14			Var _M =264 σ _M =16.25		=Co Var P _M =- 168

$$\text{Beta} = \frac{\text{Co Var P}_M}{\sigma_M^2} = \frac{-168}{264} = -.636$$

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17. The rates of return on the security of Company X and market portfolio for 10 periods are given below:

Period	Return of Security X (%)	Return on Market Portfolio (%)
1	20	22
2	22	20
3	25	18
4	21	16
5	18	20
6	-5	8
7	17	-6
8	19	5
9	-7	6
10	20	11

- (i) What is the beta of Security X?
(ii) What is the characteristic line for Security X?

Answer:

(i)

Period	R_X	R_M	$R_X - \bar{R}_X$	$R_M - \bar{R}_M$	$(R_X - \bar{R}_X)(R_M - \bar{R}_M)$	$(R_M - \bar{R}_M)^2$
1	20	22	5	10	50	100
2	22	20	7	8	56	64
3	25	18	10	6	60	36
4	21	16	6	4	24	16
5	18	20	3	8	24	64
6	-5	8	-20	-4	80	16
7	17	-6	2	-18	-36	324
8	19	5	4	-7	-28	49
9	-7	6	-22	-6	132	36
10	20	11	5	-1	-5	1
	<u>150</u>	<u>120</u>			<u>357</u>	<u>706</u>
	ΣR_X	ΣR_M			$\Sigma (R_X - \bar{R}_X)(R_M - \bar{R}_M)$	$\Sigma (R_M - \bar{R}_M)^2$

$$\bar{R}_X = 15 \quad \bar{R}_M = 12$$

$$\sigma^2_M = \frac{\sum (R_M - \bar{R}_M)^2}{n} = \frac{706}{10} = 70.60$$

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$$\text{Cov}_{XM} = \frac{\sum (R_X - \bar{R}_X)(R_M - \bar{R}_M)}{n} = \frac{357}{10} = 35.70$$

$$\text{Beta}_X = \frac{\text{Cov}_{XM}}{\sigma_M^2} = \frac{35.70}{70.60} = 0.505$$

Alternative Solution

Period	X	Y	Y ²	XY
1	20	22	484	440
2	22	20	400	440
3	25	18	324	450
4	21	16	256	336
5	18	20	400	360
6	-5	8	64	-40
7	17	-6	36	-102
8	19	5	25	95
9	-7	6	36	-42
10	<u>20</u>	<u>11</u>	<u>121</u>	<u>220</u>
	<u>150</u>	<u>120</u>	<u>2146</u>	<u>2157</u>
	$\bar{X} = 15$	$\bar{Y} = 12$		

$$= \frac{\sum XY - n\bar{X}\bar{Y}}{\sum X^2 - n(\bar{X})^2}$$

$$= \frac{2157 - 10 \times 15 \times 12}{2146 - 10 \times 12 \times 12} = \frac{357}{706} = 0.506$$

(ii) $\bar{R}_X = 15$ $\bar{R}_M = 12$

$$y = \alpha + \beta x$$

$$15 = \alpha + 0.505 \times 12$$

$$\text{Alpha } (\alpha) = 15 - (0.505 \times 12) = 8.94\%$$

$$\text{Characteristic line for security X} = \alpha + \beta \times R_M$$

Where, R_M = Expected return on Market Index

$$\therefore \text{Characteristic line for security X} = 8.94 + 0.505 R_M$$

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18. XYZ Ltd. has substantial cash flow and until the surplus funds are utilised to meet the future capital expenditure, likely to happen after several months, are invested in a portfolio of shortterm equity investments, details for which are given below:

Investment	No. of shares	Beta	Market price per share ₹	Expected dividend yield
I	60,000	1.16	4.29	19.50%
II	80,000	2.28	2.92	24.00%
III	1,00,000	0.90	2.17	17.50%
IV	1,25,000	1.50	3.14	26.00%

The current market return is 19% and the risk free rate is 11%.

Required to:

- Calculate the risk of XYZ's short-term investment portfolio relative to that of the market;
- Whether XYZ should change the composition of its portfolio.

[ALSO ASKED IN MTP → APRIL 2018 → 8 MARKS]

Answer:

(i) Computation of Beta of Portfolio

Investment	No. of shares	Market Price	Market Value	Dividend Yield	Dividend	Composition	β	Weighted β
I.	60,000	4.29	2,57,400	19.50%	50,193	0.2339	1.16	0.27
II.	80,000	2.92	2,33,600	24.00%	56,064	0.2123	2.28	0.48
III.	1,00,000	2.17	2,17,000	17.50%	37,975	0.1972	0.90	0.18
IV.	1,25,000	3.14	3,92,500	26.00%	1,02,050	0.3566	1.50	0.53
			11,00,500		2,46,282	1.0000		1.46

$$\text{Return of the Portfolio} = \frac{2,46,282}{11,00,500} = 0.2238$$

$$\text{Beta of Port Folio} = 1.46$$

Market Risk implicit

$$0.2238 = 0.11 + \beta \times (0.19 - 0.11)$$

$$\text{Or, } 0.08 \beta + 0.11 = 0.2238$$

$$\beta = \frac{0.2238 - 0.11}{0.08} = 1.42$$

Market β implicit is 1.42 while the port folio β is 1.46. Thus the portfolio is marginally risky compared to the market.

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- (ii) The decision regarding change of composition may be taken by comparing the dividend yield (given) and the expected return as per CAPM as follows:

Expected return R_s as per CAPM is:

$$R_s = I_{RF} + (R_M - I_{RF}) \beta$$

For investment I R_s = $I_{RF} + (R_M - I_{RF}) \beta$

$$= .11 + (.19 - .11) 1.16$$

$$= 20.28\%$$

For investment II, R_s = $.11 + (.19 - .11) 2.28 = 29.24\%$

For investment III, R_s = $.11 + (.19 - .11) .90$

$$= 18.20\%$$

For investment IV, R_s = $.11 + (.19 - .11) 1.50$

$$= 23\%$$

Comparison of dividend yield with the expected return R_s shows that the dividend yields of investment I, II and III are less than the corresponding R_s . So, these investments are over-priced and should be sold by the investor. However, in case of investment IV, the dividend yield is more than the corresponding R_s , so, XYZ Ltd. should increase its proportion.

19. Mr. FedUp wants to invest an amount of Rs. 520 lakhs and had approached his Portfolio Manager. The Portfolio Manager had advised Mr. FedUp to invest in the following manner:

Security	Moderate	Better	Good	Very Good	Best
Amount (in ₹ Lakhs)	60	80	100	120	160
Beta	0.5	1.00	0.80	1.20	1.50

You are required to advise Mr. FedUp in regard to the following, using Capital Asset Pricing Methodology:

- (i) Expected return on the portfolio, if the Government Securities are at 8% and the NIFTY is yielding 10%.
- (ii) Advisability of replacing Security 'Better' with NIFTY.

[ALSO ASKED IN MTP → APRIL 2018 → 7 MARKS | RTP → NOV 2018]

Answer:

- (i) Computation of Expected Return from Portfolio

Security	Beta (β)	Expected Return (r) as per CAPM	Amount (₹ Lakhs)	Weights (w)	wr
Moderate	0.50	$8\% + 0.50(10\% - 8\%) = 9\%$	60	0.115	1.035
Better	1.00	$8\% + 1.00(10\% - 8\%) = 10\%$	80	0.154	1.540
Good	0.80	$8\% + 0.80(10\% - 8\%) = 9.60\%$	100	0.192	1.843

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Very Good	1.20	$8\% + 1.20(10\% - 8\%) = 10.40\%$	120	0.231	2.402
Best	1.50	$8\% + 1.50(10\% - 8\%) = 11\%$	160	0.308	3.388
Total			520	1	10.208

Thus Expected Return from Portfolio 10.208% say 10.21%.

Alternatively, it can be computed as follows:

$$\text{Average } \beta = 0.50 \times \frac{60}{520} + 1.00 \times \frac{80}{520} + 0.80 \times \frac{100}{520} + 1.20 \times \frac{120}{520} + 1.50 \times \frac{160}{520} = 1.104$$

As per CAPM

$$= 0.08 + 1.104(0.10 - 0.08) = 0.10208 \text{ i.e. } 10.208\%$$

- (ii) As computed above the expected return from Better is 10% same as from Nifty, hence there will be no difference even if the replacement of security is made. The main logic behind this neutrality is that the beta of security 'Better' is 1 which clearly indicates that this security shall yield same return as market return.

20. Your client is holding the following securities:

Particulars of Securities	Cost ₹	Dividends ₹	Market Price ₹	BETA
Equity Shares:				
Co. X	8,000	800	8,200	0.8
Co. Y	10,000	800	10,500	0.7
Co. Z	16,000	800	22,000	0.5
PSU Bonds	34,000	3,400	32,300	0.2

Assuming a Risk-free rate of 15%, calculate:

- Expected rate of return in each, using the Capital Asset Pricing Model (CAPM).
- Average return of the portfolio.

Answer:

Calculation of expected return on market portfolio (R_m)

Investment	Cost (₹)	Dividends (₹)	Capital Gains (₹)
Shares X	8,000	800	200
Shares Y	10,000	800	500
Shares Z	16,000	800	6,000
PSU Bonds	34,000	3,400	-1,700
	68,000	5,800	5,000

$$R_m = \frac{5,800 + 5,000}{68,000} \times 100 = 15.88\%$$

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Calculation of expected rate of return on individual security:

Security

Shares X	$15 + 0.8 (15.88 - 15.0)$	= 15.70%
Shares Y	$15 + 0.7 (15.88 - 15.0)$	= 15.62%
Shares Z	$15 + 0.5 (15.88 - 15.0)$	= 15.44%
PSU Bonds	$15 + 0.2 (15.88 - 15.0)$	= 15.18%

Calculation of the Average Return of the Portfolio:

$$= \frac{15.70 + 15.62 + 15.44 + 15.18}{4} = 15.49\%$$

21. Following are the details of a portfolio consisting of three shares:

Share	Portfolio weight	Beta	Expected return in %	Total variance
A	0.20	0.40	14	0.015
B	0.50	0.50	15	0.025
C	0.30	1.10	21	0.100

Standard Deviation of Market Portfolio Returns = 10%

You are given the following additional data:

Covariance (A, B) = 0.030

Covariance (A, C) = 0.020

Covariance (B, C) = 0.040

Calculate the following:

(i) The Portfolio Beta

(ii) Residual variance of each of the three shares

(iii) Portfolio variance using Sharpe Index Model

(iv) Portfolio variance (on the basis of modern portfolio theory given by Markowitz)

[MTP → AUGUST 2018 → 10 MARKS | RTP → MAY 2018]

Answer:

(i) Portfolio Beta

$$0.20 \times 0.40 + 0.50 \times 0.50 + 0.30 \times 1.10 = 0.66$$

(ii) Residual Variance

To determine Residual Variance first of all we shall compute the Systematic Risk as follows:

$$\beta_A^2 \times \sigma_M^2 = (0.40)^2 (0.01) = 0.0016$$

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$$\beta_B^2 \times \sigma_M^2 = (0.50)^2(0.01) = 0.0025$$

$$\beta_C^2 \times \sigma_M^2 = (1.10)^2(0.01) = 0.0121$$

Residual Variance

A $0.015 - 0.0016 = 0.0134$

B $0.025 - 0.0025 = 0.0225$

C $0.100 - 0.0121 = 0.0879$

(iii) Portfolio variance using Sharpe Index Model

Systematic Variance of Portfolio = $(0.10)^2 \times (0.66)^2 = 0.004356$

Unsystematic Variance of Portfolio = $0.0134 \times (0.20)^2 + 0.0225 \times (0.50)^2 + 0.0879 \times (0.30)^2 = 0.014072$

Total Variance = $0.004356 + 0.014072 = 0.018428$

(iii) Portfolio variance on the basis of Markowitz Theory

$$= (w_A \times w_A \times \sigma_A^2) + (w_A \times w_B \times \text{Cov}_{AB}) + (w_A \times w_C \times \text{Cov}_{AC}) + (w_B \times w_A \times \text{Cov}_{AB}) + (w_B \times w_B \times \sigma_B^2) + (w_B \times w_C \times \text{Cov}_{BC}) + (w_C \times w_A \times \text{Cov}_{CA}) + (w_C \times w_B \times \text{Cov}_{CB}) + (w_C \times w_C \times \sigma_C^2)$$

$$= (0.20 \times 0.20 \times 0.015) + (0.20 \times 0.50 \times 0.030) + (0.20 \times 0.30 \times 0.020) + (0.20 \times 0.50 \times 0.030) + (0.50 \times 0.50 \times 0.025) + (0.50 \times 0.30 \times 0.040) + (0.30 \times 0.20 \times 0.020) + (0.30 \times 0.50 \times 0.040) + (0.30 \times 0.30 \times 0.10)$$

$$= 0.0006 + 0.0030 + 0.0012 + 0.0030 + 0.00625 + 0.0060 + 0.0012 + 0.0060 + 0.0090$$

$$= 0.0363$$

22. Mr. Tamarind intends to invest in equity shares of a company the value of which depends upon various parameters as mentioned below:

Factor	Beta	Expected value in %	Actual value in %
GNP	1.20	7.70	7.70
Inflation	1.75	5.50	7.00
Interest rate	1.30	7.75	9.00
Stock market index	1.70	10.00	12.00
Industrial production	1.00	7.00	7.50

If the risk free rate of interest be 9.25%, how much is the return of the share under Arbitrage Pricing Theory?

[ALSO ASKED IN MTP → OCTOBER 2018 → 6 MARKS]

Answer:

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PORTFOLIO MANAGEMENT

Return of the stock under APT

Factor	Actual value in %	Expected value in %	Difference	Beta	Diff. x Beta
GNP	7.70	7.70	0.00	1.20	0.00
Inflation	7.00	5.50	1.50	1.75	2.63
Interest rate	9.00	7.75	1.25	1.30	1.63
Stock index	12.00	10.00	2.00	1.70	3.40
Ind. Production	7.50	7.00	0.50	1.00	0.50
					8.16
Risk free rate in %					9.25
Return under APT					17.41

23. The following are the data on five mutual funds:

Fund	Return	Standard Deviation	Beta
A	15	7	1.25
B	18	10	0.75
C	14	5	1.40
D	12	6	0.98
E	16	9	1.50

You are required to compute Reward to Volatility Ratio and rank these portfolio using:

◆ Sharpe method and

◆ Treynor's method

assuming the risk free rate is 6%

[ALSO ASKED IN RTP → NOV 2018]

Answer:

Sharpe Ratio $S = (R_p - R_f) / \sigma_p$

Treynor Ratio $T = (R_p - R_f) / \beta_p$

Where,

R_p = Return on Fund

R_f = Risk-free rate

σ_p = Standard deviation of Fund

β_p = Beta of Fund

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Reward to Variability (Sharpe Ratio)

Mutual Fund	R_p	R_f	$R_p - R_f$	σ_p	Reward to Variability	Ranking
A	15	6	9	7	1.285	2
B	18	6	12	10	1.20	3
C	14	6	8	5	1.60	1
D	12	6	6	6	1.00	5
E	16	6	10	9	1.11	4

Reward to Volatility (Treynor Ratio)

Mutual Fund	R_p	R_f	$R_p - R_f$	β_p	Reward to Volatility	Ranking
A	15	6	9	1.25	7.2	2
B	18	6	12	0.75	16	1
C	14	6	8	1.40	5.71	5
D	12	6	6	0.98	6.12	4
E	16	6	10	1.50	6.67	3

PAST EXAMINATION, MTP & RTP QUESTIONS

24. Consider the following information on two stocks, X and Y.

Year	2016	2017
Return on X (%)	10	16
Return on Y (%)	12	18

You are required to calculate:

- The expected return on a portfolio containing X and Y in the proportion of 40% and 60% respectively.
- The Standard Deviation of return from each of the two stocks.
- The Covariance of returns from the two stocks.
- The Correlation coefficient between the returns of the two stocks.
- The risk of a portfolio containing X and Y in the proportion of 40% and 60%.

[MAY 2018 → 10 MARKS]

Answer:

CHAPTER 5: PORTFOLIO MANAGEMENT

- (i) Expected return of portfolio containing X and Y in the ratio 40%,60%

$$E(X) = (10 + 16) / 2 = 13\%$$

$$E(Y) = (12 + 18) / 2 = 15\%$$

$$R_p = \sum_{i=1}^N X_i R_i = 0.4(13) + 0.6(15) = 14.2\%$$

- (ii) Standard Deviation of X and Y

Stock X:

$$\text{Variance} = 0.5 (10 - 13)^2 + 0.5 (16 - 13)^2 = 9$$

$$\text{Standard deviation} = 3\%$$

Stock Y:

$$\text{Variance} = 0.5 (12 - 15)^2 + 0.5 (18 - 15)^2 = 9$$

$$\text{Standard deviation} = 3\%$$

- (iii) $\text{Cov}_{XY} = 0.5 (10 - 13) (12 - 15) + 0.5 (16 - 13) (18 - 15) = 9$

- (iv) Correlation Coefficient $= \rho = \frac{\text{Cov}(X,Y)}{\sigma_X \sigma_Y} = \frac{9}{9} = 1$

- (v) Risk of portfolio containing 40% X and 60 % Y

$$\begin{aligned} \sigma_p &= \sqrt{X_X^2 \sigma_X^2 + X_Y^2 \sigma_Y^2 + 2X_X X_Y (\sigma_X \sigma_Y \text{Corr}_{XY})} \\ &= \sqrt{(0.4)^2 (3)^2 + (0.6)^2 (3)^2 + 2(0.4)(0.6)(3)(3)(1)} \\ &= \sqrt{1.44 + 3.24 + 4.32} = 3\% \end{aligned}$$

25.Mr. Kapoor owns a portfolio with the following characteristics:

It is assumed that security returns are generated by a two factor model.

- (i) If Mr. Kapoor has Rs. 1,00,000 to invest and sells short Rs. 50,000 of security Y and purchases Rs. 1,50,000 of security X, what is the sensitivity of Mr. Kapoor's portfolio to the two factors?
- (ii) If Mr. Kapoor borrows Rs. 1,00,000 at the risk free rate and invests the amount he borrows along with the original amount of Rs. 1,00,000 in security X and Y in the same proportion as described in part (i), what is the sensitivity of the portfolio to the two factors?
- (iii) What is the expected return premium of factor 2?

[NOV 2018 → 8 MARKS]

Answer:

- (i) Mr. Kapoor's position in the two securities is +1.50 in security X and -0.5 in security Y. Hence the portfolio sensitivities to the two factors:-

$$b \text{ prop. } 1 = 1.50 \times 0.75 + (-0.50 \times 1.50) = 0.375$$

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$$b \text{ prop. } 2 = 1.50 \times 0.60 + (-0.50 \times 1.10) = 0.35$$

(ii) Mr. Kapoor's current position:

$$\text{Security X Rs. } 3,00,000 / \text{Rs. } 1,00,000 = 3$$

$$\text{Security Y -Rs. } 1,00,000 / \text{Rs. } 1,00,000 = -1$$

$$\text{Risk free asset -Rs. } 100000 / \text{Rs. } 100000 = -1$$

$$b \text{ prop. } 1 = 3.0 \times 0.75 + (-1 \times 1.50) + (-1 \times 0) = 0.75$$

$$b \text{ prop. } 2 = 3.0 \times 0.60 + (-1 \times 1.10) + (-1 \times 0) = 0.70$$

(iii) Expected Return = Risk Free Rate of Return + Risk Premium

Let λ_1 and λ_2 are the Value Factor 1 and Factor 2 respectively.

Accordingly

$$15 = 10 + 0.75 \lambda_1 + 0.60 \lambda_2$$

$$20 = 10 + 1.50 \lambda_1 + 1.10 \lambda_2$$

On solving equation, the value of λ_1 and λ_2 comes 6.67 and 0 respectively.

Accordingly, the expected risk premium for the factor 2 shall be Zero and whatever be the risk the same shall be on account of factor 1.

Alternatively, the risk premium of Securities X & Y can be calculated as follows:

Security X

Total Return = 15%

Risk Free Return = 10%

Risk Premium = 5%

Security Y

Total Return = 20%

Risk Free Return = 10%

Risk Premium = 10%

26. Following are the details of a portfolio consisting of 3 shares:

Shares	Portfolio Weight	Beta	Expected Return (%)	Total Variance
X Ltd.	0.3	0.50	15	0.020
Y Ltd.	0.5	0.60	16	0.010
Z Ltd.	0.2	1.20	20	0.120

Standard Deviation of Market Portfolio Return = 12%

CHAPTER 5: PORTFOLIO MANAGEMENT

You are required to calculate the following:

- (i) The Portfolio Beta.
- (ii) Residual Variance of each of the three shares.
- (iii) Portfolio Variance using Sharpe Index Model.

[MAY 2019 → 8 MARKS]

Answer:

- (i) **Portfolio Beta**

$$\begin{aligned} &0.30 \times 0.50 + 0.50 \times 0.60 + 0.20 \times 1.20 \\ &= 0.15 + 0.3 + 0.24 \\ &= 0.69 \end{aligned}$$

- (ii) **Residual Variance**

To determine Residual Variance first of all we shall compute the Systematic Risk as follows:

$$\beta_X^2 \times \sigma_M^2 = (0.5)^2 (0.12)^2 = 0.0036$$

$$\beta_Y^2 \times \sigma_M^2 = (0.6)^2 (0.12)^2 = 0.0052$$

$$\beta_Z^2 \times \sigma_M^2 = (1.20)^2 (0.12)^2 = 0.0207$$

Residual Variance = Total Variance – Systematic Risk

$$X \quad 0.020 - 0.0036 = 0.0164$$

$$Y \quad 0.010 - 0.0052 = 0.0048$$

$$Z \quad 0.120 - 0.0207 = 0.0993$$

- (iii) **Portfolio variance using Sharpe Index Model**

Portfolio Variance = Systematic Risk of the Portfolio + Unsystematic Risk of the Portfolio

$$\text{Systematic Variance of Portfolio} = (0.12)^2 \times (0.69)^2 = 0.006856$$

$$\begin{aligned} \text{Unsystematic Variance of Portfolio} &= 0.0164 \times (0.30)^2 + 0.0048 \times (0.50)^2 + \\ &0.0993 \times (0.20)^2 = 0.006648 \end{aligned}$$

$$\text{Total Variance} = 0.006856 + 0.006648 = 0.013504$$

27. On 1 April 2015, Sunidhi was holding a portfolio of 10 securities whose value was Rs. 9,94,450, the weighted average of beta of 9 securities was 1.10.

Since she was expecting a fall in the prices of the shares in near future to hedge her portfolio she sold 5 contract of NIFTY Futures (Multiplier of 25) expiring in May 2015, which was trading at 8767.07 on 1 April.

- (a) Calculate the beta of the 10th security.

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(b) Reconcile the reasons in spite of 2% fall in the market as per Sunidhi's apprehension if she would have earned some profit on her cash position.

[MTP → MARCH 2018 → 8 MARKS]

Answer:

- (i) To compute the beta of 10th security first we shall compute overall weighted beta as follows:

Let weighted β be w , then

$$5 = \frac{994450}{8767.07 \times 25} \times w$$

$w = 1.102$ approximately

Let beta of 10th security is β then,

$$1.102 = 0.90 \times 1.10 + 0.10 \times \beta$$

$$\beta = 1.12$$

- (ii) the main reason for the profit in cash position might due to reason that contrary to her expectation fall in the value of cash position there may be increase in value of cash position.

28. Following is the data regarding six securities:

	U	V	W	X	Y	Z
Return (%)	10	10	15	5	11	10
Risk (%) (Standard deviation)	5	6	13	5	6	7

- (i) Recommend at least three securities which shall be selected among the six securities mentioned above. (3 Marks)
- (ii) Assuming perfect correlation, evaluate whether it is preferable to invest 80% in security U and 20% in security W or to invest 100% in Y. (Marks)

[MTP → MARCH 2018]

Answer:

- (i) When we make risk-return analysis of different securities from U to Z, we can observe that security U gives a return of 10% at risk level of 5%. Simultaneously securities V and Z give the same return of 10% as of security U, but their risk levels are 6% and 7% respectively. Security X is giving only 5% return for the risk rate of 5%. Hence, security U dominates securities V, X and Z.

Securities W and Y offer more return but it carries higher level of risk.

Hence securities U, W and Y can be selected based on individual preferences.

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- (ii) In a situation where the perfect positive correlation exists between two securities, their risk and return can be averaged with the proportion.

Assuming the perfect correlation exists between the securities U and W, average risk and return of U and W together for proportion 4 : 1 is calculated as follows:

$$\text{Risk} = (4 \times 5\% + 1 \times 13\%) \div 5 = 6.6\%$$

$$\text{Return} = (4 \times 10\% + 1 \times 15\%) \div 5 = 11\%$$

Therefore:	80% U	100%Y
	20% V	-
Risk	6.6%	6%
Return	11%	11%

When we compare risk of 6.6% and return of 11% with security Y with 6% risk and 11% return, security Y is preferable over the portfolio of securities U and W in proportion of 4 : 1.

29. Explain Asset Allocation Strategies.

[MTP → AUGUST 2018 → 4 MARKS]

Answer:

There are four asset allocation strategies:

- Integrated Asset Allocation:** Under this strategy, capital market conditions and investor objectives and constraints are examined and the allocation that best serves the investor's needs while incorporating the capital market forecast is determined.
- Strategic Asset Allocation:** Under this strategy, optimal portfolio mixes based on returns, risk, and co-variances is generated using historical information and adjusted periodically to restore target allocation within the context of the investor's objectives and constraints.
- Tactical Asset Allocation:** Under this strategy, investor's risk tolerance is assumed constant and the asset allocation is changed based on expectations about capital market conditions.
- Insured Asset Allocation:** Under this strategy, risk exposure for changing portfolio values (wealth) is adjusted; more value means more ability to take risk.

30. Mr. Tempest has the following portfolio of four shares:

Name	Beta	Investment Rs. Lac.
Oxy Rin Ltd.	0.45	0.80
Boxed Ltd.	0.35	1.50
Square Ltd.	1.15	2.25
Ellipse Ltd.	1.85	4.50

The risk-free rate of return is 7% and the market rate of return is 14%.

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CALCULATE

(i) Portfolio return.

(ii) Calculate the portfolio Beta

[MTP → OCTOBER 2018 → 8 MARKS]

Answer:

Market Risk Premium (A) = 14% – 7% = 7%

Share	Beta	Risk Premium (Beta x A) %	Risk Free Return %	Return %	Return ₹
Oxy Rin Ltd.	0.45	3.15	7	10.15	8,120
Boxed Ltd.	0.35	2.45	7	9.45	14,175
Square Ltd.	1.15	8.05	7	15.05	33,863
Ellipse Ltd.	1.85	12.95	7	19.95	89,775
Total Return					<u>1,45,933</u>

Total Investment ₹ 9,05,000

(i) Portfolio Return = $\frac{₹ 1,45,933}{₹ 9,05,000} \times 100 = 16.13\%$

(ii) Portfolio Beta

Portfolio Return = Risk Free Rate + Risk Premium x β = 16.13%

$7\% + 7\beta = 16.13\%$

$\beta = 1.30$

Alternative Approach

First, we shall compute Portfolio Beta using the weighted average method as follows:

$$\begin{aligned} \text{Beta}_P &= 0.45 \times \frac{0.80}{9.05} + 0.35 \times \frac{1.50}{9.05} + 1.15 \times \frac{2.25}{9.05} + 1.85 \times \frac{4.50}{9.05} \\ &= 0.45 \times 0.0884 + 0.35 \times 0.1657 + 1.15 \times 0.2486 + 1.85 \times 0.4972 = 0.0398 + 0.058 + 0.2859 + 0.9198 = 1.3035 \end{aligned}$$

Accordingly,

(i) Portfolio Return using CAPM formula will be as follows:

$R_P = R_F + \text{Beta}_P(R_M - R_F)$

$= 7\% + 1.3035(14\% - 7\%) = 7\% + 1.3035(7\%)$

$= 7\% + 9.1245\% = 16.1245\%$

(ii) Portfolio Beta

As calculated above 1.3035

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31. The following information is available with respect of Krishna Ltd.

Year	Krishna Ltd. Average share price	Dividend per Share	Average Market Index	Dividend Yield	Return on Govt. bonds
	Rs.	Rs.			
2012	245	20	2013	4%	7%
2013	253	22	2130	5%	6%
2014	310	25	2350	6%	6%
2015	330	30	2580	7%	6%

Calculate the Beta Value of the Krishna Ltd. at the end of 2015 and State your observation.

[MTP → MARCH 2019 → 8 MARKS]

Answer:

(i) Computation of Beta Value

Calculation of Returns

$$\text{Returns} = \frac{D_1 + (P_1 - P_0)}{P_0} \times 100$$

Year	Returns
2012 – 13	$\frac{22 + (253 - 245)}{245} \times 100 = 12.24\%$
2013 – 14	$\frac{25 + (310 - 253)}{253} \times 100 = 32.41\%$
2014 – 15	$\frac{30 + (330 - 310)}{310} \times 100 = 16.13\%$

Calculation of Returns from market Index

Year	% of Index Appreciation	Dividend Yield %	Total Return %
2012–13	$\frac{(2130 - 2013)}{2013} \times 100 = 5.81\%$	5%	10.81%
2013–14	$\frac{(2350 - 2130)}{2130} \times 100 = 10.33\%$	6%	16.33%
2014–15	$\frac{(2580 - 2350)}{2350} \times 100 = 9.79\%$	7%	16.79%

Computation of Beta

Year	Krishna Ltd. (X)	Market Index (Y)	XY	Y ²
2012–13	12.24%	10.81%	132.31	116.86
2013–14	32.41%	16.33%	529.25	266.67
2014–15	16.13%	16.79%	270.82	281.90
Total	60.78%	43.93%	932.38	665.43

$$\text{Average Return of Krishna Ltd.} = \frac{60.78}{3} = 20.26\%$$

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$$\text{Average Market Return} = \frac{43.93}{3} = 14.64\%$$

$$\text{Beta } (\beta) = \frac{\sum XY - n\bar{X}\bar{Y}}{\sum Y^2 - n(\bar{Y})^2} = \frac{932.38 - 3 \times 20.26 \times 14.64}{665.43 - 3(14.64)^2} = 1.897$$

(ii) Observation

	Expected Return (%)	Actual Return (%)	Action
2012 – 13	6% + 1.897(10.81% - 6%) = 15.12%	12.24%	Sell
2013 – 14	6% + 1.897(16.33% - 6%) = 25.60%	32.41%	Buy
2014 – 15	6% + 1.897(16.79% - 6%) = 26.47%	16.13%	Sell

32. Details about portfolio of shares of an investor is as below:

Shares	No. of shares (lakh)	Price per share	Beta
A Ltd.	3.00	Rs. 500	1.40
B Ltd.	4.00	Rs. 750	1.20
C Ltd.	2.00	Rs. 250	1.60

The investor thinks that the risk of portfolio is very high and wants to reduce the portfolio beta to 0.91. He is considering two below mentioned alternative strategies:

- (1) Dispose off a part of his existing portfolio to acquire risk free securities, or
- (2) Take appropriate position on Nifty Futures which are currently traded at Rs. 8125 and each Nifty points is worth Rs.200.

You are required to calculate:

- (i) portfolio beta,
- (ii) the value of risk free securities to be acquired,
- (iii) the number of shares of each company to be disposed off,
- (iv) the number of Nifty contracts to be bought/sold; and
- (v) the value of portfolio beta for 2% rise in Nifty.

[MTP → APRIL 2019 / OCTOBER 2019 → 10 MARKS / 8 MARKS]

Answer:

Shares	No. of shares (lakhs) (1)	Market Price of Per Share (2)	(1) × (2) (Rs. lakhs)	% to total (w)	β (x)	wx
A Ltd.	3.00	500.00	1500.00	0.30	1.40	0.42
B Ltd.	4.00	750.00	3000.00	0.60	1.20	0.72
C Ltd.	2.00	250.00	500.00	0.10	1.60	0.16
			5000.00	1.00		1.30

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- (i) Portfolio beta 1.30
(ii) Required Beta 0.91

Let the proportion of risk free securities for target beta $0.91 = p$

$$0.91 = 0 \times p + 1.30 (1 - p)$$

$$p = 0.30 \text{ i.e. } 30\%$$

Shares to be disposed off to reduce beta ($5000 \times 30\%$) Rs. 1,500 lakh and Risk Free securities to be acquired.

- (iii) Number of shares of each company to be disposed off

Shares	% to total (w)	Proportionate Amount (Rs. lakhs)	Market Price Per Share	No. of Shares (Lakh)
A Ltd.	0.30	450.00	500.00	0.90
B Ltd.	0.60	900.00	750.00	1.20
C Ltd.	0.10	150.00	250.00	0.60

- (iv) Number of Nifty Contract to be sold

$$\frac{(1.30 - 0.91) \times 5000 \text{ lakh}}{8,125 \times 200} = 120 \text{ contracts}$$

- (v) 2% rises in Nifty is accompanied by $2\% \times 1.30$ i.e. 2.6% rise for portfolio of shares

	Rs. Lakh
Current Value of Portfolio of Shares	5000
Value of Portfolio after rise	5130
Mark-to-Market Margin paid ($8125 \times 0.020 \times \text{Rs. } 200 \times 120$)	39
Value of the portfolio after rise of Nifty	5091
% change in value of portfolio $(5091 - 5000) / 5000$	1.82%
% rise in the value of Nifty	2%
Beta	0.91

33. Ram buys 10,000 shares of X Ltd. at a price of Rs. 22 per share whose beta value is 1.5 and sells 5,000 shares of A Ltd. at a price of Rs. 40 per share having a beta value of 2. He obtains a complete hedge by Nifty futures at Rs. 1,000 each. He closes out his position at the closing price of the next day when the share of X Ltd. dropped by 2%, share of A Ltd. appreciated by 3% and Nifty futures dropped by 1.5%.

Calculate the overall profit/loss to Ram?

[MTP → APRIL 2019 → 7 MARKS | RTP → NOV 2018]

Answer:

No. of the Future Contract to be obtained to get a complete hedge

$$= \frac{10000 \times ₹22 \times 1.5 - 5000 \times ₹40 \times 2}{₹1000}$$

$$= \frac{₹3,30,000 - ₹4,00,000}{₹1000} = 70 \text{ contracts}$$

Thus, by purchasing 70 Nifty future contracts to be long to obtain a complete hedge.

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Cash Outlay

$$= 10000 \times \text{Rs. } 22 - 5000 \times \text{Rs. } 40 + 70 \times \text{Rs. } 1,000$$

$$= \text{Rs. } 2,20,000 - \text{Rs. } 2,00,000 + \text{Rs. } 70,000 = \text{Rs. } 90,000$$

Cash Inflow at Close Out

$$= 10000 \times \text{Rs. } 22 \times 0.98 - 5000 \times \text{Rs. } 40 \times 1.03 + 70 \times \text{Rs. } 1,000 \times 0.985$$

$$= \text{Rs. } 2,15,600 - \text{Rs. } 2,06,000 + \text{Rs. } 68,950 = \text{Rs. } 78,550$$

Gain/ Loss

$$= \text{Rs. } 78,550 - \text{Rs. } 90,000 = - \text{Rs. } 11,450 \text{ (Loss)}$$

34. Given below is information of market rates of Returns and Data from two Companies A and B:

	Year 2015	Year 2016	Year 2017
Market (%)	12.0	11.0	9.0
Company A (%)	13.0	11.5	9.8
Company B (%)	11.0	10.5	9.5

Calculate the beta coefficients of the Shares of Company A and Company B

[MTP → APRIL 2019 → 7 MARKS]

Answer:

Company A:

Year	Return % (Ra)	Market return % (Rm)	Deviation R(a)	Deviation Rm	D Ra × DRm	Rm ²
1	13.0	12.0	1.57	1.33	2.09	1.77
2	11.5	11.0	0.07	0.33	0.02	0.11
3	9.8	9.0	-1.63	-1.67	2.72	2.79
	34.3	32.0			4.83	4.67

$$\text{Average } R_a = 11.43$$

$$\text{Average } R_m = 10.67$$

$$\text{Covariance} = \frac{\sum (R_m - \bar{R}_m)(R_a - \bar{R}_a)}{N}$$

$$\text{Covariance} = \frac{4.83}{3} = 1.61$$

$$\text{Variance } (\sigma_m^2) = \frac{\sum (R_m - \bar{R}_m)^2}{N}$$

$$= \frac{4.67}{3} = 1.557$$

$$\beta = \frac{1.61}{1.557} = 1.03$$

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Company B:

Year	Return % (R _b)	Market return % (R _m)	Deviation R(b)	Deviation R _m	D R _b × D R _m	R _m ²
1	11.0	12.0	0.67	1.33	0.89	1.77
2	10.5	11.0	0.17	0.33	0.06	0.11
3	9.5	9.0	-0.83	-1.67	1.39	2.79
	31.0	32.0			2.34	4.67

Average R_b = 10.33

Average R_m = 10.67

$$\text{Covariance} = \frac{\sum (R_m - \bar{R}_m)(R_b - \bar{R}_b)}{N}$$

$$\text{Covariance} = \frac{2.34}{3} = 0.78$$

$$\text{Variance } (\sigma_m^2) = \frac{\sum (R_m - \bar{R}_m)^2}{N}$$

$$= \frac{4.67}{3} = 1.557$$

$$\beta = \frac{0.78}{1.557} = 0.50$$

35. X Co., Ltd., invested on 1.4.2009 in certain equity shares as below:

Name of Co.	No. of shares	Cost (Rs.)
M Ltd.	1,000 (Rs. 100 each)	2,00,000
N Ltd.	500 (Rs. 10 each)	1,50,000

In September, 2009, 10% dividend was paid out by M Ltd. and in October, 2009, 30% dividend paid out by N Ltd. On 31.3.2010 market quotations showed a value of Rs. 220 and Rs. 290 per share for M Ltd. and N Ltd. respectively.

On 1.4.2010, investment advisors indicate (a) that the dividends from M Ltd. and N Ltd. for the year ending 31.3.2011 are likely to be 20% and 35%, respectively and (b) that the probabilities of market quotations on 31.3.2011 are as below:

Probability factor	Price/share of M Ltd.	Price/share of N Ltd.
0.2	220	290
0.5	250	310
0.3	280	330

You are required to:

(i) Calculate the average return from the portfolio for the year ended 31.3.2010;

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- (ii) Calculate the expected average return from the portfolio for the year 2010-11; and
(iii) Advise X Co. Ltd., of the comparative risk in the two investments by calculating the standard deviation in each case.

[MTP → APRIL 2019 → 8 MARKS | RTP → MAY 2019]

Answer:

Calculation of return on portfolio for 2009-10	(Calculation in Rs. / share)		
	M	N	
Dividend received during the year	10	3	
Capital gain/loss by 31.03.10			
Market value by 31.03.10	220	290	
Cost of investment	200	300	
Gain/loss	20	(-)10	
Yield	30	(-)7	
Cost	200	300	
% return	15%	(-)2.33%	
Weight in the portfolio	57	43	
Weighted average return			7.55%
Calculation of estimated return for 2010-11			
Expected dividend	20	3.5	
Capital gain by 31.03.11			
(220x0.2) + (250x0.5) + (280x0.3) – 220 = (253-220)	33	-	
(290x0.2) + (310x0.5) + (330x0.3) – 290 = (312 – 290)	-	22	
Yield	53	25.5	
*Market Value 01.04.10	220	290	
% return	24.09%	8.79%	
*Weight in portfolio (1,000x220): (500x290)	60.3	39.7	
Weighted average (Expected) return			18.02%
(*The market value on 31.03.10 is used as the base for calculating yield for 10-11)			

Calculation of Standard Deviation

M Ltd.

Exp. market value	Exp. gain	Exp. div.	Exp Yield (1)	Prob. Factor (2)	(1) X (2)	Dev. ($P_M - \overline{P}_M$)	Square of dev. (3)	(2) X (3)
220	0	20	20	0.2	4	-33	1089	217.80
250	30	20	50	0.5	25	-3	9	4.50
280	60	20	80	0.3	24	27	729	218.70
					53			$\sigma^2_M = 441.00$

Standard Deviation (σ_M)

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N Ltd.

Exp. market value	Exp. gain	Exp. div.	Exp. Yield (1)	Prob. Factor (2)	(1) X (2)	Dev. ($P_N - \overline{P_N}$)	Square of dev. (3)	(2) X (3)
290	0	3.5	3.5	0.2	0.7	-22	484	96.80
310	20	3.5	23.5	0.5	11.75	-2	4	2.00
330	40	3.5	43.5	0.3	13.05	18	324	97.20
					25.5			$\sigma^2_N = 196.00$

Standard Deviation (σ_N)

14

Share of company M Ltd. is more risky as the S.D. is more than company N Ltd.

36. Expected returns on two stocks for particular market returns are given in the following table:

Market Return	Aggressive	Defensive
7%	4%	9%
25%	40%	18%

You are required to calculate:

- The Betas of the two stocks.
- Expected return of each stock, if the market return is equally likely to be 7% or 25%.
- The Security Market Line (SML), if the risk free rate is 7.5% and market return is equally likely to be 7% or 25%.
- The Alphas of the two stocks.

[MTP → OCTOBER 2019 → 8 MARKS | RTP → MAY 2018]

Answer:

- The Betas of two stocks:

Aggressive stock - $40\% - 4\% / 25\% - 7\% = 2$

Defensive stock - $18\% - 9\% / 25\% - 7\% = 0.50$

Alternatively, it can also be solved by using the Characteristic Line Relationship as follows:

$$R_s = \alpha + \beta R_m$$

Where,

α = Alpha

β = Beta

R_m = Market Return

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For Aggressive Stock

$$4\% = \alpha + \beta(7\%)$$

$$40\% = \alpha + \beta(25\%)$$

$$36\% = \beta(18\%)$$

$$\beta = 2$$

For Defensive Stock

$$9\% = \alpha + \beta(7\%)$$

$$18\% = \alpha + \beta(25\%)$$

$$9\% = \beta(18\%)$$

$$\beta = 0.50$$

(ii) Expected returns of the two stocks:-

$$\text{Aggressive stock} \quad - \quad 0.5 \times 4\% + 0.5 \times 40\% = 22\%$$

$$\text{Defensive stock} \quad - \quad 0.5 \times 9\% + 0.5 \times 18\% = 13.5\%$$

(iii) Expected return of market portfolio = $0.5 \times 7\% + 0.5 \times 25\% = 16\%$

$$\therefore \text{Market risk prem.} = 16\% - 7.5\% = 8.5\%$$

$$\therefore \text{SML is, required return} = 7.5\% + \beta i 8.5\%$$

(iv) $R_s = \alpha + \beta R_m$

For Aggressive Stock

$$22\% = \alpha_A + 2(16\%)$$

$$\alpha_A = -10\%$$

For Defensive Stock

$$13.5\% = \alpha_D + 0.50(16\%)$$

$$\alpha_D = 5.5\%$$

37. An investor has decided to invest to invest Rs. 1,00,000 in the shares of two companies, namely, ABC and XYZ. The projections of returns from the shares of the two companies along with their probabilities are as follows:

Probability	ABC(%)	XYZ(%)
20	12	16
25	14	10
25	-7	28
30	28	-2

You are required to

- Comment on return and risk of investment in individual shares.
- Compare the risk and return of these two shares with a Portfolio of these shares in equal proportions.

CHAPTER 5:
PORTFOLIO MANAGEMENT

(iii) Find out the proportion of each of the above shares to formulate a minimum risk portfolio.

[RTP → MAY 2019]

Answer:

(i)

Probability	ABC (%)	XYZ (%)	1X2 (%)	1X3 (%)
(1)	(2)	(3)	(4)	(5)
0.20	12	16	2.40	3.2
0.25	14	10	3.50	2.5
0.25	-7	28	-1.75	7.0
0.30	28	-2	<u>8.40</u>	<u>-0.6</u>
Average return			<u>12.55</u>	<u>12.1</u>

Hence the expected return from ABC = 12.55% and XYZ is 12.1%

Probability	(ABC - $\bar{ABC}$)	(ABC - $\bar{ABC}$) ²	1X3	(XYZ - $\bar{XYZ}$)	(XYZ - $\bar{XYZ}$) ²	(1)X(6)
(1)	(2)	(3)	(4)	(5)	(6)	
0.20	-0.55	0.3025	0.06	3.9	15.21	3.04
0.25	1.45	2.1025	0.53	-2.1	4.41	1.10
0.25	-19.55	382.2025	95.55	15.9	252.81	63.20
0.30	15.45	238.7025	<u>71.61</u>	-14.1	198.81	<u>59.64</u>
			<u>167.75</u>			<u>126.98</u>

$$\sigma^2_{ABC} = 167.75(\%)^2; \sigma_{ABC} = 12.95\%$$

$$\sigma^2_{XYZ} = 126.98(\%)^2; \sigma_{XYZ} = 11.27\%$$

(ii) In order to find risk of portfolio of two shares, the covariance between the two is necessary here.

Probability	(ABC - $\bar{ABC}$)	(XYZ - $\bar{XYZ}$)	2X3	1X4
(1)	(2)	(3)	(4)	(5)
0.20	-0.55	3.9	-2.145	-0.429
0.25	1.45	-2.1	-3.045	-0.761
0.25	-19.55	15.9	-310.845	-77.71
0.30	15.45	-14.1	-217.845	<u>-65.35</u>
				<u>-144.25</u>

$$\sigma^2_P = (0.5^2 \times 167.75) + (0.5^2 \times 126.98) + 2 \times (-144.25) \times 0.5 \times 0.5$$

$$\sigma^2_P = 41.9375 + 31.745 - 72.125$$

$$\sigma^2_P = 1.5575 \text{ or } 1.56(\%)$$

$$\sigma_P = \sqrt{1.56} = 1.25\%$$

$$E(R_P) = (0.5 \times 12.55) + (0.5 \times 12.1) = 12.325\%$$

Hence, the return is 12.325% with the risk of 1.25% for the portfolio. Thus the portfolio results in the reduction of risk by the combination of two shares.

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

(iii) For constructing the minimum risk portfolio the condition to be satisfied is

$$X_{ABC} = \frac{\sigma_X^2 - r_{AX}\sigma_A\sigma_X}{\sigma_A^2 + \sigma_X^2 - 2r_{AX}\sigma_A\sigma_X} \text{ or } = \frac{\sigma_X^2 - \text{Cov}_{AX}}{\sigma_A^2 + \sigma_X^2 - 2\text{Cov}_{AX}}$$

σ_X = Std. Deviation of XYZ

σ_A = Std. Deviation of ABC

r_{AX} = Coefficient of Correlation between XYZ and ABC

Cov_{AX} = Covariance between XYZ and ABC.

Therefore,

$$\% \text{ ABC} = \frac{126.98 - (-144.25)}{126.98 + 167.75 - [2 \times (-144.25)]} = \frac{271.23}{583.23} = 0.46 \text{ or } 46\%$$

$\% \text{ ABC} = 46\%$, $\text{XYZ} = 54\%$

$(1 - 0.46) = 0.54$

38. A company has a choice of investments between several different equity oriented mutual funds. The company has an amount of Rs.1 crore to invest. The details of the mutual funds are as follows:

Mutual Fund	Beta
A	1.6
B	1.0
C	0.9
D	2.0
E	0.6

Required:

- If the company invests 20% of its investment in each of the first two mutual funds and an equal amount in the mutual funds C, D and E, what is the beta of the portfolio?
- If the company invests 15% of its investment in C, 15% in A, 10% in E and the balance in equal amount in the other two mutual funds, what is the beta of the portfolio?
- If the expected return of market portfolio is 12% at a beta factor of 1.0, what will be the portfolios expected return in both the situations given above?

[RTP → NOV 2019]

Answer:

With 20% investment in each MF Portfolio Beta is the weighted average of the Betas of various securities calculated as below:

(i)

Investment	Beta (β)	Investment (₹ Lacs)	Weighted Investment
A	1.6	20	32

CHAPTER 5:
PORTFOLIO MANAGEMENT

B	1.0	20	20
C	0.9	20	18
D	2.0	20	40
E	0.6	20	12
		100	122
Weighted Beta (β) = 1.22			

(ii) With varied percentages of investments portfolio beta is calculated as follows:

Investment	Beta (β)	Investment (₹ Lacs)	Weighted Investment
A	1.6	15	24
B	1.0	30	30
C	0.9	15	13.5
D	2.0	30	60
E	0.6	10	6
		100	133.5
Weighted Beta (β) = 1.335			

(iii) Expected return of the portfolio with pattern of investment as in case (i)

$$= 12\% \times 1.22 \text{ i.e. } 14.64\%$$

$$\text{Expected Return with pattern of investment as in case (ii)} = 12\% \times 1.335 \text{ i.e., } 16.02\%.$$

39. A Portfolio Manager (PM) has the following four stocks in his portfolio:

Security	No. of Shares	Market Price per share (₹)	β
VSL	10,000	50	0.9
CSL	5,000	20	1.0
SML	8,000	25	1.5
APL	2,000	200	1.2

Compute the following:

- Portfolio beta.
- If the PM seeks to reduce the beta to 0.8, how much risk free investment should he bring in?
- If the PM seeks to increase the beta to 1.2, how much risk free investment should he bring in?

[RTP → MAY 2020]

Answer:

Security	No. of shares (1)	Market Price of Per Share (2)	(1) × (2)	% to total (w)	β (x)	wx
VSL	10000	50	500000	0.4167	0.9	0.375
CSL	5000	20	100000	0.0833	1	0.083

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

SML	8000	25	200000	0.1667	1.5	0.250
APL	2000	200	400000	0.3333	1.2	0.400
			1200000	1		1.108

Portfolio beta 1.108

(i) Required Beta 0.8

It should become $(0.8 / 1.108)$ 72.2 % of present portfolio

If ₹ 12,00,000 is 72.20%, the total portfolio should be

₹ 12,00,000 $\times 100/72.20$ or ₹ 16,62,050

Additional investment in zero risk should be $(₹ 16,62,050 - ₹ 12,00,000) = ₹ 4,62,050$

Revised Portfolio will be

Security	No. of shares (1)	Market Price of Per Share (2)	(1) $\times$ (2)	% to total (w)	β (x)	wx
VSL	10000	50	500000	0.3008	0.9	0.271
CSL	5000	20	100000	0.0602	1	0.060
SML	8000	25	200000	0.1203	1.5	0.180
APL	2000	200	400000	0.2407	1.2	0.289
Risk free asset	46205	10	462050	0.2780	0	0
			1662050	1		0.800

(ii) To increase Beta to 1.2

Required beta 1.2

It should become $1.2 / 1.108$ 108.30% of present beta

If 1200000 is 108.30%, the total portfolio should be

$1200000 \times 100/108.30$ or 1108033 say 1108030

Additional investment should be (-) 91967 i.e. Divest ₹ 91970 of Risk Free Asset

Revised Portfolio will be

Security	No. of shares (1)	Market Price of Per Share (2)	(1) $\times$ (2)	% to total (w)	β (x)	wx
VSL	10000	50	500000	0.4513	0.9	0.406
CSL	5000	20	100000	0.0903	1	0.090
SML	8000	25	200000	0.1805	1.5	0.271
APL	2000	200	400000	0.3610	1.2	0.433
Risk free asset	-9197	10	-91970	-0.0830	0	0
			1108030	1		1.20

Portfolio beta 1.20

CHAPTER 6: SECURITIZATION

6.

SECURITIZATION

QUESTIONS FROM ICAI STUDY MATERIAL

1. What are the main problems faced in securitisation especially in Indian context?

[ALSO ASKED IN MTP → OCTOBER 2019 → 4 MARKS]

Answer:

Following are main problems faced in growth of Securitization of instruments especially in Indian context:

1. Stamp Duty

Stamp Duty is one of the obstacle in India. Under Transfer of Property Act, 1882, a mortgage debt stamp duty which even goes upto 12% in some states of India and this impeded the growth of securitization in India. It should be noted that since pass through certificate does not evidence any debt only able to receivable, they are exempted from stamp duty.

Moreover, in India, recognizing the special nature of securitized instruments in some states has reduced the stamp duty on them.

2. Taxation

Taxation is another area of concern in India. In the absence of any specific provision relating to securitized instruments in Income Tax Act experts' opinion differ a lot. Some are of opinion that SPV as a trustee is liable to be taxed in a representative capacity then others are of view that instead of SPV, investors will be taxed on their share of income. Clarity is also required on the issues of capital gain implications on passing payments to the investors.

3. Accounting

Accounting and reporting of securitized assets in the books of originator is another area of concern. Although securitization is slated to be an off-balance sheet instrument but in true sense receivables are removed from originator's balance sheet. Problem arises especially when assets are transferred without recourse.

4. Lack of standardization

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

Every originator following his own format for documentation and administration having lack of standardization is another obstacle in the growth of securitization.

5. Inadequate Debt Market

Lack of existence of a well-developed debt market in India is another obstacle that hinders the growth of secondary market of securitized or asset backed securities.

6. Ineffective Foreclosure laws

For many years efforts are on for effective foreclosure but still foreclosure laws are not supportive to lending institutions and this makes securitized instruments especially mortgaged backed securities less attractive as lenders face difficulty in transfer of property in event of default by the borrower.

PAST EXAMINATION & MTP QUESTIONS

2. Discuss briefly the steps involved in the Securitization mechanism.

OR

Explain the benefits of Securitization from the perspective of both originator as well as the investor

[MAY 2018 → 4 MARKS | MTP → APRIL 2019 → 6 MARKS | MAY 2019 → 4 MARKS]

Answer:

The steps involved in securitization mechanism are as follows:

Creation of Pool of Assets: The process of securitization begins with creation of pool of assets by segregation of assets backed by similar type of mortgages in terms of interest rate, risk, maturity and concentration units.

Transfer to SPV: One assets have been pooled, they are transferred to Special Purpose Vehicle (SPV) especially created for this purpose.

Sale of Securitized Papers: SPV designs the instruments based on nature of interest, risk, tenure etc. based on pool of assets. These instruments can be Pass Through Security or Pay Through Certificates.

Administration of assets: The administration of assets is subcontracted back to originator which collects principal and interest from underlying assets and transfer it to SPV, which works as a conduit.

CHAPTER 6: SECURITIZATION

Recourse to Originator: Performance of securitized papers depends on the performance of underlying assets and unless specified in case of default they go back to originator from SPV.

Repayment of funds: SPV will repay the funds in form of interest and principal that arises from the assets pooled.

Credit Rating of Instruments: Sometime before the sale of securitized instruments credit rating can be done to assess the risk of the issuer.

OR

The benefits of securitization can be viewed from the angle of various parties involved as follows:

(A) From the angle of originator: Originator (entity which sells assets collectively to Special Purpose Vehicle) achieves the following benefits from securitization.

- (i) **Off – Balance Sheet Financing:** When loan/receivables are securitized it release a portion of capital tied up in these assets resulting in off Balance Sheet financing leading to improved liquidity position which helps expanding the business of the company.
- (ii) **More specialization in main business:** By transferring the assets the entity could concentrate more on core business as servicing of loan is transferred to SPV. Further, in case of non-recourse arrangement even the burden of default is shifted.
- (iii) **Helps to improve financial ratios:** Especially in case of Financial Institutions and Banks, it helps to manage Capital –To-Weighted Asset Ratio effectively.
- (iv) **Reduced borrowing Cost:** Since securitized papers are rated due to credit enhancement even they can also be issued at reduced rate as of debts and hence the originator earns a spread, resulting in reduced cost of borrowings.

(B) From the angle of investor: Following benefits accrues to the investors of securitized securities.

1. **Diversification of Risk:** Purchase of securities backed by different types of assets provides the diversification of portfolio resulting in reduction of risk.
2. **Regulatory requirement:** Acquisition of asset backed belonging to a particular industry say micro industry helps banks to meet regulatory requirement of investment of fund in industry specific.
3. **Protection against default:** In case of recourse arrangement if there is any default by any third party then originator shall make good the least amount. Moreover, there can be insurance arrangement for compensation for any such default.

3. Discuss about the Primary Participants in the process of Securitization

[NOV 2018 → 4 MARKS | MTP → AUGUST 2018 → 4 MARKS]

Answer:

Primary Participants are main parties to the process of securitization. The primary participants in the process of securitization are as follows:

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

- (i) **Originator:** It is the initiator of deal or can be termed as securitizer. It is an entity which sells the assets lying in its books and receives the funds generated through the sale of such assets. The originator transfers both legal as well as beneficial interest to the Special Purpose Vehicle.
- (ii) **Special Purpose Vehicle:** Also, called SPV, it is created for the purpose of executing the deal. Since issuer originator transfers all rights in assets to SPV, it holds the legal title of these assets. It is created especially for the purpose of securitization only and normally could be in form of a company, a firm, a society or a trust.

The main objective of creating SPV is to remove the asset from the Balance Sheet of Originator. Since, SPV makes an upfront payment to the originator, it holds the key position in the overall process of securitization. Further, it also issues the securities (called Asset Based Securities or Mortgage Based Securities) to the investors.

- (iii) **The Investors:** Investors are the buyers of securitized papers which may be an individual, an institutional investor such as mutual funds, provident funds, insurance companies, Financial Institutions etc.

Since, they acquire a participating share in the total pool of assets/receivable, they receive their money back in the form of interest and principal as per the agreed terms.

4. Describe various securitization instruments.

[MTP → MARCH 2018 / APRIL 2019 → 5 MARKS / 6 MARKS]

Answer:

Securitization Instruments

On the basis of different maturity characteristics, the securitized instruments can be divided into following three categories:

- (i) **Pass Through Certificates (PTCs):** As the title suggests originator (seller of the assets) transfers the entire receipt of cash in form of interest or principal repayment from the assets sold. Thus, these securities represent direct claim of the investors on all the assets that has been securitized through SPV.

Since all cash flows are transferred the investors carry proportional beneficial interest in the asset held in the trust by SPV.

It should be noted that since it is a direct route any prepayment of principal is also proportionately distributed among the securities holders. Further, due to these characteristics on completion of securitization by the final payment of assets, all the securities are terminated simultaneously.

Skewness of cash flows occurs in early stage if principals are repaid before the scheduled time.

CHAPTER 6: SECURITIZATION

(ii) Pay Through Security (PTS): As mentioned earlier, since, in PTCs all cash flows are passed to the performance of the securitized assets. To overcome this limitation and limitation to single mature there is another structure i.e. PTS.

In contrast to PTC in PTS, SPV debt securities backed by the assets and hence it can restructure different tranches from varying maturities of receivables.

In other words, this structure permits desynchronization of servicing of securities issued from cash flow generating from the asset. Further, this structure also permits the SPV to reinvest surplus funds for short term as per their requirement.

Since, in Pass Through, all cash flow immediately in PTS in case of early retirement of receivables plus cash can be used for short term yield. This structure also provides the freedom to issue several debt tranches with varying maturities.

(iii) Stripped Securities: Stripped Securities are created by dividing the cash flows associated with underlying securities into two or more new securities. Those two securities are as follows:

- (i) Interest Only (IO) Securities
- (ii) Principle Only (PO) Securities

As each investor receives a combination of principal and interest, it can be stripped into two portions of Interest and Principle.

Accordingly, the holder of IO securities receives only interest while PO security holder receives only principal. Being highly volatile in nature these securities are less preferred by investors. In case yield to maturity in market rises, PO price tends to fall as borrower prefers to postpone the payment on cheaper loans. Whereas if interest rate in market falls, the borrower tends to repay the loans as they prefer to borrow fresh at lower rate of interest. In contrast, value of IO's securities increases when interest rate goes up in the market as more interest is calculated on borrowings.

However, when interest rate due to prepayments of principals, IO's tends to fall. Thus, from the above, it is clear that it is mainly perception of investors that determines the prices of IOs and POs.

5. Explain the features of 'Securitization'.

[MTP → AUGUST 2018 → 4 MARKS]

Answer:

The securitization has the following features:

- (i) Creation of Financial Instruments – The process of securities can be viewed as process of creation of additional financial product of securities in market backed by collaterals.

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

- (ii) Bundling and Unbundling – When all the assets are combined in one pool it is bundling and when these are broken into instruments of fixed denomination it is unbundling.
- (iii) Tool of Risk Management – In case of assets are securitized on non-recourse basis, then securitization process acts as risk management as the risk of default is shifted.
- (iv) Structured Finance – In the process of securitization, financial instruments are tailor structured to meet the risk return trade of profile of investor, and hence, these securitized instruments are considered as best examples of structured finance.
- (v) Trenching – Portfolio of different receivable or loan or asset are split into several parts based on risk and return they carry called 'Trenche'. Each Trench carries a different level of risk and return.
- (vi) Homogeneity – Under each trenche the securities are issued of homogenous nature and even meant for small investors the who can afford to invest in small amounts.

6. Calculate the value of share from the following information:

Profit of the company	Rs. 290 crores
Equity capital of company	Rs. 1,300 crores
Par value of share	Rs. 40 each
Debt ratio of company (Debt/ Debt + Equity)	27%
Long run growth rate of the company	8%
Beta 0.1; risk free interest rate	8.7%
Market returns	10.3%
Capital expenditure per share	Rs. 47
Depreciation per share	Rs. 39
Change in Working capital	Rs. 3.45 per share

[MTP → AUGUST 2018 → 4 MARKS | RTP → MAY 2020]

Answer:

$$\text{No. of Shares} = \frac{\text{Rs. 1,300 crores}}{\text{Rs. 40}} = 32.5 \text{ Crores}$$

$$\text{EPS} = \frac{\text{PAT}}{\text{No. of shares}}$$

$$\text{EPS} = \frac{\text{₹ 290 crores}}{32.5 \text{ crores}} = \text{Rs. 8.923}$$

$$\text{FCFE} = \text{Net income} - [(1-b) (\text{capex} - \text{dep}) + (1-b) (\Delta \text{WC})]$$

$$\text{FCFE} = 8.923 - [(1-0.27) (47-39) + (1-0.27) (3.45)]$$

$$= 8.923 - [5.84 + 2.5185] = 0.5645$$

$$\text{Cost of Equity} = R_f + \beta (R_m - R_f)$$

$$= 8.7 + 0.1 (10.3 - 8.7) = 8.86\%$$

$$P_0 = \frac{\text{FCFE}(1+g)}{K_e - g} = \frac{0.5645(1.08)}{0.0886 - 0.08} = \frac{0.60966}{0.0086} = \text{Rs. 70.89}$$

CHAPTER 6: SECURITIZATION

7. DIFFERENTIATE between PTS and PTC.

[MTP → AUGUST 2018 → 4 MARKS]

Answer:

Difference between Pass Through Certificates (PTCs) and Pay Through Security (PTS)

Pass Through Certificates (PTCs)

As the title suggests originator (seller of eh assets) transfers the entire receipt of cash in form of interest or principal repayment from the assets sold. Thus, these securities represent direct claim of the investors on all the assets that has been securitized through SPV

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Since, in Pass Through, all cash flow immediately in PTS in case of early retirement of receivables plus cash can be used for short term yield. This structure also provides the freedom to issue several debt tranches with varying maturities.

8. EXPLAIN securitisation in India.

[MTP → AUGUST 2018 → 4 MARKS]

Answer:

It is the Citi Bank who pioneered the concept of securitization in India by bundling of auto loans in securitized instruments. Thereafter many organizations securitized their receivables. Although

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

started with securitization of auto loans it moved to other types of receivables such as sales tax deferrals, aircraft receivable etc.

In order to encourage securitization, the Government has come out with Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act, 2002, to tackle menace of Non-Performing Assets (NPAs) without approaching to Court. With growing sophistication of financial products in Indian Capital Market, securitization has occupied an important place.

As mentioned above, though, initially started with auto loan receivables, it has become an important source of funding for micro finance companies and NBFCs and even now a days commercial mortgage backed securities are also emerging. The important highlight of the scenario of securitization in Indian Market is that it is dominated by a few players e.g. ICICI Bank, HDFC Bank, NHB etc.

As per a report of CRISIL, securitization transactions in India scored to the highest level of approximately Rs. 70000 crores, in Financial Year 2016. (Business Line, 15th June, 2016) In order to further enhance the investor base in securitized debts, SEBI allowed FPIs to invest in securitized debt of unlisted companies upto a certain limit.

9. Explain the pricing of the securitized Instruments

[MTP → MARCH 2019 → 4 MARKS]

Answer:

Pricing of the securitized Instruments

Pricing of securitized instruments is an important aspect of securitization. While pricing the instruments, it is important that it should be acceptable to both originators as well as to the investors. On the same basis pricing of securities can be divided into following two categories:

From Originator's Angle

From originator's point of view, the instruments can be priced at a rate at which originator has to incur an outflow and if that outflow can be amortized over a period of time by investing the amount raised through securitization.

From Investor's Angle

From an investor's angle security price can be determined by discounting best estimate of expected future cash flows using rate of yield to maturity of a security of comparable security with respect to credit quality and average life of the securities. This yield can also be estimated by referring the yield curve available for marketable securities, though some adjustments is needed on account of spread points, because of credit quality of the securitized instruments

10. Describe the concept of 'Stripped Securities'.

[MTP → MARCH 2019 → 4 MARKS]

Answer:

CHAPTER 6: SECURITIZATION

Stripped Securities

Stripped Securities are created by dividing the cash flows associated with underlying securities into two or more new securities. Those two securities are as follows:

- (i) Interest Only (IO) Securities
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In contrast, value of IO's securities increases when interest rate goes up in the market as more interest is calculated on borrowings. However, when interest rate due to prepayments of principals, IO's tends to fall. Thus, from the above, it is clear that it is mainly perception of investors that determines the prices of IOs and POs.

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Krte sir 15:48

Sir whatever it is my success belongs to you 23:50

The way you push me during exam, your motivational audios n everything always took me to the right path 23:51

Thanku so much sir 23:51

Thanku is a very small word 23:51

Thanku for being my friend philosopher elder brother 23:52

0:01 23:52 ✓✓

Forwarded

Final (Old) Examination Results, November 2019

Roll Number	200210
Name	PRIYA SHREERANG RAHUL KAKR
Group I	
Financial Reporting	285
Strategic Financial Management	248
Advanced Auditing and Professional Ethics	243
Corporate and Allied Laws	254
Total	1030
Result	PASS

23:53

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PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

7.

MUTUAL FUNDS

QUESTIONS FROM ICAI STUDY MATERIAL

1. Explain how to establish a Mutual Fund.

Answer:

Establishment of a Mutual Fund: A mutual fund is required to be registered with the Securities and Exchange Board of India (SEBI) before it can collect funds from the public. All mutual funds are governed by the same set of regulations and are subject to monitoring and inspections by the SEBI. The Mutual Fund has to be established through the medium of a sponsor. A sponsor means any body corporate who, acting alone or in combination with another body corporate, establishes a mutual fund after completing the formalities prescribed in the SEBI's Mutual Fund Regulations.

The role of sponsor is akin to that of a promoter of a company, who provides the initial capital and appoints the trustees. The sponsor should be a body corporate in the business of financial services for a period not less than 5 years, be financially sound and be a fit party to act as sponsor in the eyes of SEBI.

The Mutual Fund has to be established as either a trustee company or a Trust, under the Indian Trust Act and the instrument of trust shall be in the form of a deed. The deed shall be executed by the sponsor in favour of the trustees named in the instrument of trust. The trust deed shall be duly registered under the provisions of the Indian Registration Act, 1908. The trust deed shall contain clauses specified in the Third Schedule of the Regulations.

An Asset Management Company, who holds an approval from SEBI, is to be appointed to manage the affairs of the Mutual Fund and it should operate the schemes of such fund. The Asset Management Company is set up as a limited liability company, with a minimum net worth of Rs. 10 crores.

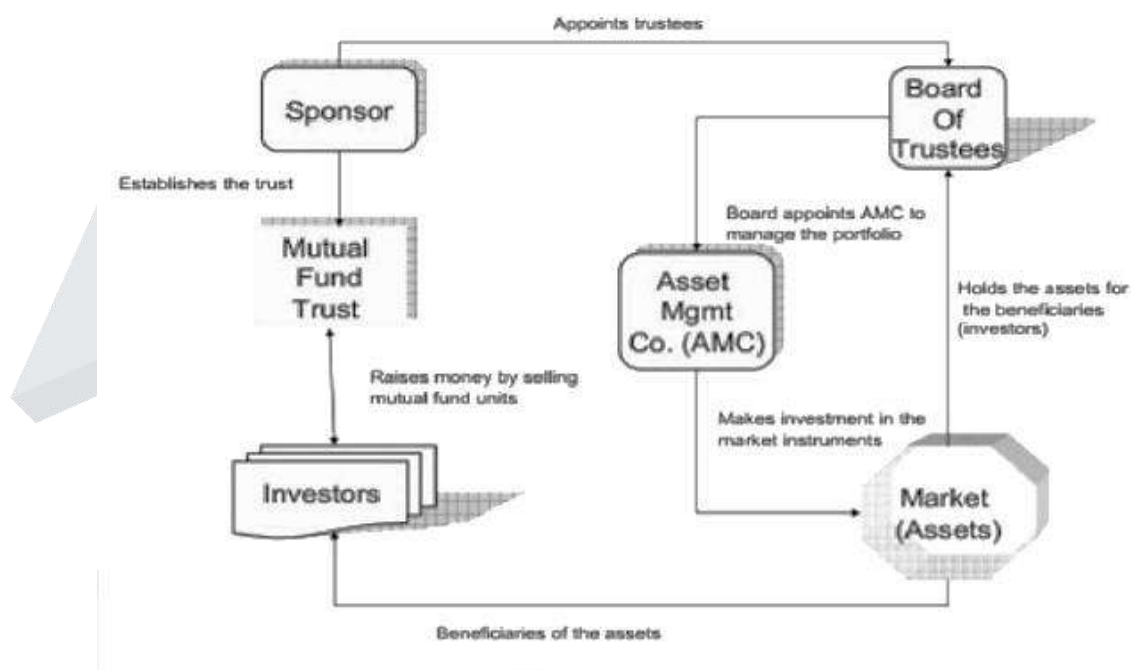
The sponsor should contribute at least 40% to the networth of the Asset Management Company. The Trustee should hold the property of the Mutual Fund in trust for the benefit of the unit holders.

SEBI regulations require that at least two-thirds of the directors of the Trustee Company or board of trustees must be independent, that is, they should not be associated with the sponsors. Also, 50 per cent of the directors of AMC must be independent. The appointment of the AMC can be terminated by majority of the trustees or by 75% of the unit holders of the concerned scheme.

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The AMC may charge the mutual fund with Investment Management and Advisory fees subject to prescribed ceiling. Additionally, the AMC may get the expenses on operation of the mutual fund reimbursed from the concerned scheme.

The Mutual fund also appoints a custodian, holding valid certificate of registration issued by SEBI, to have custody of securities held by the mutual fund under different schemes. In case of dematerialized securities, this is done by Depository Participant. The custodian must be independent of the sponsor and the AMC.



2. What are the advantages of investing in Mutual Funds?

Answer:

- (a) **Professional Management:** The funds are managed by skilled and professionally experienced managers with a back up of a Research team.
- (b) **Diversification:** Mutual Funds offer diversification in portfolio which reduces the risk.
- (c) **Convenient Administration:** There are no administrative risks of share transfer, as many of the Mutual Funds offer services in a demat form which save investor's time and delay.
- (d) **Higher Returns:** Over a medium to long-term investment, investors always get higher returns in Mutual Funds as compared to other avenues of investment. This is already seen from excellent returns, Mutual Funds have provided in the last few years. However, investors are cautioned that such high returns riding on the IT boom should not be taken as regular returns and therefore one should look at the average returns provided by the Mutual Funds particularly in the equity schemes during the last couple of years.
- (e) **Low Cost of Management:** No Mutual Fund can increase the cost beyond prescribed limits of 2.5% maximum and any extra cost of management is to be borne by the AMC.

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- (f) **Liquidity:** In all the open ended funds, liquidity is provided by direct sales / repurchase by the Mutual Fund and in case of close ended funds, the liquidity is provided by listing the units on the Stock Exchange.
- (g) **Transparency:** The SEBI Regulations now compel all the Mutual Funds to disclose their portfolios on a half-yearly basis. However, many Mutual Funds disclose this on a quarterly or monthly basis to their investors. The NAVs are calculated on a daily basis in case of open ended funds and are now published through AMFI in the newspapers.
- (h) **Other Benefits:** Mutual Funds provide regular withdrawal and systematic investment plans according to the need of the investors. The investors can also switch from one scheme to another without any load.
- (i) **Highly Regulated:** Mutual Funds all over the world are highly regulated and in India all Mutual Funds are registered with SEBI and are strictly regulated as per the Mutual Fund Regulations which provide excellent investor protection.
- (j) **Economies of scale:** The way mutual funds are structured gives it a natural advantage. The “pooled” money from a number of investors ensures that mutual funds enjoy economies of scale; it is cheaper compared to investing directly in the capital markets which involves higher charges. This also allows retail investors access to high entry level markets like real estate, and also there is a greater control over costs.
- (k) **Flexibility:** There are a lot of features in a regular mutual fund scheme, which imparts flexibility to the scheme. An investor can opt for Systematic Investment Plan (SIP), Systematic Withdrawal Plan etc. to plan his cash flow requirements as per his convenience. The wide range of schemes being launched in India by different mutual funds also provides an added flexibility to the investor to plan his portfolio accordingly.

3. Mr. A can earn a return of 16 per cent by investing in equity shares on his own. Now he is considering a recently announced equity based mutual fund scheme in which initial expenses are 5.5 per cent and annual recurring expenses are 1.5 per cent. How much should the mutual fund earn to provide Mr. A return of 16 per cent?

Answer:

Personal earnings of Mr. A = $R_1 = 16\%$

Mutual Fund earnings = R_2

$$R_2 = \frac{1}{1 - \text{Initial expenses}(\%)} R_1 + \text{Recurring expenses}(\%)$$

$$= \frac{1}{1 - 0.055} \times 16\% + 1.5\%$$

$$= 18.43\%$$

Mutual Fund earnings = 18.43%

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4. A mutual fund that had a net asset value of Rs. 16 at the beginning of a month, made income and capital gain distribution of Rs. 0.04 and Rs. 0.03 respectively per unit during the month, and then ended the month with a net asset value of Rs. 16.08. Calculate monthly and annual rate of return.

Answer:

Calculation of monthly return on the mutual funds:

$$r = \frac{(\text{NAV}_t - \text{NAV}_{t-1}) + I_t + G_t}{\text{NAV}_{t-1}}$$

$$\text{Or, } r = \frac{(\text{₹ } 16.08 - \text{₹ } 16.00) + (\text{₹ } 0.04 + \text{₹ } 0.03)}{16}$$

$$= \frac{0.08 + 0.07}{16} = 0.009375 \quad \text{or, } r = 0.9375\% \text{ or } 11.25\% \text{ p.a.}$$

5. Cinderella Mutual Fund has the following assets in Scheme Rudolf at the close of business on 31st March, 2014.

Company	No. of Shares	Market Price Per Share
Nairobi Ltd.	25000	₹ 20
Dakar Ltd.	35000	₹ 300
Senegal Ltd.	29000	₹ 380
Cairo Ltd.	40000	₹ 500

The total number of units of Scheme Rudolf are 10 lacs. The Scheme Rudolf has accrued expenses of Rs. 2,50,000 and other liabilities of Rs. 2,00,000. Calculate the NAV per unit of the Scheme Rudolf.

[ALSO ASKED IN MTP → APRIL 2018 → 8 MARKS | MTP → OCTOBER 2018 → 5 MARKS]

Answer:

Shares	No. of shares	Price	Amount (₹)
Nairobi Ltd.	25,000	20.00	5,00,000
Dakar Ltd.	35,000	300.00	1,05,00,000
Senegal Ltd.	29,000	380.00	1,10,20,000
Cairo Ltd.	40,000	500.00	2,00,00,000
			4,20,20,000
Less: Accrued Expenses			2,50,000
Other Liabilities			2,00,000
Total Value			4,15,70,000
No. of Units			10,00,000
NAV per Unit (4,15,70,000/10,00,000)			41.57

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6. A Mutual Fund Co. has the following assets under it on the close of business as on:

Company	No. of Shares	1 st February 2012 Market price per share ₹	2 nd February 2012 Market price per share ₹
L Ltd	20,000	20.00	20.50
M Ltd	30,000	312.40	360.00
N Ltd	20,000	361.20	383.10
P Ltd	60,000	505.10	503.90

Total No. of Units 6,00,000

(i) Calculate Net Assets Value (NAV) of the Fund.

(ii) Following information is given:

Assuming one Mr. A, submits a cheque of Rs. 30,00,000 to the Mutual Fund and the Fund manager of this company purchases 8,000 shares of M Ltd; and the balance amount is held in Bank. In such a case, what would be the position of the Fund?

(iii) Find new NAV of the Fund as on 2nd February 2012.

[ALSO ASKED IN MAY 2018 EXAMS → 10 MARKS]

Answer:

(i) NAV of the Fund

$$= \frac{₹ 4,00,000 + ₹ 93,72,000 + ₹ 72,24,000 + ₹ 3,03,06,000}{6,00,000}$$

$$= \frac{₹ 4,73,02,000}{6,00,000} = ₹ 78.8366 \text{ rounded to } ₹ 78.84$$

(ii) The revised position of fund shall be as follows:

Shares	No. of shares	Price	Amount (₹)
L Ltd.	20,000	20.00	4,00,000
M Ltd.	38,000	312.40	1,18,71,200
N Ltd.	20,000	361.20	72,24,000
P Ltd.	60,000	505.10	3,03,06,000
Cash			<u>5,00,800</u>
			<u>5,03,02,000</u>

$$\text{No. of units of fund} = 6,00,000 + \frac{30,00,000}{78.8366} = 6,38,053$$

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(iii) On 2nd February 2012, the NAV of fund will be as follows:

Shares	No. of shares	Price	Amount (₹)
L Ltd.	20,000	20.50	4,10,000
M Ltd.	38,000	360.00	1,36,80,000
N Ltd.	20,000	383.10	76,62,000
P Ltd.	60,000	503.90	3,02,34,000
Cash			<u>5,00,800</u>
			<u>5,24,86,800</u>

$$\text{NAV as on 2nd February 2012} = \frac{\text{₹ } 5,24,86,800}{6,38,053} = \text{₹ } 82.26 \text{ per unit}$$

PAST EXAMINATION, MTP & RTP QUESTIONS

7. A mutual fund having 300 units has shown its NAV of Rs. 8.75 and Rs. 9.45 at the beginning and at the end of the year respectively. The Mutual fund has given two options to the investors:

- (i) Get dividend of Rs. 0.75 per unit and capital gain of Rs. 0.60 per unit, or
- (ii) These distributions are to be reinvested at an average NAV of Rs. 8.65 per unit.

What difference would it make in terms of returns available and which option is preferable by the investors?

[NOV 2018 → 8 MARKS | MTP → MARCH 2018 → 8 MARKS]

Answer:

Option 1: When Dividend and Capital Gain are paid:

Calculation of monthly return on the mutual funds:

$$r = \frac{(\text{NAV}_t - \text{NAV}_{t-1}) + I_t + G_t}{\text{NAV}_{t-1}}$$

$$\text{Or, } r = \frac{(\text{₹ } 9.45 - \text{₹ } 8.75) + (\text{₹ } 0.75 + \text{₹ } 0.60)}{8.75}$$

$$= \frac{0.70 + 1.35}{8.75} = 23.43\%$$

Option 2: When Dividend and Capital Gain are reinvested:

If all dividends and capital gain are reinvested into additional units at Rs. 8.65 per unit the position would be.

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Total amount reinvested = Rs. 1.35×300 = Rs. 405

Additional units added = Rs. 405 / 8.65 = 46.82 units or 47 units

Value of units at the end = 346.82 units x Rs. 9.45 = Rs. 3277.45

Or = 347 units x Rs. 9.45 = Rs. 3279.15

Price paid for 300 units as at the beginning = $(300 \times \text{Rs. } 8.75)$ = Rs. 2,625

Return = $(\text{Rs. } 3277.45 - \text{Rs. } 2625) / \text{Rs. } 2625 = 24.86\%$

Or Return = $(\text{Rs. } 3279.15 - \text{Rs. } 2625) / \text{Rs. } 2625 = \text{Rs. } 654.15 / \text{Rs. } 2625 = 24.92\%$

From the above, it can be said that reinvestment option is better.

8. A Mutual Fund Company introduces two schemes - Dividend Plan and Bonus Plan. The face value of the Unit is Rs.10 on 1-4-2014. Mr. R invested Rs. 5 lakh in Dividend Plan and Rs. 10 lakh in Bonus Plan. The NAV of Dividend Plan is Rs. 46 and NAV of Bonus Plan is Rs. 42. Both the plans matured on 31-03-2019. The particulars of Dividend and Bonus declared over the period are as follows:

Date	Dividend %	Bonus Ratio	NAV of Dividend Plan	NAV of Bonus Plan
			(₹)	(₹)
31-12-2014	12%	-	47.0	42.0
30-09-2015	-	1 : 4	48.0	43.0
31-03-2016	15%	-	49.5	41.5
30-09-2017	-	1 : 6	50.0	44.0
31-03-2018	10%	-	48.0	43.5
31-03-2019	-	-	49.0	44.0

You are required to calculate the effective yield per annum in respect of the above two plans.

[MAY 2019 → 8 MARKS]

Answer:

Dividend Plan

$$\text{Unit acquired} = \frac{5,00,000}{46} = 10869.57$$

Date	Units held	Dividend		Reinvestment	New	Total
		%	Amount	Rate	Units	Units
01.04.2014						10869.57
31.12.2014	10869.57	12	13043.48	47.0	277.52	11147.09
31.03.2016	11147.09	15	16720.64	49.5	337.79	11484.88
31.03.2018	11484.88	10	11484.88	48.0	239.27	11724.15

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31.03.2019	Maturity Value (₹ 49.0 X 11724.15)	₹ 5,74,483.35
	Less: Cost of Acquisition	₹ 5,00,000.00
	Total Gain	₹ 74,483.35

$$\therefore \text{Effective Yield} = \frac{\text{₹ } 74,483.35}{\text{₹ } 5,00,000} \times \frac{1}{5} \times 100 = 2.98\%$$

Bonus Plan

$$\text{Units Acquired} = \frac{10,00,000}{42} = 23809.52$$

Date	Particulars	Calculation Working	No. of Units	NAV (₹)
1.4.14	Investment		23809.52	42
30.9.15	Bonus	23,809.52 / 4 =	5952.38	
			29761.90	43
30.9.17	"	29761.9 / 6 =	4960.32	
			34722.22	44
31.3.19	Maturity Value	34722.22 x ₹ 44 =		15,27,777.68
	Less: Investment			10,00,000.00
	Gain			5,27,777.68

$$\therefore \text{Effective Yield} = \frac{5,27,777.68}{10,00,000} \times \frac{1}{5} \times 100 = 10.56\%$$

9. On 1st April, an open ended scheme of mutual fund had 300 lakh units outstanding with Net Assets Value (NAV) of Rs. 18.75. At the end of April, it issued 6 lakh units at opening NAV plus 2% load, adjusted for dividend equalization. At the end of May, 3 Lakh units were repurchased at opening NAV less 2% exit load adjusted for dividend equalization. At the end of June, 70% of its available income was distributed.

In respect of April-June quarter, the following additional information are available:

	Rs. in lakh
Portfolio value appreciation	425.47
Income of April	22.950
Income for May	34.425
Income for June	45.450

You are required to calculate

- Income available for distribution;
- Issue price at the end of April;
- repurchase price at the end of May; and
- net asset value (NAV) as on 30th June.

[MTP → AUGUST 2018 / APRIL 2019 → 10 MARKS / 8 MARKS]

Answer:

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Calculation of Income available for Distribution

	Units (Lakh)	Per Unit (Rs.)	Total (Rs. In lakh)
Income from April	300	0.0765	22.9500
Add: Dividend equalization collected on issue	6	0.0765	0.4590
	306	0.0765	23.4090
Add: Income from May		0.1125	34.4250
	306	0.1890	57.8340
Less: Dividend equalization paid on repurchase	3	0.1890	(0.5670)
	303	0.1890	57.2670
Add: Income from June		0.1500	45.4500
	303	0.3390	102.7170
Less: Dividend Paid		0.2373	(71.9019)
	303	0.1017	30.8151

Calculation of Issue Price at the end of April

	Rs.
Opening NAV	18.750
Add: Entry Load 2% of Rs. 18.750	(0.375)
	19.125
Add: Dividend Equalization paid on Issue Price	0.0765
	19.2015

Calculation of Issue Price at the end of April

	Rs.
Opening NAV	18.750
Add: Entry Load 2% of Rs. 18.750	(0.375)
	19.125
Add: Dividend Equalization paid on Issue Price	0.0765
	19.2015

Calculation of Repurchase Price at the end of May

	Rs.
Opening NAV	18.750
Less: Exit Load 2% of Rs. 18.750	(0.375)
	18.375
Add: Dividend Equalization paid on Issue Price	0.1890
	18.564

Closing NAV

		Rs. (Lakh)
Opening Net Asset Value (Rs. 18.75 × 300)		5625.0000
Portfolio Value Appreciation		425.4700
Issue of Fresh Units (6 × 19.2015)		115.2090
Income Received (22.950 + 34.425 + 45.450)		102.8250
		6268.504
Less: Units repurchased (3 × 18.564)	-55.692	
Income Distributed	-71.9019	(-127.5939)
Closing Net Asset Value		6140.9101
Closing Units (300 + 6 – 3) lakh		303 lakh
∴ Closing NAV as on 30 th June		Rs. 20.2670

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10. A Mutual Fund is holding the following assets in Rs. Crores :

Investments in diversified equity shares	90.00
Cash and Bank Balances	<u>10.00</u>
	<u>100.00</u>

The Beta of the portfolio is 1.1. The index future is selling at 4300 level. The Fund Manager apprehends that the index will fall at the most by 10%. Calculate the number of index futures he should short for perfect hedging. One index future consists of 50 units.

Evaluate your answer assuming the Fund Manager's apprehension will materialize.

[MTP → MARCH 2019 → 7 MARKS]

Answer:

Number of index future to be sold by the Fund Manager is:

$$\frac{1.1 \times 90,00,00,000}{4,300 \times 50} = 4,605$$

Justification of the answer:

Loss in the value of the portfolio if the index falls by 10% is Rs. $\frac{11}{100} \times 90$ Crore = Rs. 9.90 Crore.

Gain by short covering of index future is: $\frac{0.1 \times 4,300 \times 50 \times 4,605}{1,00,00,000} = 9.90$ Crore

This justifies the answer. Further, cash is not a part of the portfolio.

11. Orange purchased 200 units of Oxygen Mutual Fund at Rs. 45 per unit on 31st December, 2009. In 2010, he received Rs. 1.00 as dividend per unit and a capital gains distribution of Rs. 2 per unit.

Required:

- Calculate the return for the period of one year assuming that the NAV as on 31st December 2010 was Rs. 48 per unit.
- Calculate the return for the period of one year assuming that the NAV as on 31st December 2010 was Rs. 48 per unit and all dividends and capital gains distributions have been reinvested at an average price of Rs. 46.00 per unit. Ignore taxation.

[MTP → MARCH 2019 → 8 MARKS]

Answer:

(i) Returns for the year

(All changes on a Per -Unit Basis)

Change in Price:	Rs. 48 – Rs.45 =	Rs. 3.00
Dividends received:		Rs. 1.00
Capital gains distribution		<u>Rs. 2.00</u>
Total reward		<u>Rs. 6.00</u>

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Holding period reward: $\frac{₹6.00}{₹45} \times 100 = 13.33\%$

- (ii) When all dividends and capital gains distributions are re-invested into additional units of the fund @ (Rs. 46/unit)

Dividend + Capital Gains per unit = Rs. 1.00 + Rs. 2.00 = Rs. 3.00

Total received from 200 units = Rs. 3.00 x 200 = Rs. 600/-.

Additional Units Acquired = Rs. 600/Rs. 46 = 13.04 Units.

Total No. of Units = 200 units + 13.04 units = 213.04 units.

Value of 213.04 units held at the end of the year

= 213.04 units x Rs.48 = Rs. 10225.92

Price Paid for 200 Units at the beginning of the year = 200 units x Rs. 45 = Rs. 9000.00

Holding Period Reward Rs. (10225.92 – 9000.00) = Rs.1225.92

Holding Period Reward = $\frac{₹1225.92}{₹9000} \times 100 = 13.62\%$

12. Mr. Abhishek is interested in investing Rs. 2,00,000 for which he is considering following three alternatives:

- (i) Invest Rs. 2,00,000 in Mutual Fund X (MFX)
- (ii) Invest Rs. 2,00,000 in Mutual Fund Y (MFY)
- (iii) Invest Rs. 1,20,000 in Mutual Fund X (MFX) and Rs. 80,000 in Mutual Fund Y (MFY)

Average annual return earned by MFX and MFY is 15% and 14% respectively. Risk free rate of return is 10% and market rate of return is 12%.

Covariance of returns of MFX, MFY and market portfolio Mix are as follow:

	MFX	MFY	Mix
MFX	4.800	4.300	3.370
MFY	4.300	4.250	2.800
Mix	3.370	2.800	3.100

You are required to calculate:

- (i) variance of return from MFX, MFY and market return,
- (ii) portfolio return, beta, portfolio variance and portfolio standard deviation,
- (iii) expected return, systematic risk and unsystematic risk; and
- (iv) Sharpe ratio, Treynor ratio and Alpha of MFX, MFY and Portfolio Mix.

[MTP → MARCH 2019 → 12 MARKS]

Answer:

- (i) Variance of Returns

$$\text{Cor}_{ij} = \frac{\text{Cov}(i, j)}{\sigma_i \sigma_j}$$

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Accordingly, for MFX

$$1 = \frac{\text{Cov}(X, X)}{\sigma_X \sigma_X}$$

$$\sigma_X^2 = 4.800$$

Accordingly, for MFY

$$1 = \frac{\text{Cov}(Y, Y)}{\sigma_Y \sigma_Y}$$

$$\sigma_Y^2 = 4.250$$

Accordingly, for Market Return

$$1 = \frac{\text{Cov}(M, M)}{\sigma_M \sigma_M}$$

$$\sigma_M^2 = 3.100$$

(ii) Portfolio return, beta, variance and standard deviation

$$\text{Weight of MFX in portfolio} = \frac{1,20,000}{2,00,000} = 0.60$$

$$\text{Weight of MFY in portfolio} = \frac{80,000}{2,00,000} = 0.40$$

Accordingly Portfolio Return

$$0.60 \times 15\% + 0.40 \times 14\% = 14.60\%$$

Beta of each Fund

$$\beta = \frac{\text{Cov}(\text{Fund}, \text{Market})}{\text{Variance of Market}}$$

$$\beta_X = \frac{3.370}{3.100} = 1.087$$

$$\beta_Y = \frac{2.800}{3.100} = 0.903$$

Portfolio Beta

$$0.60 \times 1.087 + 0.40 \times 0.903 = 1.013$$

Portfolio Variance

$$\sigma_{XY}^2 = w_X^2 \sigma_X^2 + w_Y^2 \sigma_Y^2 + 2 w_X w_Y \text{Cov}_{XY}$$

$$= (0.60)^2 (4.800) + (0.40)^2 (4.250) + 2(0.60)(0.40)(4.300)$$

$$= 4.472$$

Or Portfolio Standard Deviation

$$\sigma_{XY} = \sqrt{4.472} = 2.115$$

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(iii) Expected Return, Systematic and Unsystematic Risk of Portfolio

$$\text{Portfolio Return} = 10\% + 1.0134(12\% - 10\%) = 12.03\%$$

$$\text{MF X Return} = 10\% + 1.087(12\% - 10\%) = 12.17\%$$

$$\text{MF Y Return} = 10\% + 0.903(12\% - 10\%) = 11.81\%$$

$$\text{Systematic Risk} = \beta^2 \sigma^2$$

Accordingly,

$$\text{Systematic Risk of MFX} = (1.087)^2 \times 3.10 = 3.663$$

$$\text{Systematic Risk of MFY} = (0.903)^2 \times 3.10 = 2.528$$

$$\text{Systematic Risk of Portfolio} = (1.013)^2 \times 3.10 = 3.181$$

$$\text{Unsystematic Risk} = \text{Total Risk} - \text{Systematic Risk}$$

Accordingly,

$$\text{Unsystematic Risk of MFX} = 4.80 - 3.663 = 1.137$$

$$\text{Unsystematic Risk of MFY} = 4.250 - 2.528 = 1.722$$

$$\text{Unsystematic Risk of Portfolio} = 4.472 - 3.181 = 1.291$$

(iv) Sharpe and Treynor Ratios and Alpha

Sharpe Ratio

$$\text{MFX} = \frac{15\% - 10\%}{\sqrt{4.800}} = 2.282$$

$$\text{MFY} = \frac{14\% - 10\%}{\sqrt{4.250}} = 1.94$$

$$\text{Portfolio} = \frac{14.6\% - 10\%}{2.115} = 2.175$$

Treynor Ratio

$$\text{MFX} = \frac{15\% - 10\%}{1.087} = 4.60$$

$$\text{MFY} = \frac{14\% - 10\%}{0.903} = 4.43$$

$$\text{Portfolio} = \frac{14.6\% - 10\%}{1.0134} = 4.54$$

Alpha

$$\text{MFX} = 15\% - 12.17\% = 2.83\%$$

$$\text{MFY} = 14\% - 11.81\% = 2.19\%$$

$$\text{Portfolio} = 14.6\% - 12.03\% = 2.57\%$$

13. Explain about Direct Plan in Mutual Fund

[MTP → APRIL 2019 → 4 MARKS]

Answer:

Direct Plans in Mutual Funds

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Asset management companies (AMC) have been permitted to make direct investments in mutual fund schemes even before 2011. But, there were no separate plans for these investments. These investments were made in distributor plan itself and were tracked with single NAV - one of the distributor plans. Therefore, an investor was forced to buy mutual funds based on the NAV of the distributor plans. However, things changed with introduction of direct plans by SEBI on January 1, 2013.

Mutual fund direct plans are those plan where Asset Management Companies or mutual fund Houses do not charge distributor expenses, trail fees and transaction charges. NAV of the direct plan are generally higher in comparison to a regular plan. Studies have shown that the 'Direct Plans' have performed better than the 'Regular Plans' for almost all the mutual fund schemes.

14. An investor purchased 300 units of a Mutual Fund at Rs. 12.25 per unit on 31st December, 2009. As on 31st December, 2010 he has received Rs. 1.25 as dividend and Rs. 1.00 as capital gains distribution per unit.

Required:

- (i) The return on the investment if the NAV as on 31 st December, 2010 is Rs. 13.00.
- (ii) The return on the investment as on 31st December, 2010 if all dividends and capital gains distributions are reinvested into additional units of the fund at Rs. 12.50 per unit.

[MTP → OCTOBER 2019 → 8 MARKS]

Answer:

Return for the year (all changes on a per year basis)

Particulars	Rs. /Unit
Change in price (Rs. 13.00 – Rs. 12.25)	0.75
Dividend received	1.25
Capital gain distribution	<u>1.00</u>
Total Return	<u>3.00</u>

$$\text{Return on investment} = \frac{3.00}{12.25} \times 100 = 24.49\%$$

Alternatively, it can also be computed as follows:

$$\begin{aligned} & \frac{(\text{NAV}_1 - \text{NAV}_0) + D_1 + \text{CG}_1}{\text{NAV}_0} \times 100 \\ &= \frac{(13 - 12.25) + 1.25 + 1.00}{12.25} \times 100 \\ &= 24.49\% \end{aligned}$$

If all dividends and capital gain are reinvested into additional units at Rs. 12.50 per unit the position would be.

$$\text{Total amount reinvested} = \text{Rs. } 2.25 \times 300 = \text{Rs. } 675$$

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$$\text{Additional units added} = \frac{\text{₹ } 675}{12.50} = 54 \text{ units}$$

Value of 354 units as on 31-12-2010 = Rs. 4,602

Price paid for 300 units on 31-12-2009 (300 × Rs. 12.25) = Rs. 3,675

$$\text{Return} = \frac{\text{₹ } 4,602 - \text{₹ } 3,675}{\text{₹ } 3,675} = \frac{\text{₹ } 927}{\text{₹ } 3,675} = 25.22\%$$

15. Sun Moon Mutual Fund (Approved Mutual Fund) sponsored open-ended equity oriented scheme “Chanakya Opportunity Fund”. There were three plans viz. ‘A’ – Dividend Reinvestment Plan, ‘B’ – Bonus Plan & ‘C’ – Growth Plan.

At the time of Initial Public Offer on 1.4.2009, Mr. Anand, Mr. Bacchan & Mrs. Charu, three investors invested Rs. 1,00,000 each & chosen ‘B’, ‘C’ & ‘A’ Plan respectively.

The History of the Fund is as follows:

Date	Dividend %	Bonus Ratio	Net Asset Value per Unit (F.V. ₹ 10)		
			Plan A	Plan B	Plan C
28.07.2013	20		30.70	31.40	33.42
31.03.2014	70	5 : 4	58.42	31.05	70.05
31.10.2017	40		42.18	25.02	56.15
15.03.2018	25		46.45	29.10	64.28
31.03.2018		1 : 3	42.18	20.05	60.12
24.03.2019	40	1 : 4	48.10	19.95	72.40
31.07.2019			53.75	22.98	82.07

On 31st July 2019 all three investors redeemed all the balance units.

CALCULATE:

- Annual rate of return of Mrs. Charu who has invested in ‘A’ – Dividend Re-investment Plan.
- Annual rate of return of Mr. Anand who has invested in ‘B’ – Bonus Plan.
- Annual rate of return of Mr. Bacchan who has invested ‘C’ – Growth Plan.

Assumptions:

- Long-term Capital Gain is exempt from Income tax.
- Short-term Capital Gain is subject to 10% Income tax.
- Security Transaction Tax 0.2 per cent only on sale/redemption of units.
- Ignore Education Cess

[RTP → MAY 2018]

CHAPTER 7:
MUTUAL FUNDS

Answer:

(i) Return of Mrs. Charu invested in Plan A (Dividend Reinvestment)

(Amount in ₹)

Date	Investment	Dividend payout (%)	Dividend Re-invested (Closing Units X Face value of '10 X Dividend Payout %)	NAV	Units	Closing Unit Balance Σ Units
01.04.2009	1,00,000.00			10.00	10,000.00	10,000.00
28.07.2013		20	20,000.00	30.70	651.47	10,651.47
31.03.2014		70	74,560.29	58.42	1,276.28	11,927.75
31.10.2017		40	47,711.00	42.18	1,131.13	13,058.88
15.03.2018		25	32,647.20	46.45	702.85	13,761.73
24.03.2019		40	55,046.92	48.10	1,144.43	14,906.16

Redemption value $14,906.16 \times 53.75$	8,01,206.10
Less: Security Transaction Tax (STT) is 0.2%	<u>1,602.41</u>
Net amount received	7,99,603.69
Less: Short term capital gain tax @ 10% on 1,144.43 (53.64* – 48.10) = 6,340	<u>634</u>
Net of tax	7,98,969.69
Less: Investment	<u>1,00,000.00</u>
	<u>6,98,969.69</u>

*(53.75 – STT @ 0.2%) ~ This value can also be taken as zero

$$\text{Annual average return (\%)} = \frac{6,98,969.69}{1,00,000} \times \frac{12}{124} \times 100 = 67.64 \%$$

(ii) Return of Mr. Anand invested in Plan B – (Bonus)

(Amount in ₹)				
Date	Units	Bonus units	Total Balance	NAV per unit
01.04.2009	10,000		10,000	10
31.03.2014		12,500	22,500	31.05
31.03.2018		7,500	30,000	20.05
24.03.2019		7,500	37,500	19.95

Redemption value $37,500 \times 22.98$	8,61,750.00
Less: Security Transaction Tax (STT) is 0.2%	<u>1,723.50</u>
Net amount received	8,60,026.50
Less: Short term capital gain tax @ 10%	
$7,500 \times (22.93^{\dagger} - 19.95) = 22,350$	<u>2,235.00</u>

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Net of tax	8,57,791.50
Less: Investment	<u>1,00,000.00</u>
Net gain	<u>7,57,791.50</u>
†(22.98 – STT @ 0.2%)	
Annual average return (%)	$\frac{7,57,791.50}{1,00,000} \times \frac{12}{124} \times 100 = 73.33 \%$

(iii) Return of Mr. Bacchan invested in Plan C – (Growth)

Particulars	(Amount in ₹)
Redemption value 10,000 × 82.07	8,20,700.00
Less: Security Transaction Tax (S.T.T) is .2%	<u>1,641.40</u>
Net amount received	8,19,058.60
Less: Short term capital gain tax @ 10%	<u>0.00</u>
Net of tax	8,19,058.60
Less: Investment	<u>1,00,000.00</u>
Net gain	<u>7,19,058.60</u>

Annual average return (%)	$\frac{7,19,058}{1,00,000} \times \frac{12}{124} \times 100 = 69.59 \%$

Note: Alternatively, figure of * and † can be taken as without net of Tax because, as per Proviso 5 of Section 48 of IT Act, no deduction of STT shall be allowed in computation of Capital Gain.

16. Following information is related to XYZ Regular Income Fund:

Particulars	₹ Crores
Listed shares at Cost (ex-dividend)	20
Cash in hand	1.23
Bonds and debentures at cost	4.3
Of these, bonds not listed and quoted	1
Other fixed interest securities at cost	4.5
Dividend accrued	0.8
Amount payable on shares	6.32
Expenditure accrued	0.75
Number of units (₹ 10 face value)	20 lacs
Current realizable value of fixed income securities of face value of ₹ 100	106.5
The listed shares were purchased when Index was	1,000
Present index is	2,300
Value of listed bonds and debentures at NAV date	8

CALCULATE the NAV of scheme on per unit basis if there has been a diminution of 20% in unlisted bonds and debentures and Other fixed interest securities are valued at cost.

CHAPTER 7: MUTUAL FUNDS

[RTP → NOV 2018]

Answer:

Particulars	Adjusted Values ₹ crores
Equity Shares	46.00
Cash in hand	1.23
Bonds and debentures not listed	0.80
Bonds and debentures listed	8.00
Dividends accrued	0.80
Fixed income securities	4.50
Sub total assets (A)	61.33
Less: Liabilities	
Amount payable on shares	6.32
Expenditure accrued	0.75
Sub total liabilities (B)	7.07
Net Assets Value (A) – (B)	54.26
No. of units	20,00,000
Net Assets Value per unit (₹ 54.26 crore / 20,00,000)	₹ 271.30

17. There are two Mutual Funds viz. D Mutual Fund Ltd. and K Mutual Fund Ltd. Each having close ended equity schemes.

NAV as on 31-12-2014 of equity schemes of D Mutual Fund Ltd. is Rs. 70.71 (consisting 99% equity and remaining cash balance) and that of K Mutual Fund Ltd. is 62.50 (consisting 96% equity and balance in cash).

Following is the other information:

Particular	Equity Schemes	
	D Mutual Fund Ltd.	K Mutual Fund Ltd.
Sharpe Ratio	2	3.3
Treynor Ratio	15	15
Standard deviation	11.25	5

There is no change in portfolios during the next month and annual average cost is Rs. 3 per unit for the schemes of both the Mutual Funds.

If Share Market goes down by 5% within a month, calculate expected NAV after a month for the schemes of both the Mutual Funds.

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For calculation, consider 12 months in a year and ignore number of days for particular month.

[RTP → MAY 2019]

Answer:

Working Notes:

(i) Decomposition of Funds in Equity and Cash Components

	D Mutual Fund Ltd.	K Mutual Fund Ltd.
NAV on 31.12.14	₹ 70.71	₹ 62.50
% of Equity	99%	96%
Equity element in NAV	₹ 70	₹ 60
Cash element in NAV	₹ 0.71	₹ 2.50

(ii) Calculation of Beta

(a) D Mutual Fund Ltd.

$$\text{Sharpe Ratio} = 2 = \frac{E(R) - R_f}{\sigma_D} = \frac{E(R) - R_f}{11.25}$$

$$E(R) - R_f = 22.50$$

$$\text{Treynor Ratio} = 15 = \frac{E(R) - R_f}{\beta_D} = \frac{22.50}{\beta_D}$$

$$\beta_D = 22.50/15 = 1.50$$

(b) K Mutual Fund Ltd.

$$\text{Sharpe Ratio} = 3.3 = \frac{E(R) - R_f}{\sigma_K} = \frac{E(R) - R_f}{5}$$

$$E(R) - R_f = 16.50$$

$$\text{Treynor Ratio} = 15 = \frac{E(R) - R_f}{\beta_K} = \frac{16.50}{\beta_K}$$

$$\beta_K = 16.50/15 = 1.10$$

(iii) Decrease in the Value of Equity

	D Mutual Fund Ltd.	K Mutual Fund Ltd.
Market goes down by	5.00%	5.00%
Beta	1.50	1.10
Equity component goes down	7.50%	5.50%

(iv) Balance of Cash after 1 month

	D Mutual Fund Ltd.	K Mutual Fund Ltd.
Cash in Hand on 31.12.14	₹ 0.71	₹ 2.50
Less: Exp. Per month	₹ 0.25	₹ 0.25
Balance after 1 month	₹ 0.46	₹ 2.25

CHAPTER 7:
MUTUAL FUNDS

NAV after 1 month

	D Mutual Fund Ltd.	K Mutual Fund Ltd.
Value of Equity after 1 month		
70 x (1 - 0.075)	₹ 64.75	-
60 x (1 - 0.055)	-	₹ 56.70
Cash Balance	0.46	2.25
	65.21	58.95

18. On 1st April 2009 Fair Return Mutual Fund has the following assets and prices at 4.00 p.m.

Shares	No. of Shares	Market Price Per Share (₹)
A Ltd.	10000	19.70
B Ltd.	50000	482.60
C Ltd.	10000	264.40
D Ltd.	100000	674.90
E Ltd.	30000	25.90
No. of units of funds		8, 00,000

Please calculate:

(a) NAV of the Fund on 1st April 2009.

(b) Assuming that on 1st April 2009, Mr. X, a HNI, send a cheque of Rs. 50,00,000 to the Fund and Fund Manager immediately purchases 18000 shares of C Ltd. and balance is held in bank. Then what will be position of fund.

(c) Now suppose on 2 April 2009 at 4.00 p.m. the market price of shares is as follows:

Shares	Rs.
A Ltd.	20.30
B Ltd.	513.70
C Ltd.	290.80
D Ltd.	671.90
E Ltd.	44.20

Then what will be new NAV.

[RTP → NOV 2019]

Answer:

(a) NAV of the Fund.

$$\frac{₹ 1,97,000 + ₹ 2,41,30,000 + ₹ 26,44,000 + ₹ 6,74,90,000 + ₹ 7,77,000}{800000}$$

$$\frac{₹ 9,52,38,000}{800000} = ₹ 119.0475 \text{ rounded to } ₹ 119.05$$

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(b) The revised position of fund shall be as follows:

Shares	No. of shares	Price	Amount (₹)
A Ltd.	10000	19.70	1,97,000
B Ltd.	50000	482.60	2,41,30,000
C Ltd.	28000	264.40	74,03,200
D Ltd.	100000	674.90	674,90,000
E Ltd.	30000	25.90	7,77,000
Cash			<u>2,40,800</u>
			<u>10,02,38,000</u>

$$\text{No. of units of fund} = 800000 + \frac{5000000}{119.0475} = 8,42,000$$

(c) On 2nd April 2009, the NAV of fund will be as follows:

Shares	No. of shares	Price	Amount (₹)
A Ltd.	10000	20.30	2,03,000
B Ltd.	50000	513.70	2,56,85,000
C Ltd.	28000	290.80	81,42,400
D Ltd.	100000	671.90	6,71,90,000
E Ltd.	30000	44.20	13,26,000
Cash			<u>2,40,800</u>
			<u>10,27,87,200</u>

$$\text{NAV as on 2nd April 2009} = \frac{\text{₹ } 10,27,87,200}{842000} = \text{₹ } 122.075 \text{ per unit}$$

19. On 01-07-2016, Mr. X Invested Rs. 50,000/- at initial offer in Mutual Funds at a face value of Rs. 10 each per unit. On 31-03-2017, a dividend was paid @ 10% and annualized yield was 120%. On 31-03-2018, 20% dividend and capital gain of Rs. 0.60 per unit was given. Mr. X redeemed all his 6271.98 units when his annualized yield was 71.50% over the period of holding. Calculate NAV as on 31-03-2017, 31-03-2018 and 31-03-2019.

For calculations consider a year of 12 months.

[RTP → MAY 2020]

Answer:

Yield for 9 months (120% x 9/12) = 90%

Market value of Investments as on 31.03.2017 = ₹ 50,000/- + (₹ 50,000 x 90%) = ₹ 95,000/-

Therefore, NAV as on 31.03.2017 = (₹ 95,000 - ₹ 5,000)/5,000 = ₹ 18.00

Since dividend was reinvested by Mr. X, additional units acquired = $\frac{\text{₹ } 5,000}{\text{₹ } 18} = 277.78 \text{ unit}$

CHAPTER 7: MUTUAL FUNDS

Therefore, units as on 31.03.2017 = $5,000 + 277.78 = 5,277.78$

Alternatively, units as on 31.03.2017 = $(₹ 95,000/₹18) = 5,277.78$

Dividend as on 31.03.2018 = $5,277.78 \times ₹ 10 \times 0.2 = ₹10,555.56$

Capital Gain ($5277.78 \times ₹ 0.60$) = ₹ 3,166.67

= ₹13,722.23

Let X be the NAV on 31.03.2018, then number of new units reinvested will be $₹13,722.23/X$.

Accordingly, 6,271.98 units shall consist of reinvested units and 5277.78 (as on 31.03.2017).

Thus, by way of equation it can be shown as follows:

$$6,271.98 = \frac{₹ 13,722.23}{X} + 5,277.78$$

Therefore, NAV as on 31.03.2018 = $₹ 13,722.23/(6,271.98 - 5,277.78) = ₹ 13.80$

NAV as on 31.03.2019 = $₹ 50,000 (1+0.715 \times 33/12)/6,271.98 = ₹23.656$



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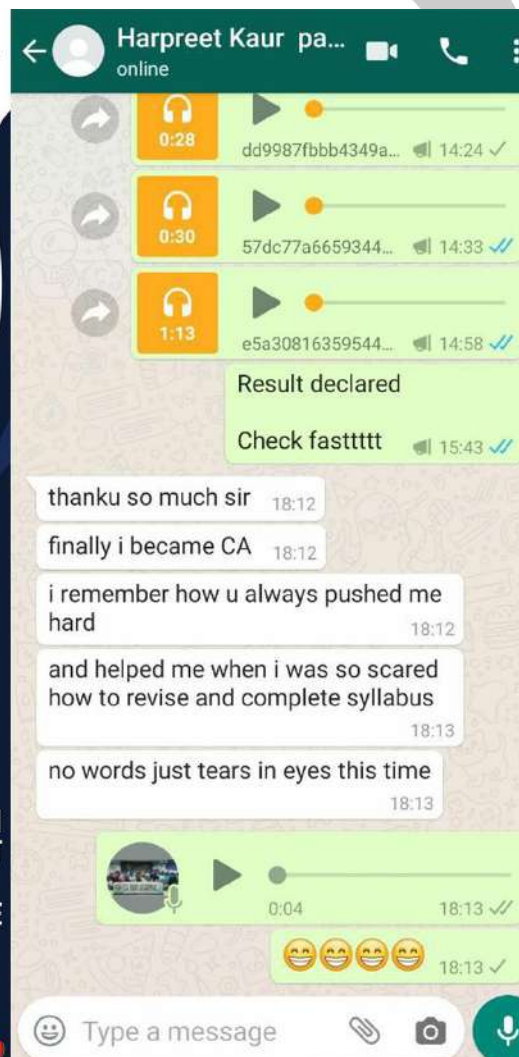
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thanku so much sir 18:12

finally i became CA 18:12

i remember how u always pushed me hard 18:12

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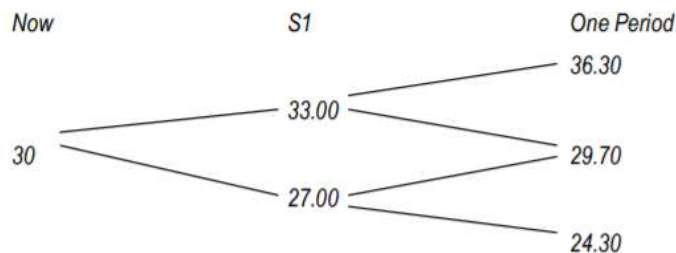
PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

8.

DERIVATIVES ANALYSIS AND VALUATION

ILLUSTRATIONS AND QUESTIONS FROM ICAI STUDY MATERIAL

1. Following is a two-period tree for a share of stock in CAB Ltd.:



Using the binomial model, calculate the current fair value of a regular call option on CAB Stock with the following characteristics: $X = \text{Rs. } 28$, Risk Free Rate = 5 percent. You should also indicate the composition of the implied riskless hedge portfolio at the valuation date.

Answer:

$$u = 33.00/30.00 = 36.30/33.00 = 1.10 \quad d = 27.00/30.00 = 24.30/27.00 = 0.90$$

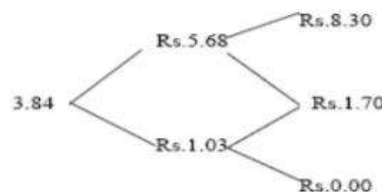
$$r = (1 + .05)^{1/2} = 1.0247$$

$$p = \frac{r - d}{u - d} = \frac{1.0247 - 0.90}{1.10 - 0.90} = 0.1247/0.20 = 0.6235$$

$$C_{uu} = \text{Max}[0, 36.30 - 28] = 8.30$$

$$C_{ud} = \text{Max}[0, 29.70 - 28] = 1.70$$

$$C_{dd} = \text{Max}[0, 24.30 - 28] = 0$$



$$C_u = \frac{(0.6235)(8.30) + (0.3765)(1.70)}{1.025} = \frac{5.175 + .64}{1.025} = 5.815/1.025 = ₹ 5.675$$

$$C_d = \frac{(0.6235)(1.70) + (0.3765)(0.00)}{1.025} = \frac{1.05995}{1.025} = ₹ 1.0340$$

$$C_o = \frac{(0.6235)(5.675) + (0.3765)(1.0340)}{1.025} = \frac{3.538 + .3895}{1.025} = ₹ 3.83$$

$$h = (33.00 - 27.00)/(1.03 - 5.68) = 6.00/4.65 = 1.29$$

CHAPTER 8:
DERIVATIVES ANALYSIS AND VALUATION

2. The current market price of an equity share of Penchant Ltd is Rs. 420. Within a period of 3 months, the maximum and minimum price of it is expected to be Rs. 500 and Rs. 400 respectively. If the risk free rate of interest be 8% p.a.,

What should be the value of a 3 months Call option under the “Risk Neutral” method at the strike rate of Rs. 450 ?

Given $e^{0.02} = 1.0202$

[ALSO ASKED IN MTP → OCTOBER 2018 → 6 MARKS]

Answer:

Let the probability of attaining the maximum price be p

$$(500 - 420) \times p + (400 - 420) \times (1-p) = 420 \times (e^{0.02} - 1)$$

$$\text{or, } 80p - 20(1 - p) = 420 \times 0.0202$$

$$\text{or, } 80p - 20 + 20p = 8.48$$

$$\text{or, } 100p = 28.48$$

$$p = 0.2848$$

$$\text{The value of Call Option in ₹} = \frac{0.2848 \times (500 - 450)}{1.0202} = \frac{0.2848 \times 50}{1.0202} = 13.96$$

3.

- (i) The shares of TIC Ltd. are currently priced at Rs. 415 and call option exercisable in three months' time has an exercise rate of Rs. 400. Risk free interest rate is 5% p.a. and standard deviation (volatility) of share price is 22%. Based on the assumption that TIC Ltd. is not going to declare any dividend over the next three months, is the option worth buying for Rs. 25?
- (ii) Calculate value of aforesaid call option based on Black Scholes valuation model if the current price is considered as Rs. 380.
- (iii) What would be the worth of put option if current price is considered Rs. 380.
- (iv) If TIC Ltd. share price at present is taken as Rs. 408 and a dividend of Rs. 10 is expected to be paid in the two months time, then, calculate value of the call option.

Answer:

(i) Given: TIC Ltd. Current Price = ₹ 415

Exercise rate = 400

Risk free interest rate is = 5% p.a.

SD (Volatility) = 22%

Based on the above bit is calculated value of an option based on Black Scholes Model:

$$d_1 = \frac{\ln\left(\frac{415}{400}\right) + \left[0.05 + \frac{1}{2}(0.22)^2\right] \cdot 0.25}{0.22 \sqrt{0.25}} = \frac{0.03681 + 0.01855}{0.11} = 0.5032727$$

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$$d_2 = \frac{\ln\left(\frac{415}{400}\right) + \left[.05 - \frac{1}{2}(.22)^2\right].25}{.22\sqrt{.25}} = \frac{.03681 + .00645}{.11} = .3932727$$

$$N(d_1) = N(.50327) = 1 - .3072 = .6928$$

$$N(d_2) = N(.39327) = 1 - .3471 = .6529$$

$$\begin{aligned}\text{Value of Option} &= 415(.6928) - \frac{400}{e^{(.05)(.25)}}(.6529) \\ &= 287.512 - \frac{400}{1.012578}(.6529) = 287.512 - 257.916 = ₹ 29.60\end{aligned}$$

NB : $N(0.39327)$ can also be find as under :

Step 1: From table of area under normal curve find the area of variable 0.39 i.e. 0.6517.

Step 2: From table of area under normal curve find the area of variable 0.40.

Step 3: Find out the difference between above two variables and areas under normal curve.

Step 4 : Using interpolation method find out the value of 0.00327. Which is as follows:

$$\frac{0.0037}{0.01} \times 0.00327 = 0.0012$$

Step 5: Add this value, computed above to the $N(0.39)$. Thus $N(0.39327) = 0.6517 + 0.0012 = 0.6529$

Since market price of ₹ 25 is less than ₹ 27.60 (Block Scholes Valuation model) indicate that option is underpriced, hence worth buying.

(ii) If the current price is taken as ₹ 380 the computations are as follows:

$$d_1 = \frac{\ln\left(\frac{380}{400}\right) + \left[.05 + \frac{1}{2}(.22)^2\right].25}{.22\sqrt{.25}} = \frac{-0.05129 + .01855}{.11} = -0.297636$$

$$d_2 = \frac{\ln\left(\frac{380}{400}\right) + \left[.05 - \frac{1}{2}(.22)^2\right].25}{.22\sqrt{.25}} = \frac{-0.05129 + .00645}{.11} = -0.407636$$

$$V_o = V_s N(d_1) - \frac{E}{e^{\pi}} N(d_2)$$

$$N(d_1) = N(-0.297636) = .3830$$

$$N(d_2) = N(-0.407636) = .3418$$

$$380(.3830) - \frac{400}{e^{(.05)(.25)}} \times (.3418)$$

$$145.54 - \frac{400}{1.012578}(.3418) = 145.54 - 135.02 = ₹ 10.52$$

CHAPTER 8:
DERIVATIVES ANALYSIS AND VALUATION

(iii) Value of call option = ₹ 10.52

Current Market Value = ₹ 415

$$\text{Present Value of Exercise Price} = \frac{400}{1.0125} = 395.06$$

$$V_p = -V_s + V_s + PV(E)$$

$$V_p = -380 + 10.52 + 395.06 = 25.58 = ₹ 25.58 \text{ Ans}$$

(iv) Since dividend is expected to be paid in two months time we have to adjust the share price and then use Block Scholes model to value the option:

Present Value of Dividend (using continuous discounting) = Dividend $\times e^{-rt}$

$$= ₹ 10 \times e^{-0.05 \times .1666}$$

$$= ₹ 10 \times e^{-0.008333}$$

$$= ₹ 9.917 \text{ (Please refer Exponential Table)}$$

Adjusted price of shares is ₹ 408 – 9.917 = ₹ 398.083

This can be used in Block Scholes model

$$d_1 = \frac{\ln\left(\frac{398.083}{400}\right) + \left[.05 + \frac{1}{2}(.22)^2\right].25}{.22\sqrt{.25}} = \frac{-0.00480 + .01855}{.11} = .125$$

$$d_2 = \frac{\ln\left(\frac{398.083}{400}\right) + \left[.05 - \frac{1}{2}(.22)^2\right].25}{.22\sqrt{.25}} = \frac{-0.00480 + .00645}{.11} = .015$$

$$N(d_1) = N(.125) = .5498$$

$$N(d_2) = N(.015) = .5060$$

$$\text{Value of Option} = 398.083 (.5498) - \frac{400}{e^{(.05)(.25)}} (.5060)$$

$$218.866 - \frac{400}{e^{.0125}} (.5060)$$

$$218.866 - \frac{400}{1.012578} (.5060) = 218.866 - 199.8858 = ₹ 18.98$$

4. What are the reasons for stock index futures becoming more popular financial derivatives over stock futures segment in India?

Answer:

Stock index futures is most popular financial derivatives over stock futures due to following reasons:

1. It adds flexibility to one's investment portfolio. Institutional investors and other large equity holders prefer the most this instrument in terms of portfolio hedging purpose. The stock systems do not provide this flexibility and hedging.
2. It creates the possibility of speculative gains using leverage. Because a relatively small amount of margin money controls a large amount of capital represented in a stock index contract, a

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small change in the index level might produce a profitable return on one's investment if one is right about the direction of the market. Speculative gains in stock futures are limited but liabilities are greater.

3. Stock index futures are the most cost efficient hedging device whereas hedging through individual stock futures is costlier.
4. Stock index futures cannot be easily manipulated whereas individual stock price can be exploited more easily.
5. Since, stock index futures consists of many securities, so being an average stock, is much less volatile than individual stock price. Further, it implies much lower capital adequacy and margin requirements in comparison of individual stock futures. Risk diversification is possible under stock index future than in stock futures.
6. One can sell contracts as readily as one buys them and the amount of margin required is the same.
7. In case of individual stocks the outstanding positions are settled normally against physical delivery of shares. In case of stock index futures they are settled in cash all over the world on the premise that index value is safely accepted as the settlement price.
8. It is also seen that regulatory complexity is much less in the case of stock index futures in comparison to stock futures.
9. It provides hedging or insurance protection for a stock portfolio in a falling market.

5. Write short note on Marking to market.

Answer:

It implies the process of recording the investments in traded securities (shares, debt-instruments, etc.) at a value, which reflects the market value of securities on the reporting date. In the context of derivatives trading, the futures contracts are marked to market on periodic (or daily) basis. Marking to market essentially means that at the end of a trading session, all outstanding contracts are repriced at the settlement price of that session. Unlike the forward contracts, the future contracts are repriced every day. Any loss or profit resulting from repricing would be debited or credited to the margin account of the broker. It, therefore, provides an opportunity to calculate the extent of liability on the basis of repricing. Thus, the futures contracts provide better risk management measure as compared to forward contracts.

Suppose on 1st day we take a long position, say at a price of Rs. 100 to be matured on 7th day. Now on 2nd day if the price goes up to Rs. 105, the contract will be repriced at Rs. 105 at the end of the trading session and profit of Rs. 5 will be credited to the account of the buyer. This profit of Rs. 5 may be drawn and thus cash flow also increases. This marking to market will result in three things – one, you will get a cash profit of Rs. 5; second, the existing contract at a price of Rs. 100 would stand cancelled; and third you will receive a new futures contract at Rs. 105. In essence, the marking

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to market feature implies that the value of the futures contract is set to zero at the end of each trading day.

6. State any four assumptions of Black Scholes Model.

Answer:

The Black-Scholes model is used to calculate a theoretical price of an Option. The Black-Scholes price is nothing more than the amount an option writer would require as compensation for writing a call and completely hedging the risk of buying stock. The important point is that the hedger's view about future stock prices is irrelevant. Thus, while any two investors may strongly disagree on the rate of return they expect on a stock they will, given agreement to the assumptions of volatility and the risk-free rate, always agree on the fair value of the option on that underlying asset. This key concept underlying the valuation of all derivatives -- that fact that the price of an option is independent of the risk preferences of investors -- is called risk-neutral valuation. It means that all derivatives can be valued by assuming that the return from their underlying assets is the risk-free rate.

The model is based on a normal distribution of underlying asset returns.

The following assumptions accompany the model:

1. European Options are considered,
2. No transaction costs,
3. Short term interest rates are known and are constant,
4. Stocks do not pay dividend,
5. Stock price movement is similar to a random walk,
6. Stock returns are normally distributed over a period of time, and
7. The variance of the return is constant over the life of an Option

7. Write short note on Embedded derivatives.

Answer:

Embedded Derivatives: A derivative is defined as a contract that has all the following characteristics:

- Its value changes in response to a specified underlying, e.g. an exchange rate, interest rate or share price;
- It requires little or no initial net investment;
- It is settled at a future date;
- The most common derivatives are currency forwards, futures, options, interest rate swaps etc.

An embedded derivative is a derivative instrument that is embedded in another contract - the host contract. The host contract might be a debt or equity instrument, a lease, an insurance contract or a sale or purchase contract.

Derivatives require to be marked-to-market through the income statement, other than qualifying hedging instruments. This requirement on embedded derivatives are designed to ensure that mark-

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to-market through the income statement cannot be avoided by including - embedding - a derivative in another contract or financial instrument that is not marked-to market through the income statement.

An embedded derivative can arise from deliberate financial engineering and intentional shifting of certain risks between parties. Many embedded derivatives, however, arise inadvertently through market practices and common contracting arrangements. Even purchase and sale contracts that qualify for executory contract treatment may contain embedded derivatives. An embedded derivative causes modification to a contract's cash flow, based on changes in a specified variable.

8. Define the term Greeks with respect to options.

Answer:

The Greeks are a collection of statistical values (expressed as percentages) that give the investor a better overall view of how a stock has been performing. These statistical values can be helpful in deciding what options strategies are best to use. The investor should remember that statistics show trends based on past performance. It is not guaranteed that the future performance of the stock will behave according to the historical numbers. These trends can change drastically based on new stock performance.

9. Calculate the price of 3 months PQR futures, if PQR (FV Rs. 10) quotes Rs. 220 on NSE and the three months future price quotes at Rs. 230 and the one month borrowing rate is given as 15 percent and the expected annual dividend is 25 percent per annum payable before expiry. Also examine arbitrage opportunities.

Answer:

$$\begin{aligned}\text{Future's Price} &= \text{Spot} + \text{cost of carry} - \text{Dividend} \\ F &= 220 + 220 \times 0.15 \times 0.25 - 0.25^{**} \times 10 = 225.75\end{aligned}$$

** Entire 25% dividend is payable before expiry, which is ₹2.50.

Thus we see that futures price by calculation is ₹225.75 which is quoted at ₹230 in the exchange.

(i) **Analysis:**

Fair value of Futures less than Actual futures Price:

Futures Overvalued Hence it is advised to sell. Also do Arbitraging by buying stock in the cash market.

Step I

He will buy PQR Stock at ₹220 by borrowing at 15% for 3 months. Therefore, his outflows are:

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Cost of Stock	220.00
Add: Interest @ 15 % for 3 months i.e. 0.25 years ($220 \times 0.15 \times 0.25$)	<u>8.25</u>
Total Outflows (A)	<u>228.25</u>

Step II

He will sell March 2000 futures at ₹230. Meanwhile he would receive dividend for his stock.

Hence his inflows are	230.00
Sale proceeds of March 2000 futures	<u>2.50</u>
Total inflows (B)	<u>232.50</u>

Inflow – Outflow = Profit earned by Arbitrageur
 $= 232.50 - 228.25 = 4.25$

10. Sensex futures are traded at a multiple of 50. Consider the following quotations of Sensex futures in the 10 trading days during February, 2009:

Day	High	Low	Closing
4-2-09	3306.4	3290.00	3296.50
5-2-09	3298.00	3262.50	3294.40
6-2-09	3256.20	3227.00	3230.40
7-2-09	3233.00	3201.50	3212.30
10-2-09	3281.50	3256.00	3267.50
11-2-09	3283.50	3260.00	3263.80
12-2-09	3315.00	3286.30	3292.00
14-2-09	3315.00	3257.10	3309.30
17-2-09	3278.00	3249.50	3257.80
18-2-09	3118.00	3091.40	3102.60

Abhishek bought one sensex futures contract on February, 04. The average daily absolute change in the value of contract is Rs. 10,000 and standard deviation of these changes is Rs. 2,000. The maintenance margin is 75% of initial margin.

You are required to determine the daily balances in the margin account and payment on margin calls, if any

[ALSO ASKED IN RTP → NOV 2019]

Answer:

$$\text{Initial Margin} = \mu + 3\sigma$$

Where μ = Daily Absolute Change

σ = Standard Deviation

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Accordingly

Initial Margin = ₹ 10,000 + ₹ 6,000 = ₹ 16,000

Maintenance margin = ₹ 16,000 × 0.75 = ₹ 12,000

Day	Changes in future Values (₹)	Margin A/c (₹)	Call Money (₹)
4/2/09	-	16000	-
5/2/09	50 × (3294.40 - 3296.50) = -105	15895	-
6/2/09	50 × (3230.40 - 3294.40) = -3200	12695	-
7/2/09	50 × (3212.30 - 3230.40) = -905	16000	4210
10/2/09	50 × (3267.50 - 3212.30) = 2760	18760	-
11/2/09	50 × (3263.80 - 3267.50) = -185	18575	-
12/2/09	50 × (3292 - 3263.80) = 1410	19985	-
14/2/09	50 × (3309.30 - 3292) = 865	20850	-
17/2/09	50 × (3257.80 - 3309.30) = -2575	18275	-
18/2/09	50 × (3102.60 - 3257.80) = -7760	16000	5485

11. Sumana wanted to buy shares of EIL which has a range of Rs. 411 to Rs. 592 a month later. The present price per share is Rs. 421. Her broker informs her that the price of this share can sore up to Rs. 522 within a month or so, so that she should buy a one month CALL of EIL. In order to be prudent in buying the call, the share price should be more than or at least Rs. 522 the assurance of which could not be given by her broker.

Though she understands the uncertainty of the market, she wants to know the probability of attaining the share price Rs. 592 so that buying of a one month CALL of EIL at the execution price of Rs. 522 is justified. Advice her. Take the risk free interest to be 3.60% and $e^{0.036} = 1.037$.

[MTP → AUGUST 2018 → 4 MARKS]

Answer:

$$p = \frac{e^{rt} - d}{u - d}$$

$$e^{rt} = e^{0.036}$$

$$d = 411/421 = 0.976$$

$$u = 592/421 = 1.406$$

$$p = \frac{e^{0.036} - 0.976}{1.406 - 0.976} = \frac{1.037 - 0.976}{0.43} = \frac{0.061}{0.43} = 0.1418$$

Thus probability of rise in price 0.1418

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12. Mr. X established the following spread on the Delta Corporation's stock :

- (i) Purchased one 3-month call option with a premium of Rs. 30 and an exercise price of Rs. 550.
- (ii) Purchased one 3-month put option with a premium of Rs. 5 and an exercise price of Rs. 450.

Delta Corporation's stock is currently selling at Rs. 500. Determine profit or loss, if the price of Delta Corporation's :

- (i) remains at Rs.500 after 3 months.
- (ii) falls at Rs.350 after 3 months.
- (iii) rises to Rs.600.

Assume the size option is 100 shares of Delta Corporation.

[ALSO ASKED IN MTP → OCTOBER 2018 → 8 MARKS]

Answer:

- (i) Total premium paid on purchasing a call and put option

$$= (\text{Rs. } 30 \text{ per share} \times 100) + (\text{Rs. } 5 \text{ per share} \times 100) \\ = 3,000 + 500 = \text{Rs. } 3,500$$

In this case, X exercises neither the call option nor the put option as both will result in a loss for him.

$$\text{Ending value} = - \text{Rs. } 3,500 + \text{zero gain} = - \text{Rs. } 3,500 \text{ i.e.}$$

$$\text{Net loss} = \text{Rs. } 3,500$$

- (ii) Since the price of the stock is below the exercise price of the call, the call will not be exercised. Only put is valuable and is exercised.

$$\text{Total premium paid} = \text{Rs. } 3,500$$

$$\text{Ending value} = - \text{Rs. } 3,500 + \text{Rs. } [(450 - 350) \times 100] = - \text{Rs. } 3,500 + \text{Rs. } 10,000 = \text{Rs. } 6,500$$

$$\therefore \text{Net gain} = \text{Rs. } 6,500$$

- (iii) In this situation, the put is worthless, since the price of the stock exceeds the put's exercise price. Only call option is valuable and is exercised.

$$\text{Total premium paid} = \text{Rs. } 3,500$$

$$\text{Ending value} = -3,500 + [(600 - 550) \times 100]$$

$$\text{Net Gain} = -3,500 + 5,000 = \text{Rs. } 1,500$$

13. The equity share of VCC Ltd. is quoted at Rs. 210. A 3-month call option is available at a premium of Rs. 6 per share and a 3-month put option is available at a premium of Rs. 5 per share. Ascertain the net payoffs to the optionholder of a call option and a put option.

- (i) the strike price in both cases in Rs. 220; and

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(ii) the share price on the exercise day is Rs. 200, 210, 220, 230, 240.

Also indicate the price range at which the call and the put options may be gainfully exercised.

[ALSO ASKED IN NOV 2018 EXAMS → 8 MARKS & MTP → OCTOBER 2019 → 7 MARKS]

Answer:

Net payoff for the holder of the call option

	(₹)				
Share price on exercise day	200	210	220	230	240
Option exercise	No	No	No	Yes	Yes
Outflow (Strike price)	Nil	Nil	Nil	220	220
Out flow (premium)	6	6	6	6	6
Total Outflow	6	6	6	226	226
Less inflow (Sales proceeds)	-	-	-	230	240
Net payoff	-6	-6	-6	4	14

Net payoff for the holder of the put option

	(₹)				
Share price on exercise day	200	210	220	230	240
Option exercise	Yes	Yes	No	No	No
Inflow (strike price)	220	220	Nil	Nil	Nil
Less outflow (purchase price)	200	210	-	-	-
Less outflow (premium)	5	5	5	5	5
Net Payoff	15	5	-5	-5	-5

The call option can be exercised gainfully for any price above ₹226 (₹220 + ₹6) and put option for any price below ₹215 (₹220 - ₹5).

PAST EXAMINATION, MTP & RTP QUESTIONS

14. Sabanam Ltd. has issued convertible debentures with coupon rate 11%. Each debenture has an option to convert to 16 equity shares at any time until the date of maturity. Debentures will be redeemed at Rs. 100 on maturity of 5 years. An investor generally requires a rate of return of 8% p.a. on a 5-year security. As an advisor, when will you advise the investor to exercise conversion for given market prices of the equity share of (i) Rs. 5, (ii) Rs. 6 and (iii) Rs. 7.10.

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Cumulative PV factor for 8% for 5 years	:	3.993
PV factor for 8% for year 5	:	0.681

[MAY 2018 → 6 MARKS]

Answer:

If Debentures are not converted its value is as under: -

	PVF @ 8 %	₹
Interest - ₹ 11 for 5 years	3.993	43.923
Redemption - ₹ 100 in 5 th year	0.681	<u>68.100</u>
		<u>112.023</u>

Value of equity shares:-

Market Price	No.	Total
₹ 5	16	₹ 80
₹ 6	16	₹ 96
₹ 7.10	16	₹ 113.60

Hence, unless the market price is ₹ 7.10 conversion should not be exercised.

15. Mr. KK purchased a 3-month call option for 100 shares in PQR Ltd. at a premium of Rs. 40 per share, with an exercise price of Rs. 560. He also purchased a 3-month put option for 100 shares of the same company at a premium of Rs. 10 per share with an exercise price of Rs. 460. The market price of the share on the date of Mr. KK's purchase of options, is Rs. 500. Compute the profit or loss that Mr. KK would make assuming that the market price falls to Rs. 360 at the end of 3 months.

[MAY 2018 → 4 MARKS]

Answer:

Since the market price at the end of 3 months falls to Rs. 360 which is below the exercise price under the call option, the call option will not be exercised. Only put option becomes viable.

	₹
The gain will be:	
Gain per share (₹460 – ₹ 360)	<u>100</u>
Total gain per 100 shares	10,000
Cost or premium paid (₹ 40 x 100) + (₹ 10 x 100)	<u>5,000</u>
Net gain	<u>5,000</u>

16. Mr. John established the following spread on the TTK Ltd.'s stock:

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1. Purchased one 3-month put option with a premium of Rs. 15 and an exercise price of Rs. 900.
2. Purchased one 3-month call option with a premium of Rs. 90 and an exercise price of Rs. 1100.

TTK Ltd.'s stock is currently selling) at Rs. 1000. Calculate gain or loss, if the price of stock of TTK Ltd. –

(iv) Remains at Rs. 1000 after 3 months.

(v) Falls to Rs. 700 after 3 months.

(vi) Raises to Rs. 1200 after 3 months.

Assume the size of option is 200 shares of TTK Ltd

[MAY 2019 → 8 MARKS]

Answer:

- (i) Total premium paid on purchasing a call and put option
 $= (\text{Rs. 15 per share} \times 200) + (\text{Rs. 90 per share} \times 200)$
 $= \text{Rs. 3,000} + \text{Rs. 18,000} = \text{Rs. 21,000}$

In this case, Mr. John exercises neither the call option nor the put option as both will result in a loss for him.

Ending value = – Rs. 21,000 + zero gain = – Rs. 21,000
 i.e. Net loss = Rs. 21,000

- (ii) Since the price of the stock is below the exercise price of the call, the call will not be exercised. Only put is valuable and is exercised.

Net Gain = (Exercise Price – Current Price) x No of Shares – Premium Paid
 Total premium paid = Rs. 21,000
 Ending value = – Rs. 21,000 + Rs. [(900 – 700) × 200] = Rs. 19,000
 $\therefore$ Net gain = Rs. 19,000

- (iii) In this situation, the put is worthless, since the price of the stock exceeds the put's exercise price. Only call option is valuable and is exercised.

Total premium paid = Rs. 21,000
 Ending value = – Rs. 21,000 + Rs. [(1200 – 1100) × 200] = –Rs. 1,000
 Net Loss = Rs. 1,000

17. A Rice Trader has planned to sell 22000 kg of Rice after 3 months from now. The spot price of the Rice is Rs. 60 per kg and 3 months future on the same is trading at Rs. 59 per kg.

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Size of the contract is 1000 kg. The price is expected to fall as low as Rs. 56 per kg, 3 months hence. What the trader can do to mitigate its risk of reduced profit? If he decides to make use of future market, what would be the effective realized price for its sale when after 3 months, spot price is Rs. 57 per kg and future contract price for 3 months is Rs. 58 per kg?

[MAY 2019 → 8 MARKS]

Answer:

In order to hedge its position trader would go short on future at current future price of ₹ 59/kg. This will help the trade to realize sure ₹ 59 per kg. after 3 months.

Particulars	
(a) Quantity of Rice to be hedged	22000 kg.
(b) Contract Size	1000 kg.
(c) No. of Contracts to be sold (a/b)	22
(d) Future Price	₹ 59/kg.
(e) Exposure in the future market (a x d)	₹ 12,98,000

After 3 months, trader would cancel its position in the future by buying a future contract of same quantity and will sell Rice in the spot market and position shall be as follows:

Particulars	₹
(a) Price of Future Contract	58/kg.
(b) Amount bought = 22000 x 58	12,76,000
(c) Gain(Loss) on future position (12,98,000 – 12,76,000)	22,000
(d) Spot Price	57/kg
(e) Amount realized by selling in the spot market (22000 x 57)	12,54,000
(f) Effective Selling Amount (c + e)	12,76,000
(g) Effective Selling Price (12,76,000/22000)	58/kg.

18. Mr. Dayal is interested in purchasing equity shares of ABC Ltd. which are currently selling at Rs. 600 each. He expects that price of share may go upto Rs. 780 or may go down to Rs. 480 in three months. The chances of occurring such variations are 60% and 40% respectively. A call option on the shares of ABC Ltd. can be exercised at the end of three months with a strike price of Rs. 630.

- (i) Recommend the combination of share and the option which Mr. Dayal should select if he wants a perfect hedge. (2 Marks)
- (ii) Analyze and calculate the value of option today. (the risk free rate is 10% p.a.) (4 Marks)
- (iii) Calculate the expected rate of return on the option.

[MTP → MARCH 2018]

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Answer:

- (i) To compute perfect hedge we shall compute Hedge Ratio (Δ) as follows:

$$\Delta = \frac{C_1 - C_2}{S_1 - S_2} = \frac{150 - 0}{780 - 480} = \frac{150}{300} = 0.50$$

Mr. Dayal should purchase 0.50 share for every 1 call option.

- (ii) Value of Option today

If price of share comes out to be ₹780 then value of purchased share will be:

Sale Proceeds of Investment (0.50 x ₹ 780)	₹ 390
Loss on account of Short Position (₹ 780 – ₹ 630)	₹ 150
	₹ 240

If price of share comes out to be ₹ 480 then value of purchased share will be:

Sale Proceeds of Investment (0.50 x ₹ 480)	₹ 240

Accordingly, Premium say P shall be computed as follows:

$$(\text{₹ } 300 - P) 1.025 = \text{₹ } 240$$

$$P = \text{₹ } 65.85$$

- (iii) Expected Return on the Option

$$\text{Expected Option Value} = (\text{₹ } 780 - \text{₹ } 630) \times 0.60 + \text{₹ } 0 \times 0.40 = \text{₹ } 90$$

$$\text{Expected Rate of Return} = \frac{90 - 65.85}{65.85} \times 100 = 36.67\%$$

19. You as an investor had purchased a 4 month call option on the equity shares of X Ltd. of Rs. 10, of which the current market price is Rs. 132 and the exercise price Rs. 150. You expect the price to range between Rs. 120 to Rs. 190. The expected share price of X Ltd. and related probability is given below:

Expected Price (Rs.)	120	140	160	180	190
Probability	.05	.20	.50	.10	.15

- (i) Recommend the Expected Share price at the end of 4 months. (2 Marks)
 (ii) Analyze and calculate the value of Call Option at the end of 4 months, if the exercise price prevails. (4 Marks)
 (iii) Calculate the expected value of the call option in case the option is held to its maturity. (2 Marks)

[MTP → APRIL 2018]

Answer:

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(i) **Recommendation of Expected Share Price**

$$= \text{Rs. } 120 \times 0.05 + \text{Rs. } 140 \times 0.20 + \text{Rs. } 160 \times 0.50 + \text{Rs. } 180 \times 0.10 + \text{Rs. } 190 \times 0.15$$

$$= \text{Rs. } 6 + \text{Rs. } 28 + \text{Rs. } 80 + \text{Rs. } 18 + \text{Rs. } 28.50 = \text{Rs. } 160.50$$

(ii) **Analysis of Value of Call Option**

In case if exercise price prevail the value of call option shall be Nil (Rs.150 - Rs.150) as strike price and spot price are same.

(iii) **Calculation of expected Value of Call Option if the option is held till maturity**

Expected price (X)	Value of call (C)	Probability (P)	CP
Rs. 120	0	0.05	0
Rs. 140	0	0.20	0
Rs. 160	Rs. 10	0.50	Rs. 5
Rs. 180	Rs. 30	0.10	Rs. 3
Rs. 190	Rs. 40	0.15	<u>Rs. 6</u>
	Total		<u>Rs. 14</u>

Alternatively, it can also be calculated as follows:

Expected Value of Option

(120 – 150) X 0.1	Not Exercised*
(140 – 150) X 0.2	Not Exercised*
(160 – 150) X 0.5	5
(180 – 150) X 0.1	3
(190 – 150) X 0.15	<u>6</u>
	<u>14</u>

* If the strike price goes below Rs. 150, option is not exercised at all.

20. Explain Random Walk theory

[MTP → APRIL 2018 → 6 MARKS]

Answer:

Random Walk Theory

Random Walk hypothesis states that the behaviour of stock market prices is unpredictable and that there is no relationship between the present prices of the shares and their future prices. Basic premises of the theory are as follows:

- Prices of shares in stock market can never be predicted. The reason is that the price trends are not the result of any underlying factors, but that they represent a statistical expression of past data.
- There may be periodical ups or downs in share prices, but no connection can be established between two successive peaks (high price of stocks) and troughs (low price of stocks).

21. The data given below relates to a convertible bond :

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Face value	Rs. 250
Coupon rate	12%
No. of shares per bond	20
Market price of share	Rs. 12
Straight value of bond	Rs. 235
Market price of convertible bond	Rs. 265

Calculate:

- (i) Stock value of bond. (1 Mark)
- (ii) The percentage of downside risk. (2 Marks)
- (iii) The conversion premium (2 Marks)
- (iv) The conversion parity price of the stock. (2 Marks)

[MTP → APRIL 2018]

Answer:

- (i) Calculation of Stock value or conversion value of bond

$$12 \times 20 = \text{Rs. } 240$$

- (ii) Calculation of Percentage of the downside risk

$$\frac{\text{Rs. } 265 - \text{Rs. } 235}{\text{Rs. } 235} = 0.1277 \text{ or } 12.77\% \quad \text{or} \quad \frac{\text{Rs. } 265 - \text{Rs. } 235}{\text{Rs. } 265} = 0.1132 \text{ or } 11.32\%$$

This ratio gives the percentage price decline experienced by the bond if the stock becomes worthless.

- (iii) Calculation of Conversion Premium

$$\frac{\text{Market Price} - \text{Conversion Value}}{\text{Conversion Value}} \times 100$$

$$\frac{\text{Rs. } 265 - \text{Rs. } 240}{\text{Rs. } 240} \times 100 = 10.42\%$$

- (iv) Calculation of Conversion Parity Price

$$\frac{\text{Bond Price}}{\text{No. of Shares on Conversion}}$$

$$\frac{\text{Rs. } 265}{20} = \text{Rs. } 13.25$$

This indicates that if the price of shares rises to Rs. 13.25 from Rs. 12 the investor will neither gain nor lose on buying the bond and exercising it. Observe that Rs. 1.25 (Rs. 13.25 – Rs. 12.00) is 10.42% of Rs. 12, the Conversion Premium.

22. Describe the characteristics of financial instruments

[MTP → MARCH 2019 → 4 MARKS]

Answer:

Characteristics of Financial Instruments

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The important characteristics of financial instruments are enumerated as below:

- (a) Liquidity: Financial instruments provide liquidity. These can be easily and quickly converted into cash.
- (b) Marketing: Financial instruments facilitate easy trading on the market. They have a ready market.
- (c) Collateral value: Financial instruments can be pledged for getting loans.
- (d) Transferability: Financial instruments can be transferred from one person to another.
- (e) Maturity period: The maturity period of financial instruments may be short term, medium term or long term.
- (f) Transaction cost: Financial instruments involve buying and selling cost. The buying and selling costs are called transaction costs.
- (g) Risk: Financial instruments carry risk. Equity based instruments are riskier in comparison to debt based instruments because the payment of dividend is uncertain. A company may not declare dividend in a particular year. However, payment of principle or interest is more or less certain unless the company gets insolvent.
- (h) Future trading: Financial instruments facilitate future trading so as to cover risks arising out of price fluctuations, interest rate fluctuations etc.

23. On January 1, 2013 an investor has a portfolio of 5 shares as given below:

Security	Price	No. of Shares	Beta
A	349.30	5,000	1.15
B	480.50	7,000	0.40
C	593.52	8,000	0.90
D	734.70	10,000	0.95
E	824.85	2,000	0.85

The cost of capital to the investor is 10.5% per annum.

You are required to calculate:

- (i) The beta of his portfolio.
- (ii) The theoretical value of the NIFTY futures for February 2013.
- (iii) The number of contracts of NIFTY the investor needs to sell to get a full hedge until February for his portfolio if the current value of NIFTY is 5900 and NIFTY futures have a minimum trade lot requirement of 200 units. Assume that the futures are trading at their fair value.
- (iv) The number of future contracts the investor should trade if he desires to reduce the beta of his portfolios to 0.6.

No. of days in a year be treated as 365.

Given: $\ln(1.105) = 0.0998$ and $e^{(0.015858)} = 1.01598$

[MTP → MARCH 2019 → 8 MARKS | RTP → MAY 2020]

Answer:

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(i) Calculation of Portfolio Beta

Security	Price of the Stock	No. of shares	Value	Weightage w_i	Beta B_i	Weighted Beta
A	349.30	5,000	17,46,500	0.093	1.15	0.107
B	480.50	7,000	33,63,500	0.178	0.40	0.071
C	593.52	8,000	47,48,160	0.252	0.90	0.227
D	734.70	10,000	73,47,000	0.390	0.95	0.370
E	824.85	2,000	16,49,700	0.087	0.85	0.074
			1,88,54,860			0.849

Portfolio Beta = 0.849

(ii) Calculation of Theoretical Value of Future Contract

Cost of Capital = 10.5% p.a. Accordingly, the Continuously Compounded Rate of Interest In (1.105) = 0.0998

For February 2013 contract, $t = 58/365 = 0.1589$

Further $F = Se^{rt}$

$$F = \text{Rs. } 5,900e^{(0.0998)(0.1589)}$$

$$F = \text{Rs. } 5,900e^{0.015858}$$

$$F = \text{Rs. } 5,900 \times 1.01598 = \text{Rs. } 5,994.28$$

Alternatively, it can also be taken as follows:

$$= \text{Rs. } 5900 e^{0.105 \times 58/365}$$

$$= \text{Rs. } 5900 e^{0.01668}$$

$$= \text{Rs. } 5900 \times 1.01682 = \text{Rs. } 5,999.24$$

(iii) When total portfolio is to be hedged:

$$= \frac{\text{Value of Spot Position requiring hedging}}{\text{Value of Future Contract}} \times \text{Portfolio Beta}$$

$$= \frac{1,88,54,860}{5994.28 \times 200} \times 0.849 = 13.35 \text{ contracts say 13 or 14 contracts}$$

(iv) When total portfolio beta is to be reduced to 0.6:

$$\text{Number of Contracts to be sold} = \frac{P(\beta_P - \beta_P^*)}{F}$$

$$= \frac{1,88,54,860 (0.849 - 0.600)}{5994.28 \times 200} = 3.92 \text{ contracts say 4 contracts}$$

24.A Ltd. has issued convertible bonds, which carries a coupon rate of 14%. Each bond is convertible into 20 equity shares of the company A Ltd. The prevailing interest rate for similar credit rating bond is 8%. The convertible bond has 5 years maturity. It is redeemable at par at Rs. 100. The relevant present value table is as follows.

CHAPTER 8:
DERIVATIVES ANALYSIS AND VALUATION

Present values	t_1	t_2	t_3	t_4	t_5
$PVIF_{0.14, t}$	0.877	0.769	0.675	0.592	0.519
$PVIF_{0.08, t}$	0.926	0.857	0.794	0.735	0.681

You are required to estimate:

(Calculations be made upto 3 decimal places)

- (i) current market price of the bond, assuming it being equal to its fundamental value,
- (ii) minimum market price of equity share at which bond holder should exercise conversion option; and
- (iii) duration of the bond.

[MTP → OCTOBER 2019 → 8 MARKS]

Answer:

- (i) Current Market Price of Bond

Time	CF	PVIF 8% PV (CF)	PV (CF)
1	14	0.926	12.964
2	14	0.857	11.998
3	14	0.794	11.116
4	14	0.735	10.290
5	114	0.681	77.634
$\Sigma PV (CF) \text{ i.e. } P_0 =$			<u>124.002</u>

Say

Rs. 124.00

- (ii) Minimum Market Price of Equity Shares at which Bondholder should exercise conversion option:

$$\frac{124.00}{20.00} = \text{Rs. } 6.20$$

- (iii) Duration of the Bond

Year	Cash flow	P.V. @ 8%		Proportion of bond value	Proportion of bond value x time (years)
1	14	0.926	12.964	0.105	0.105
2	14	0.857	11.998	0.097	0.194
3	14	0.794	11.116	0.089	0.267
4	14	0.735	10.290	0.083	0.332
5	114	0.681	<u>77.634</u>	<u>0.626</u>	<u>3.130</u>
			<u>124.002</u>	<u>1.000</u>	<u>4.028</u>

25. The following market data is available:

Spot USD/JPY 116.00

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Deposit rates p.a.	USD	JPY
3 months	4.50%	0.25%
6 months	5.00%	0.25%

Forward Rate Agreement (FRA) for Yen is Nil.

Required:

- (i) **CALCULATE 3 months FRA rate at 3 months forward?**
(ii) **RECOMMEND** arbitrage strategy, when 6 & 12 months LIBORS are 5% & 6.5% respectively and X Ltd. bank is quoting 6/12 USD FRA at 6.50 – 6.75%.

[RTP → MAY 2018]

Answer:

- (i) **3 Months Interest rate is 4.50% & 6 Months Interest rate is 5% p.a.**

Future Value 6 Months from now is a product of Future Value 3 Months now & 3 Months

Future Value from after 3 Months.

$$(1+0.05*6/12) = (1+0.045*3/12) \times (1+i_{3,6} *3/12)$$

$$i_{3,6} = [(1+0.05*6/12) / (1+0.045*3/12) - 1] *12/3$$

i.e. 5.44% p.a.

- (ii) To find arbitrage opportunity first we shall find out the 6 Months forward 6 month rate as follows:

$$(1+0.065) = (1+0.05*6/12) \times (1+i_{6,6} *6/12)$$

$$i_{6,6} = [(1+0.065/1.025) - 1] *12/6$$

6 Months forward 6 month rate is 7.80% p.a.

The Bank is quoting 6/12 USD FRA at 6.50 – 6.75%

Therefore, there is an arbitrage Opportunity of earning interest @ 7.80% p.a. & Paying @ 6.75%

Strategy: Borrow for 6 months, buy an FRA & invest for 12 months

To get \$ 1.065 at the end of 12 months for \$ 1 invested today

To pay\$ 1.060# at the end of 12 months for every \$ 1 Borrowed today

Net gain \$ 0.005 i.e. risk less profit for every \$ borrowed

$$\# (1+0.05/2) (1+.0675/2) = (1.05959) \text{ say } 1.060$$

26. TMC Holding Ltd. has a portfolio of shares of diversified companies valued at Rs. 400 crore enters into a swap arrangement with None Bank on the terms that it will get 1.15% quarterly on notional principal of Rs. 400 crore in exchange of return on portfolio which is exactly tracking the Sensex which is presently 21600.

CHAPTER 8: DERIVATIVES ANALYSIS AND VALUATION

CALCULATE the net payment to be received/ paid at the end of each quarter if Sensex turns out to be 21,860, 21,780, 22,080 and 21,960.

[RTP → MAY 2018]

Answer:

Qtrs.	Sensex	Sensex Return (%)	Amount Payable (₹ Crore)	Fixed Return (Receivable) (₹ Crore)	Net (₹ Crore)
(1)	(2)	(3)	(4)	(5)	(5) – (4)
0	21,600	-	-	-	-
1	21,860	1.2037	4.8148	4.6000	- 0.2148
2	21,780	-0.3660	-1.4640	4.6000	6.0640
3	22,080	1.3774	5.5096	4.6000	- 0.9096
4	21,960	-0.5435	-2.1740	4.6000	6.7740

27. Ram holding shares of Reliance Industries Ltd. which is currently selling at Rs. 1000. He is expecting that this price will further fall due to lower than expected level of profits to be announced after one month. As on following option contract are available in Reliance Share.

Strike Price (₹)	Option	Premium (₹)
1030	Call	40
1010	Call	35
1000	Call	30
990	Put	35
970	Put	20
950	Put	8
930	Put	5

Ram is interested in selling his stock holding as he cannot afford to lose more than 5% of its value.

RECOMMEND a hedging strategy with option and show how his position will be protected.

[RTP → NOV 2018]

Answer:

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Instead of selling the stock of Reliance Ltd., Ram must cover his Risk by buying or long position in Put Option with appropriate strike price. Since Ram's risk appetite is 5%, the most suitable strike price in Put Option shall be Rs. 950 (Rs. 1000 – 5% of Rs. 1000). If Ram does so, the overall position will be as follows:

Spot Price after 1 month	Stock Value	Put Payoff	Initial Cash Flow	Total
$S < 950$	S	$950 - S$	-8	$942 - S$
$S > 950$	S	-	-8	$S - 8$

Thus, from the above, it can be seen that the value of holding of Ram shall never be less than Rs. 942 as Put Option will compensate for loss below spot price of Rs. 950. However, this strategy will involve a cost of Rs. 8.

28. The market received rumour about ABC corporation's tie-up with a multinational company. This has induced the market price to move up. If the rumour is false, the ABC corporation stock price will probably fall dramatically. To protect from this an investor has bought the call and put options.

He purchased one 3 months call with a striking price of Rs.42 for Rs.2 premium, and paid Re.1 per share premium for a 3 months put with a striking price of Rs.40.

- (i) Determine the Investor's position if the tie up offer bids the price of ABC Corporation's stock up to Rs.43 in 3 months.**
- (ii) Determine the Investor's ending position, if the tie up programme fails and the price of the stocks falls to Rs. 36 in 3 months**

[RTP → MAY 2019]

Answer:

Cost of Call and Put Options

$$\begin{aligned}
 &= (\text{Rs. 2 per share}) \times (100 \text{ share call}) + (\text{Rs. 1 per share}) \times (100 \text{ share put}) \\
 &= \text{Rs. 2} \times 100 + 1 \times 100 \\
 &= \text{Rs. 300}
 \end{aligned}$$

- (i) Price increases to Rs.43. Since the market price is higher than the strike price of the call, the investor will exercise it.

$$\begin{aligned}
 \text{Ending position} &= (- \text{Rs. 300 cost of 2 option}) + (\text{Rs. 1 per share gain on call}) \times 100 \\
 &= - \text{Rs. 300} + 100 \\
 \text{Net Loss} &= - \text{Rs. 200}
 \end{aligned}$$

- (ii) The price of the stock falls to Rs.36. Since the market price is lower than the strike price, the investor may not exercise the call option.

$$\begin{aligned}
 \text{Ending Position} &= (- \text{Rs.300 cost of 2 options}) + (\text{Rs.4 per stock gain on put}) \times 100 \\
 &= - \text{Rs.300} + 400 \\
 \text{Gain} &= \text{Rs. 100}
 \end{aligned}$$

CHAPTER 8: DERIVATIVES ANALYSIS AND VALUATION

29. Indira has a fund of Rs. 3 lacs which she wants to invest in share market with rebalancing target after every 10 days to start with for a period of one month from now. The present NIFTY is 5326. The minimum NIFTY within a month can at most be 4793.4. She wants to know as to how she should rebalance her portfolio under the following situations, according to the theory of Constant Proportion Portfolio Insurance Policy, using "2" as the multiplier:

- (1) Immediately to start with.
- (2) 10 days later-being the 1st day of rebalancing if NIFTY falls to 5122.96.
- (3) 10 days further from the above date if the NIFTY touches 5539.04.

For the sake of simplicity, assume that the value of her equity component will change in tandem with that of the NIFTY and the risk free securities in which she is going to invest will have no Beta.

[RTP → MAY 2019]

Answer:

$$\text{Maximum decline in one month} = \frac{5326 - 4793.40}{5326} \times 100 = 10\%$$

- (1) Immediately to start with

Investment in equity = Multiplier x (Portfolio value – Floor value)

$$= 2 (3,00,000 - 2,70,000) = ₹ 60,000$$

Indira may invest ₹ 60,000 in equity and balance in risk free securities.

- (2) After 10 days

$$\text{Value of equity} = 60,000 \times 5122.96/5326 = ₹ 57,713$$

$$\text{Value of risk free investment} = ₹ 2,40,000$$

$$\text{Total value of portfolio} = ₹ 2,97,713$$

Investment in equity = Multiplier x (Portfolio value – Floor value)

$$= 2 (2,97,713 - 2,70,000) = ₹ 55,426$$

Revised Portfolio:

$$\text{Equity} = ₹ 55,426$$

$$\text{Risk free Securities} = ₹ 2,97,713 - ₹ 55,426 = ₹ 2,42,287$$

- (3) After another 10 days

$$\text{Value of equity} = 55,426 \times 5539.04/5122.96 = ₹ 59,928$$

$$\text{Value of risk free investment} = ₹ 2,42,287$$

$$\text{Total value of portfolio} = ₹ 3,02,215$$

Investment in equity = Multiplier x (Portfolio value – Floor value)

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$$= 2 (3,02,215 - 2,70,000) = ₹ 64,430$$

Revised Portfolio:

$$\text{Equity} = ₹ 64,430$$

$$\text{Risk Free Securities} = ₹ 3,02,215 - ₹ 64,430 = ₹ 2,37,785$$

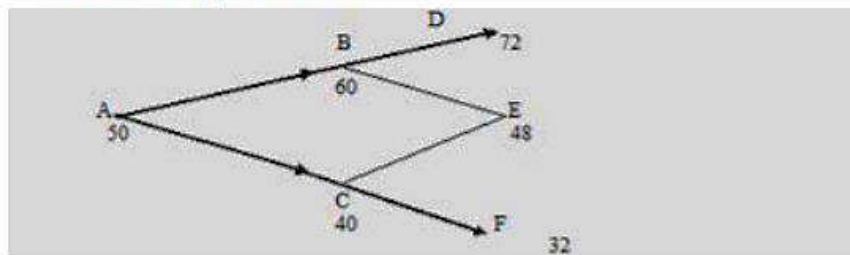
The investor should off-load 4502 of risk free securities and divert to Equity.

30. Consider a two-year call option with a strike price of Rs. 50 on a stock the current price of which is also Rs. 50. Assume that there are two-time periods of one year and in each year the stock price can move up or down by equal percentage of 20%. The risk-free interest rate is 6%. Using binominal option model, calculate the probability of price moving up and down. Also draw a two-step binomial tree showing prices and payoffs at each node.

[RTP → NOV 2019]

Answer:

Stock prices in the two step Binominal tree

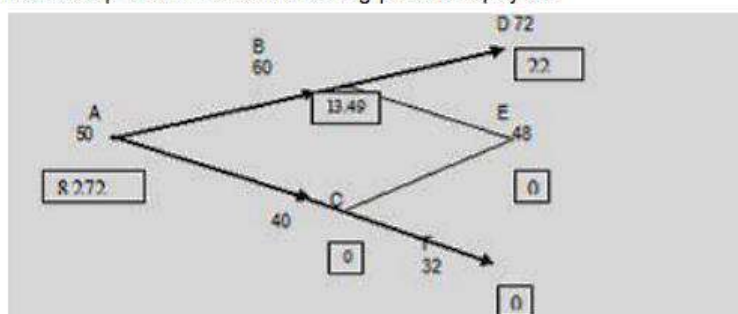


Using the single period model, the probability of price increase is

$$P = \frac{R - d}{u - d} = \frac{1.06 - 0.80}{1.20 - 0.80} = \frac{0.26}{0.40} = 0.65$$

Therefore the p of price decrease = $1 - 0.65 = 0.35$

The two step Binominal tree showing price and pay off



The value of an American call option at nodes D, E and F will be equal to the value of European option at these nodes and accordingly the call values at nodes D, E and F will be 22, 0 and 0 using the single period binomial model the value of call option at node B is

$$C = \frac{C_u p + C_d (1 - p)}{R} = \frac{22 \times 0.65 + 0 \times 0.35}{1.06} = 13.49$$

The value of option at node 'A' is

$$\frac{13.49 \times 0.65 + 0 \times 0.35}{1.06} = 8.272$$

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31. From the following data for certain stock, find the value of a call option:

Price of stock now	= Rs. 80
Exercise price	= Rs. 75
Standard deviation of continuously compounded annual return	= 0.40
Maturity period	= 6 months
Annual interest rate	= 12%

Given

Number of S.D. from Mean, (z)	Area of the left or right (one tail)
0.25	0.4013
0.30	0.3821
0.55	0.2912
0.60	0.2743

$$e^{0.12 \times 0.5} = 1.062$$

$$\ln 1.0667 = 0.0646$$

[RTP → MAY 2020]

Answer:

Applying the Black Scholes Formula,

Value of the Call option now:

The Formula $C = SN(d_1) - Ke^{(-rt)} N(d_2)$

$$d_1 = \frac{\ln(S/K) + (r + \sigma^2 / 2)t}{\sigma\sqrt{t}}$$

$$d_2 = d_1 - \sigma\sqrt{t}$$

Where,

C = Theoretical call premium

S = Current stock price

t = time until option expiration

K = option striking price

r = risk-free interest rate

N = Cumulative standard normal distribution

e = exponential term

σ = Standard deviation of continuously compounded annual return.

ln = natural logarithm

$$d_1 = \frac{\ln(1.0667) + (12\% + 0.08)0.5}{0.40\sqrt{0.5}}$$

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$$= \frac{0.0646 + (0.2)0.5}{0.40 \times 0.7071}$$

$$= \frac{0.1646}{0.2828}$$

$$= 0.5820$$

$$d_2 = 0.5820 - 0.2828 = 0.2992$$

$$N(d_1) = N(0.5820)$$

$$N(d_2) = N(0.2992)$$

$$\text{Price} = SN(d_1) - Ke^{(-rt)} N(d_2)$$

$$= 80 \times N(d_1) - (75/1.062) \times N(d_2)$$

Value of option

$$= 80 N(d_1) - \frac{75}{1.062} \times N(d_2)$$

$$N(d_1) = N(0.5820) = 0.7197$$

$$N(d_2) = N(0.2992) = 0.6176$$

$$\text{Price} = 80 \times 0.7197 - \frac{75}{1.062} \times 0.6176$$

$$= 57.57 - 70.62 \times 0.6176$$

$$= 57.57 - 43.61$$

$$= ₹13.96$$

Teaching Notes:

Students may please note following important point:

Values of $N(d_1)$ and $N(d_2)$ have been computed by interpolating the values of areas under respective numbers of SD from Mean (Z) given in the question.

It may also be possible that in question paper areas under Z may be mentioned otherwise e.g. Cumulative Area or Area under Two tails. In such situation the areas of the respective Zs given in the question will be as follows:

Cumulative Area

Number of S.D. from Mean, (z)	Cumulative Area
0.25	0.5987
0.30	0.6179
0.55	0.7088
0.60	0.7257

Two tail area

Number of S.D. from Mean, (z)	Area of the left and right (two tail)
0.25	0.8026
0.30	0.7642
0.55	0.5823
0.60	0.5485

**CHAPTER 9:
FOREIGN EXCHANGE EXPOSURE AND RISK MANAGEMENT**

9.

FOREIGN EXCHANGE EXPOSURE AND RISK MANAGEMENT

ILLUSTRATIONS & QUESTIONS FROM ICAI STUDY MATERIAL

1. Suppose you are a dealer of ABC Bank and on 20.10.2014 you found that balance in your Nostro account with XYZ Bank in London is £65,000 and you had overbought £35,000. During the day following transaction have taken place:

	£
DD purchased	12,500
Purchased a Bill on London	40,000
Sold forward TT	30,000
Forward purchase contract cancelled	15,000
Remitted by TT	37,500
Draft on London cancelled	15,000

What steps would you take, if you are required to maintain a credit Balance of £7,500 in the Nostro A/c and keep as overbought position on £7,500?

Answer:

Exchange Position:

Particulars	Purchase £	Sale £
Opening Balance Overbought	35,000	—
DD Purchased	12,500	—
Purchased a Bill on London	40,000	—
Sold forward TT	—	30,000
Forward purchase contract cancelled	—	15,000
TT Remittance		37,500
Draft on London cancelled	15,000	—
	1,02,500	82,500
Closing Balance Overbought	—	20,000
	1,02,500	1,02,500

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Cash Position (Nostro A/c)

	Credit £	Debit £
Opening balance credit	65,000	—
TT Remittance	—	37,500
	65,000	37,500
Closing balance (credit)	—	27,500
	65,000	65,000

To maintain Cash Balance in Nostro Account at £7,500 you have to sell £20,000 in Spot which will bring Overbought exchange position to Nil. Since bank require Overbought position of £7,500 it has to buy the same in forward market.

- 2. If the Indian rupee is the home currency and the foreign currency is the US Dollar then what is the exchange rate between the rupee and the US dollar?**

Answer:

US\$ 0.0217/Rs. 1 reads "0.0217 US dollar per rupee." This means that for one Indian rupee one can buy 0.0217 US dollar.

In this method, known as the European terms, the rate is quoted in terms of the number of units of the foreign currency for one unit of the domestic currency. This is called an indirect quote.

The alternative method, called the American terms, expresses the home currency price of one unit of the foreign currency. This is called a direct quote.

This means the exchange rate between the US dollar and rupee can be expressed as:

Rs. 46.08/US\$ reads "Rs. 46.08 per US dollar."

Hence, a relationship between US dollar and rupee can be expressed in two different ways which have the same meaning:

- One can buy 0.0217 US dollars for one Indian rupee.
- Rs. 46.08 Indian rupees are needed to buy one US dollar.

- 3. On 1st June 2015 the bank enters into a forward contract for 2 months for selling US\$ 1,00,000 at Rs. 65.5000. On 1st July 2015 the spot rate was Rs. 65.7500/65.2500. Calculate the amount to be debited in the customer's account.**

Answer:

The bank will apply rate originally agreed upon i.e. Rs. 65.5000 and will debit the account of the customer with Rs. 65,50,000.

CHAPTER 9:
FOREIGN EXCHANGE EXPOSURE AND RISK MANAGEMENT

4. On 1 October 2015 Mr. X an exporter enters into a forward contract with a BNP Bank to sell US\$ 1,00,000 on 31 December 2015 at Rs. 65.40/\$. However, due to the request of the importer, Mr. X received amount on 28 November 2015. Mr. X requested the bank the take delivery of the remittance on 30 November 2015 i.e. before due date. The inter-banking rates on 28 November 2015 was as follows:

Spot	Rs. 65.22/65.27
One Month Premium	10/15

If bank agrees to take early delivery then what will be net inflow to Mr. X assuming that the prevailing prime lending rate is 18%

[ALSO ASKED IN MAY 2019 EXAMS → 8 MARKS | MTP OCTOBER 2018 → 8 MARKS]

Answer:

Bank will buy from customer at the agreed rate of Rs. 65.40. In addition to the same if bank will charge/ pay swap difference and interest on outlay funds.

(a) Swap Difference	
Bank Sells at Spot Rate on 28 November 2015	Rs. 65.22
Bank Buys at Forward Rate of 31 December 2015 ($65.27 + 0.15$)	<u>Rs. 65.42</u>
Swap Loss per US\$	<u>Rs. 00.20</u>
Swap loss for US\$ 1,00,000	Rs. 20,000
(b) Interest on Outlay Funds	
On 28th November Bank sells at	Rs. 65.22
It buys from customer at	<u>Rs. 65.40</u>
Outlay of Funds per US\$	<u>Rs. 00.18</u>
Interest on Outlay fund for US\$ 1,00,000 for 31 days ($US\$100000 \times 00.18 \times 31/365 \times 18\%$)	Rs. 275.00
(c) Charges for early delivery	
Swap loss	Rs. 20,000.00
Interest on Outlay fund for US\$ 1,00,000 for 31 days	<u>Rs. 275.00</u>
	<u>Rs. 20,275.00</u>
(d) Net Inflow to Mr. X	
Amount received on sale (Rs. 65.40 x 1,00,000)	Rs. 65,40,000
Less: Charges for early delivery payable to bank	<u>(Rs. 20,275)</u>
	<u>Rs. 65,19,725</u>

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

5. On 15th January 2015 you as a banker booked a forward contract for US\$ 250000 for your import customer deliverable on 15th March 2015 at Rs. 65.3450. On due date customer request you to cancel the contract. On this date quotation for US\$ in the inter-bank market is as follows:

Spot	Rs. 65.2900/2975 per US\$
Spot/ April	3000/ 3100
Spot/ May	6000/ 6100

Assuming that the flat charges for the cancellation is Rs. 100 and exchange margin is 0.10%, then determine the cancellation charges payable by the customer.

Answer:

Bank will buy from customer at the agreed rate of Rs. 65.40.

Since this is sale contract the contract shall be cancelled at ready buying rate on the date of cancellation as follows:

Spot Buying Rate on 15 March 2015	Rs. 65.2900
Less: Exchange Margin	<u>Rs. 0.0653</u>
	<u>Rs. 65.2247</u>
Rounded to Rs. 65.2250	
Dollar sold to customer at	Rs. 65.3450
Dollar bought from customer	<u>Rs. 65.2250</u>
Net amount payable by the customer per US\$	<u>Rs. 0.1200</u>
Amount payable by the customer	
Flat Charges	Rs. 100.00
Cancellation Charges (Rs. 0.12 x 250000)	<u>Rs. 30,000.00</u>
	<u>Rs. 30,100.00</u>

6. You as a banker has entered into a 3 month's forward contract with your customer to purchase AUD 1,00,000 at the rate of Rs. 47.2500. However after 2 months your customer comes to you and requests cancellation of the contract. On this date quotation for AUD in the market is as follows:

Spot	Rs. 47.3000/3500 per AUD
1 month forward	Rs. 47.4500/5200 per AUD

Determine the cancellation charges payable by the customer

Answer:

The contract shall be cancelled at the 1 month forward sale rate of Rs. 47.5200 as follows:

CHAPTER 9:
FOREIGN EXCHANGE EXPOSURE AND RISK MANAGEMENT

AUD bought from customer under original forward contract at	Rs. 47.2500
On cancellation it is sold to him at	<u>Rs. 47.5200</u>
Net amount payable by customer per AUD	<u>Rs. 00.2700</u>
Thus total cancellation charges payable by the customer Rs. 27,000	

7. Suppose you are a banker and one of your export customer has booked a US\$ 1,00,000 forward sale contract for 2 months with you at the rate of Rs. 62.5200 and simultaneously you covered yourself in the interbank market at Rs. 62.5900. However on due date, after 2 months your customer comes to you and requests for cancellation of the contract and also requests for extension of the contract by one month. On this date quotation for US\$ in the market was as follows:

Spot	Rs. 62.7200/62.6800
1 month forward	Rs. 62.6400/62.7400

Determine the extension charges payable by the customer assuming exchange margin of 0.10% on buying as well as selling.

Answer:

Cancellation

First the original contract shall be cancelled as follows:

US\$/Rs. Spot Selling Rate	Rs. 62.7200
Add: Margin @ 0.10%	<u>Rs. 0.06272</u>
Net amount payable by customer per US\$	<u>Rs. 62.78272</u>
Rounded off Rs. 62.7825	
Bank buys US\$ under original contract at	Rs. 62.5200
Bank Sells at	<u>Rs. 62.7825</u>
	<u>Rs. 0.2675</u>

Thus total cancellation charges payable by the customer for US\$ 1,00,000 is Rs. 26,750.

Rebooking

Forward US\$/Rs. Buying Rate	Rs. 62.6400
Less: Margin @ 0.10%	<u>Rs. 0.06264</u>
Net amount payable by customer per US\$	<u>Rs. 62.57736</u>
Rounded off Rs. 62.5775	

8. Suppose you as a banker entered into a forward purchase contract for US\$ 50,000 on 5th March with an export customer for 3 months at the rate of Rs. 59.6000. On the same day you also covered yourself in the market at Rs. 60.6025. However on 5th May your customer comes to you and requests extension of the contract to 5th July. On this date (5th May) quotation for US\$ in the market is as follows:

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Spot Rs. 59.1300/1400 per US\$

Spot/ 5th June Rs. 59.2300/2425 per US\$

Spot/ 5th July Rs. 59.6300/6425 per US\$

Assuming a margin 0.10% on buying and selling, determine the extension charges payable by the customer and the new rate quoted to the customer.

Answer:

(a) Cancellation of Original Contract

The forward purchase contract shall be cancelled at the for the forward sale rate for delivery June.

Interbank forward selling rate	Rs. 59.2425
Add: Exchange Margin	<u>Rs. 0.0592</u>
Net amount payable by customer per US\$	<u>Rs. 59.3017</u>
Rounded off, the rate applicable is Rs. 59.3000	
Buying US\$ under original contract at original rate	Rs. 59.6000
Selling rate to cancel the contract	<u>Rs. 59.3000</u>
Difference per US\$	<u>Rs. 00.3000</u>

Exchange difference for US\$ 50,000 payable to the customer is Rs. 15,000.

(b) Rate for booking new contract

The forward contract shall be rebooked with the delivery 15th July as follows:

Forward buying rate (5 th July)	Rs. 59.6300
Less: Exchange Margin	<u>Rs. 0.0596</u>
Net amount payable by customer per US\$	<u>Rs. 59.5704</u>
Rounded off to Rs. 59.5700	

9. An importer booked a forward contract with his bank on 10th April for USD 2,00,000 due on 10th June @ Rs. 64.4000. The bank covered its position in the market at Rs. 64.2800.

The exchange rates for dollar in the interbank market on 10th June and 20th June were:

	10th June	20th June
Spot USD 1=	₹ 63.8000/8200	₹ 63.6800/7200
Spot/June	₹ 63.9200/9500	₹ 63.8000/8500
July	₹ 64.0500/0900	₹ 63.9300/9900
August	₹ 64.3000/3500	₹ 64.1800/2500
September	₹ 64.6000/6600	₹ 64.4800/5600

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Exchange Margin 0.10% and interest on outlay of funds @ 12%. The importer requested on 20th June for extension of contract with due date on 10th August.

Rates rounded to 4 decimal in multiples of 0.0025.

On 10th June, Bank Swaps by selling spot and buying one month forward.

Calculate:

- (i) Cancellation rate
- (ii) Amount payable on \$ 2,00,000
- (iii) Swap loss
- (iv) Interest on outlay of funds, if any
- (v) New contract rate
- (vi) Total Cost

[ALSO ASKED IN RTP → MAY 2018]

Answer:

- (i) **Cancellation Rate:**

The forward sale contract shall be cancelled at Spot TT Purchase for \$ prevailing on the date of cancellation as follows:

\$/ ₹ Market Buying Rate	₹ 63.6800
Less: Exchange Margin @ 0.10%	₹ 0.0636
	₹ 63.6163

Rounded off to ₹ 63.6175

- (ii) **Amount payable on \$ 2,00,000**

Bank sells \$2,00,000 @ ₹ 64.4000	₹ 1,28,80,000
Bank buys \$2,00,000 @ ₹ 63.6163	₹ 1,27,23,260
Amount payable by customer	₹ 1,56,740

- (iii) **Swap Loss**

On 10th June the bank does a swap sale of \$ at market buying rate of ₹ 63.8000 and forward purchase for June at market selling rate of ₹ 63.9500.

Bank buys at	₹ 63.9500
Bank sells at	₹ 63.8000
Amount payable by customer	₹ 0.1500

Swap Loss for \$ 2,00,000 in ₹ = ₹ 30,000

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(iv) Interest on Outlay of Funds

On 10th April, the bank receives delivery under cover contract at ₹ 64.2800 and sell spot at ₹ 63.8000.

Bank buys at	₹ 64.2800
Bank sells at	₹ 63.8000
Amount payable by customer	₹ 0.4800

Outlay for \$ 2,00,000 in ₹ 96,000

Interest on ₹ 96,000 @ 12% for 10 days ₹ 320

(v) New Contract Rate

The contract will be extended at current rate

\$/ ₹ Market forward selling Rate for August	₹ 64.2500
Add: Exchange Margin @ 0.10%	₹ 0.0643
	₹ 64.3143

Rounded off to ₹ 64.3150

(vi) Total Cost

Cancellation Charges	₹ 1,56,740.00
Swap Loss	₹ 30,000.00
Interest	₹ 320.00
	₹ 1,87,060.00

10. What do you mean by Nostro, Vostro and Loro Accounts?

Answer:

In interbank transactions, foreign exchange is transferred from one account to another account and from one centre to another centre. Therefore, the banks maintain three types of current accounts in order to facilitate quick transfer of funds in different currencies. These accounts are Nostro, Vostro and Loro accounts meaning “our”, “your” and “their”. A bank’s foreign currency account maintained by the bank in a foreign country and in the home currency of that country is known as Nostro Account or “our account with you”. For example, An Indian bank’s Swiss franc account with a bank in Switzerland. Vostro account is the local currency account maintained by a foreign bank/branch. It is also called “your account with us”. For example, Indian rupee account maintained by a bank in Switzerland with a bank in India. The Loro account is an account wherein a bank remits funds in foreign currency to another bank for credit to an account of a third bank.

11. The price of a bond just before a year of maturity is \$ 5,000. Its redemption value is \$ 5,250 at the end of the said period. Interest is \$ 350 p.a. The Dollar appreciates by 2% during the said period. Calculate the rate of return.

Answer:

Here we can assume two cases (i) If investor is US investor then there will be no impact of appreciation in \$. (ii) If investor is from any other nation other than US say Indian then there will be impact of \$ appreciation on his returns.

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First we shall compute return on bond which will be common for both investors.

$$\begin{aligned}\text{Return} &= \frac{(\text{Price at end} - \text{Price at beginning}) + \text{Interest}}{\text{Price at beginning}} \\ &= \frac{(5250 - 5000) + 350}{5000} \\ &= \frac{250 + 350}{5000} = 0.12 \text{ say } 12\%\end{aligned}$$

(i) For US investor the return shall be 12% and there will be no impact of appreciation in \$.

(ii) If \$ appreciate by 2% then return for non-US investor shall be:

$$\text{Return} \times 1.02 = 0.12 \times 1.02 = 0.1224 \text{ i.e. } 12.24\%$$

Alternatively it can also be considered that \$ appreciation will be applicable to the amount of principal as well. The answer therefore could also be

$$(1 + 0.12)(1 + 0.02) - 1 = 1.12 \times 1.02 - 1 = 0.1424 \text{ i.e. } 14.24\%$$

12. ABC Ltd. of UK has exported goods worth Can \$ 5,00,000 receivable in 6 months. The exporter wants to hedge the receipt in the forward market. The following information is available:

Spot Exchange Rate Can	\$ 2.5/£
Interest Rate in UK	12%
Interest Rate In Canada	15%

The forward rates truly reflect the interest rates differential. Find out the gain/loss to UK exporter if Can \$ spot rates (i) declines 2%, (ii) gains 4% or (iii) remains unchanged over next 6 months.

Answer:

$$\text{Forward Rate} = \frac{2.50 (1 + 0.075)}{(1 + 0.060)} = \text{Can\$ } 2.535/\text{£}$$

(i) If spot rate decline by 2%

$$\text{Spot Rate} = \text{Can\$ } 2.50 \times 1.02 = \text{Can\$ } 2.55/\text{£}$$

	£
£ receipt as per Forward Rate (Can \$ 5,00,000/ Can\$ 2.535)	1,97,239
£ receipt as per Spot Rate (Can \$ 5,00,000/ Can\$ 2.55)	1,96,078
Gain due to forward contract	1,161

(ii) If spot rate gains by 4%

$$\text{Spot Rate} = \text{Can\$ } 2.50 \times 0.96 = \text{Can\$ } 2.40/\text{£}$$

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	£
£ receipt as per Forward Rate (Can \$ 5,00,000/ Can\$ 2.535)	1,97,239
£ receipt as per Spot Rate (Can \$ 5,00,000/ Can\$ 2.40)	2,08,333
Loss due to forward contract	11,094

(iii) If spot rate remains unchanged

	£
£ receipt as per Forward Rate (Can \$ 5,00,000/ Can\$ 2.535)	1,97,239
£ receipt as per Spot Rate (Can \$ 5,00,000/ Can\$ 2.50)	2,00,000
Loss due to forward contract	2,761

13. On January 28, 2013 an importer customer requested a Bank to remit Singapore Dollar (SGD) 2,500,000 under an irrevocable Letter of Credit (LC). However, due to unavoidable factors, the Bank could effect the remittances only on February 4, 2013. The inter-bank market rates were as follows:

	January 28, 2013	February 4, 2013
US\$ 1=	₹ 45.85/45.90	₹ 45.91/45.97
GBP £ 1=	US\$ 1.7840/1.7850	US\$ 1.7765/1.7775
GBP £ 1=	SGD 3.1575/3.1590	SGD 3.1380/3.1390

The Bank wishes to retain an exchange margin of 0.125%

Required:

How much does the customer stand to gain or lose due to the delay?
(Note: Calculate the rate in multiples of 0.0001)

[ALSO ASKED IN RTP → NOV 2018]

Answer:

On January 28, 2013 the importer customer requested to remit SGD 25 lakhs.

To consider sell rate for the bank:

US \$	=	₹ 45.90
Pound 1	=	US\$ 1.7850
Pound 1	=	SGD 3.1575
Therefore, SGD 1	=	$\frac{₹ 45.90 \times 1.7850}{\text{SGD } 3.1575}$

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SGD 1	=	₹25.9482
Add: Exchange margin (0.125%)		<u>₹ 0.0324</u>
		<u>₹ 25.9806</u>

On February 4, 2013 the rates are

US \$	=	₹ 45.97
Pound 1	=	US\$ 1.7775
Pound 1	=	SGD 3.1380
Therefore, SGD 1	=	$\frac{₹ 45.97 \times 1.7775}{\text{SGD } 3.1380}$
SGD 1	=	₹ 26.0394
Add: Exchange margin (0.125%)		<u>₹ 0.0325</u>
		<u>₹ 26.0719</u>

Hence, loss to the importer

$$= \text{SGD } 25,00,000 (\text{₹}26.0719 - \text{₹}25.9806) = \text{₹}2,28,250$$

14. In March, 2009, the Multinational Industries make the following assessment of dollar rates per British pound to prevail as on 1.9.2009:

\$/Pound	Probability
1.60	0.15
1.70	0.20
1.80	0.25
1.90	0.20
2.00	0.20

(i) What is the expected spot rate for 1.9.2009?

(ii) If, as of March, 2009, the 6-month forward rate is \$ 1.80, should the firm sell forward its pound receivables due in September, 2009?

Answer:

(i) Calculation of expected spot rate for September, 2009:

\$ for £ (1)	Probability (2)	Expected \$/£ (1) × (2) = (3)
1.60	0.15	0.24
1.70	0.20	0.34
1.80	0.25	0.45
1.90	0.20	0.38

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2.00	$\frac{0.20}{1.00}$	$\frac{0.40}{EV = 1.81}$

Therefore, the expected spot value of \$ for £ for September, 2009 would be \$ 1.81.

- (ii) If the six-month forward rate is \$ 1.80, the expected profits of the firm can be maximised by retaining its pounds receivable.

15. An Indian exporting firm, Rohit and Bros., would be covering itself against a likely depreciation of pound sterling. The following data is given:

Receivables of Rohit and Bros	:	£500,000
Spot rate	:	Rs. 56.00/£
Payment date	:	3-months
3 months interest rate	:	India : 12 per cent per annum
	:	UK : 5 per cent per annum

What should the exporter do?

[ALSO ASKED IN MTP → OCTOBER 2018 → 6 MARKS]

Answer:

The only thing lefts Rohit and Bros to cover the risk in the money market. The following steps are required to be taken:

- (i) Borrow pound sterling for 3- months. The borrowing has to be such that at the end of three months, the amount becomes £ 500,000. Say, the amount borrowed is £ x. Therefore

$$x \left[1 + 0.05 \times \frac{3}{12} \right] = 500,000 \text{ or } x = £493,827$$

- (ii) Convert the borrowed sum into rupees at the spot rate. This gives: £493,827 × ₹ 56 = ₹ 27,654,312

- (iii) The sum thus obtained is placed in the money market at 12 per cent to obtain at the end of 3- months:

$$S = ₹ 27,654,312 \times \left[1 + 0.12 \times \frac{3}{12} \right] = ₹ 28,483,941$$

- (iv) The sum of £500,000 received from the client at the end of 3- months is used to refund the loan taken earlier.

From the calculations. It is clear that the money market operation has resulted into a net gain of ₹ 483,941 (₹ 28,483,941 – ₹ 500,000 × 56).

If pound sterling has depreciated in the meantime. The gain would be even bigger.

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16. The rate of inflation in India is 8% per annum and in the U.S.A. it is 4%. The current spot rate for USD in India is Rs. 46. What will be the expected rate after 1 year and after 4 years applying the Purchasing Power Parity Theory.

Answer:

End of Year	₹	₹/USD
1	$₹46.00 \times \frac{(1+0.08)}{(1+0.04)}$	47.77
2	$₹47.77 \times \frac{(1+0.08)}{(1+0.04)}$	49.61
3	$₹49.61 \times \frac{(1+0.08)}{(1+0.04)}$	51.52
4	$₹51.52 \times \frac{(1+0.08)}{(1+0.04)}$	53.50

17. On April 1, 3 months interest rate in the UK £ and US \$ are 7.5% and 3.5% per annum respectively. The UK £/US \$ spot rate is 0.7570. What would be the forward rate for US \$ for delivery on 30th June?

Answer:

As per interest rate parity

$$S_1 = S_0 \left[\frac{1 + \text{in A}}{1 + \text{in B}} \right]$$

$$S_1 = £0.7570 \left[\frac{1 + (0.075) \times \frac{3}{12}}{1 + (0.035) \times \frac{3}{12}} \right]$$

$$= £0.7570 \left[\frac{1.01875}{1.00875} \right]$$

$$= £0.7570 \times 1.0099 = £0.7645$$

$$= \text{UK } £0.7645 / \text{US\$}$$

18. ABC Technologic is expecting to receive a sum of US\$ 4,00,000 after 3 months. The company decided to go for future contract to hedge against the risk. The standard size of future contract available in the market is \$1000. As on date spot and futures \$ contract are quoting at Rs. 44.00 & Rs. 45.00 respectively. Suppose after 3 months the company closes out its position futures are quoting at Rs. 44.50 and spot rate is also quoting at Rs. 44.50. You are required to calculate effective realization for the company while selling the receivable. Also calculate how company has been benefitted by using the future option.

Answer:

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The company can hedge position by selling future contracts as it will receive amount from outside.

$$\text{Number of Contracts} = \frac{\$4,00,000}{\$1,000} = 400 \text{ contracts}$$

$$\text{Gain by trading in futures} = (\text{₹ } 45 - \text{₹ } 44.50) 4,00,000 = \text{₹ } 2,00,000$$

$$\text{Net Inflow after after 3 months} = \text{₹ } 44.50 \times \text{₹ } 4,00,000 + 2,00,000 = \text{₹ } 1,80,00,000$$

$$\text{Effective Price realization} = \frac{\text{₹ } 1,80,00,000}{\$4,00,000} = \text{₹ } 45 \text{ Per US\$}$$

19. XYZ Ltd. a US firm will need £ 3,00,000 in 180 days. In this connection, the following information is available:

Spot rate 1 £ = \$ 2.00

180 days forward rate of £ as of today = \$1.96

Interest rates are as follows:

	U.K.	US
180 days deposit rate	4.5%	5%
180 days borrowing rate	5%	5.5%

A call option on £ that expires in 180 days has an exercise price of \$ 1.97 and a premium of \$ 0.04.

XYZ Ltd. has forecasted the spot rates 180 days hence as below:

Future rate	Probability
\$ 1.91	25%
\$ 1.95	60%
\$ 2.05	15%

Which of the following strategies would be most preferable to XYZ Ltd.?

- (a) A forward contract;
- (b) A money market hedge;
- (c) An option contract;
- (d) No hedging.

Show calculations in each case

[ALSO ASKED IN MTP → APRIL 2018 → 10 MARKS]

Answer:

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- (a) Forward contract: Dollar needed in 180 days = £3,00,000 x \$ 1.96 = \$5,88,000/-
- (b) Money market hedge: Borrow \$, convert to £, invest £, repay \$ loan in 180 days
 Amount in £ to be invested = 3,00,000/1.045 = £ 2,87,081
 Amount of \$ needed to convert into £ = 2,87,081 x 2 = \$ 5,74,162
 Interest and principal on \$ loan after 180 days = \$5,74,162 x 1.055 = \$ 6,05,741
- (c) **Call option:**

Expected Spot rate in 180 days	Prem. /unit	Exercise Option	Total price per unit	Total price for £3,00,000xi	Prob. Pi	Pi xi
1.91	0.04	No	1.95	5,85,000	0.25	1,46,250
1.95	0.04	No	1.99	5,97,000	0.60	3,58,200
2.05	0.04	Yes	2.01*	6,03,000	0.15	90,450
Add: Interest on Premium @ 5.5% (12,000 x 5.5%)						660
						5,95,560

* (\$1.97 + \$0.04)

- (d) **No hedge option:**

Expected Future spot rate	Dollar needed Xi	Prob. Pi	Pi xi
1.91	5,73,000	0.25	1,43,250
1.95	5,85,000	0.60	3,51,000
2.05	6,15,000	0.15	92,250
			5,86,500

The probability distribution of outcomes for no hedge strategy appears to be most preferable because least number of \$ are needed under this option to arrange £3,00,000.

20. A Ltd. of U.K. has imported some chemical worth of USD 3,64,897 from one of the U.S. suppliers. The amount is payable in six months time. The relevant spot and forward rates are:

Spot rate **USD 1.5617-1.5673**
6 months' forward rate **USD 1.5455 –1.5609**

The borrowing rates in U.K. and U.S. are 7% and 6% respectively and the deposit rates are 5.5% and 4.5% respectively.

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Currency options are available under which one option contract is for GBP 12,500. The option premium for GBP at a strike price of USD 1.70/GBP is USD 0.037 (call option) and USD 0.096 (put option) for 6 months period.

The company has 3 choices:

- (i) Forward cover
- (ii) Money market cover, and
- (iii) Currency option

Which of the alternatives is preferable by the company?

[ALSO ASKED IN MTP → MARCH 2018 / APRIL 2019 → 10 MARKS / 8 MARKS]

Answer:

In the given case, the exchange rates are indirect. These can be converted into direct rates as follows:

Spot rate

$$\text{GBP} = \frac{1}{\text{USD } 1.5617} \quad \text{to} \quad \frac{1}{\text{USD } 1.5673}$$

$$\text{USD} = \text{GBP } 0.64033 \quad - \quad \text{GBP } 0.63804$$

6 months' forward rate

$$\text{GBP} = \frac{1}{\text{USD } 1.5455} \quad \text{to} \quad \frac{1}{\text{USD } 1.5609}$$

$$\text{USD} = \text{GBP } 0.64704 \quad - \quad \text{GBP } 0.64066$$

Payoff in 3 alternatives

i. Forward Cover

Amount payable USD 3,64,897

Forward rate GBP 0.64704

Payable in GBP GBP 2,36,103

ii. Money market Cover

Amount payable USD 3,64,897

PV @ 4.5% for 6 months i.e. $\frac{1}{1.0225} = 0.9779951$ USD 3,56,867

Spot rate purchase GBP 0.64033

Borrow GBP 3,56,867 x 0.64033 GBP 2,28,512

Interest for 6 months @ 7 % 7,998

Payable after 6 months GBP 2,36,510

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iii. Currency options

Amount payable	USD 3,64,897
Unit in Options contract	GBP 12,500
Value in USD at strike rate of 1.70 (GBP 12,500 x 1.70)	USD 21,250
Number of contracts USD 3,64,897/ USD 21,250	17.17
Exposure covered USD 21,250 x 17	USD 3,61,250
Exposure to be covered by Forward (USD 3,64,897 – USD 3,61,250)	USD 3,647
Options premium 17 x GBP 12,500 x 0.096	USD 20,400
Premium in GBP (USD 20,400 x 0.64033)	GBP 13,063
Total payment in currency option	
Payment under option (17 x 12,500)	GBP 2,12,500
Premium payable	GBP 13,063
Payment for forward cover (USD 3,647 x 0.64704)	<u>GBP 2,360</u>
	<u>GBP 2,27,923</u>

Thus total payment in:

(i) Forward Cover	2,36,103 GBP
(ii) Money Market	2,36,510 GBP
(iii) Currency Option	2,27,923 GBP

The company should take currency option for hedging the risk.

Note: Even interest on Option Premium can also be considered in the above solution.

PAST EXAMINATION, MTP & RTP QUESTIONS

21. Following information is given:

Exchange rates: Canadian dollar 0.666 per DM (spot)

Canadian dollar 0.671 per DM (3-months)

Interest rates: DM 7.5% p.a.

Canadian Dollar - 9.5% p.a.

To take the possible arbitrage gains, what operations would be carried out?

[MAY 2018 → 8 MARKS]

Answer:

In this case, DM is at a premium against the Can\$.

Premium = $[(0.671 - 0.666) / 0.666] \times (12/3) \times 100 = 3.00$ per cent

Interest rate differential = 9.5% - 7.5% = 2 per cent.

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Since the interest rate differential is smaller than the premium, it will be profitable to place money in Deutschmarks the currency whose 3-months interest is lower.

The following operations are carried out:

- (i) Borrow Can\$ 1000 at 9.5 per cent for 3- months;
- (ii) Change this sum into DM at the spot rate to obtain DM
 $= (1000/0.666) = 1501.50$
- (iii) Place DM 1501.50 in the money market for 3 months to obtain a sum of DM

Principal:	1501.50
Add: Interest @ 7.5% for 3 months =	<u>28.15</u>
Total	1529.65

- (iv) Sell DM at 3-months forward to obtain Can\$ = $(1529.65 \times 0.671) = 1026.40$
- (v) Refund the debt taken in Can\$ with the interest due on it, i.e.,

	Can\$
Principal	1000.00
Add: Interest @ 9.5% for 3 months	<u>23.75</u>
Total	1023.75

Net arbitrage gain = $1026.40 - 1023.75 = \text{Can\$ } 2.65$

Note: The students may use any quantity of currency to arrive at the arbitrage gain since no specific amount is mentioned in the question.

22. Punjab Bank has entered into a plain vanilla swap through on Overnight Index Swap (OIS) on a principal of Rs. 2 crore and agreed to receive MIBOR overnight floating rate for a fixed payment on the principal. The swap was entered into on Monday, 24th July, 2017 and was to commence on 25th July, 2017 and run for a period of 7 days.

Respective MIBOR rates for Tuesday to Monday were:

8.70%, 9.10%, 9.12%, 8.95%, 8.98% and 9.10%.

If Punjab Bank received Rs. 507 net on settlement, calculate Fixed rate and interest under both legs.

Notes:

- (i) Sunday is a Holiday.

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- (ii) Workout in rounded rupees and avoid decimal working.
(iii) Consider a year consists of 365 days

[MAY 2018 → 8 MARKS]

Answer:

Day	Principal (₹)	MIBOR (%)	Interest (₹)
Tuesday	2,00,00,000	8.70	4,767
Wednesday	2,00,04,767	9.10	4,987
Thursday	2,00,09,754	9.12	5,000
Friday	2,00,14,754	8.95	4,908
Saturday & Sunday (*)	2,00,19,662	8.98	9,851
Monday	2,00,29,513	9.10	<u>4,994</u>
Total Interest @ Floating			34,507
Less: Net Received			<u>507</u>
Expected Interest @ fixed			<u>34,000</u>
Thus Fixed Rate of Interest			0.0886428
Approx.			8.86%

(*) i.e. interest for two days.

23. A dealer in foreign exchange has the following position in Swiss Francs on 31st January, 2018:

	(Swiss Francs)
Balance in the Nostro A/c Credit	1,00,000
Opening Position Overbought	50,000
Purchased a bill on Zurich	70,000
Sold forward TT	49,000
Forward purchase contract cancelled	41,000
Remitted by TT	75,000
Draft on Zurich cancelled	40,000

Examine what steps would the dealer take, if he is required to maintain a credit balance of Swiss Francs 30,000 in the Nostro A/c and keep as overbought position on Swiss Francs 10,000?

[NOV 2018 → 8 MARKS]

Answer:

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Exchange Position:

Particulars	Purchase Sw. Fcs.	Sale Sw. Fcs.
Opening Balance Overbought	50,000	
Bill on Zurich	70,000	
Forward Sales – TT		49,000
Cancellation of Forward Contract		41,000
TT Sales		75,000
Draft on Zurich cancelled	40,000	—
	1,60,000	1,65,000
Closing Balance Oversold	5,000	—
	1,65,000	1,65,000

Cash Position (Nostro A/c)

	Credit	Debit
Opening balance credit	1,00,000	—
TT sales	—	75,000
	1,00,000	75,000
Closing balance (credit)	—	25,000
	1,00,000	1,00,000

The Bank has to buy spot TT Sw. Fcs. 5,000 to increase the balance in Nostro account to Sw. Fcs. 30,000.

This would bring down the oversold position on Sw. Fcs. as Nil.

Since the bank requires an overbought position of Sw. Fcs. 10,000, it has to buy forward Sw. Fcs. 10,000.

24. An Indian company obtains the following quotes (Rs./\$)

Spot:	35.90/36.10
3 - Months forward rate:	36.00/36.25
6 - Months forward rate:	36.10/36.40

The company needs \$ funds for six months. Determine whether the company should borrow in \$ or Rs. Interest rates are :

3 - Months interest rate :	Rs. : 12%, \$: 6%
6 - Months interest rate :	Rs. : 11.50%, \$: 5.5%

Also determine what should be the rate of interest after 3-months to make the company indifferent between 3-months borrowing and 6-months borrowing in the case of:

- (i) Rupee borrowing
- (ii) Dollar borrowing

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Note: For the purpose of calculation you can take the units of dollar and rupee as 100 each.

[NOV 2018 → 8 MARKS]

Answer:

- (i) If company borrows in \$ then outflow would be as follows:

Let company borrows \$ 100	\$ 100.00
Add: Interest for 6 months @ 5.5%	<u>\$ 2.75</u>
Amount Repayable after 6 months	<u>\$ 102.75</u>
Applicable 6 month forward rate	36.40
Amount of Cash outflow in Indian Rupees	Rs. 3,740.10

If company borrows equivalent amount in Indian Rupee, then outflow would be as follows:

Equivalent Rs. amount Rs. 36.10 x 100	Rs. 3,610.00
Add: Interest @11.50%	<u>Rs. 207.58</u>
	<u>Rs. 3817.58</u>

Since cash outflow is more in Rs. borrowing then borrowing should be made in \$.

- (ii)

- (a) Let ' i_r ' be the interest rate of Rs. borrowing make indifferent between 3 months borrowings and 6 months borrowing then

$$(1 + 0.03) (1 + i_r) = (1 + 0.0575)$$

$$i_r = 2.67\% \text{ or } 10.68\% \text{ (on annualized basis)}$$

- (b) Let ' i_d ' be the interest rate of \$ borrowing after 3 months to make indifference between 3 months borrowings and 6 months borrowings. Then,

$$(1 + 0.015) (1 + i_d) = (1 + 0.0275)$$

$$i_d = 1.232\% \text{ or } 4.93\% \text{ (on annualized basis)}$$

25. A dealer quotes 'All-in-cost' for a generic swap at 6% against six month LIBOR flat. If the notional principal amount of swap is Rs. 8,00,000:

- (i) Calculate semi-annual fixed payment.
- (ii) Find the first floating rate payment for (i) above if the six month period from the effective date of swap to the settlement date comprises 181 days and that the corresponding LIBOR was 5% on the effective date of swap.
- (iii) In (ii) above, if the settlement is on 'Net' basis, how much the fixed rate payer would pay to the floating rate payer? Generic swap is based on 30/360 days basis.

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[NOV 2018 → 4 MARKS]

Answer:

- (i) Semi-annual fixed payment
 = (N) (AIC) (Period)
 Where N = Notional Principal amount = ₹8,00,000
 AIC = All-in-cost = 6% = 0.06

$$= 8,00,000 \times 0.06 \left(\frac{180}{360} \right)$$

$$= 8,00,000 \times 0.06 (0.5)$$

$$= ₹24,000$$
- (ii) Floating Rate Payment

$$= N (\text{LIBOR}) \left(\frac{dt}{360} \right)$$

$$= 8,00,000 \times 0.05 \times \frac{181}{360}$$

$$= ₹20,111 \text{ or } ₹ 20,120$$
- (iii) Net Amount

$$= (i) - (ii)$$

$$= ₹24,000 - ₹20,111 = ₹3889$$
 Or
$$= ₹24,000 - ₹20,120 = ₹3880$$

26. On 19th January, Bank A entered into forward contract with a customer for a forward sale of US \$ 7,000, delivery 20th March at Rs. 46.67. On the same day, it covered its position by buying forward from the market due 19th March, at the rate of Rs. 46.655. On 19th February, the customer approaches the bank and requests for early delivery of US \$. Rates prevailing in the interbank markets on that date are as under:

Spot (Rs./\$)	46.5725/5800
March	46.3550/3650

Interest on outflow of funds is 16% and on inflow of funds is 12%. Flat charges for early delivery are Rs. 100.

What is the amount that would be recovered from the customer on the transaction?

Note: Calculation should be made on months basis than on days basis.

[NOV 2018 → 8 MARKS]

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Answer:

The bank would sell US \$ to its customer at the agreed rate under the contract. However, it would recover loss from the customer for early delivery.

On 19th February bank would buy US\$ 7000 from market and shall sell to customer. Further, Bank would enter into one month forward contract to sell the US \$ acquired under the cover deal.

(i) Swap Difference

Bank sells at	Rs. 46.3550
Bank buys at	<u>Rs. 46.5800</u>
Swap loss per US \$	<u>0.225</u>
Swap loss for US \$ 7000	Rs. 1,575

(ii) Interest on Outlay of Funds

On 19th February, Bank sell to customer	Rs. 46.67
It buys from spot Market	<u>Rs. 46.58</u>
Inflow of funds per US \$	<u>Rs. 0.09</u>

Inflow of funds for US \$ 7000 is Rs. 630
Interest on Rs. 630 at 12% for one month Rs. 6.30

(iii) Charges for early delivery

Swap loss	Rs. 1,575.00
Flat charges	Rs. 100.00
Less: Interest on outflow of funds	<u>Rs. 6.30</u>
	<u>Rs. 1,668.70</u>

Total amount to be recovered from the customer

Amount as per Forward Contract Rs. 46.67 x 7000	Rs. 3,26,690.00
Add: Charges for early delivery	<u>Rs. 1,668.70</u>
	<u>Rs. 3,28,358.70</u>

27. Sun Limited, an Indian company will need \$ 5,00,000 in 90 days. In this connection, following information is given below:

Spot Rate - \$1 = Rs. 71

90 days forward rate of \$1 as of today = Rs. 73

Interest Rates are as follows:

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Particulars	US	India
90 days Deposit Rate	2.50%	4.00%
90 days Borrowing Rate	4.00%	6.00%

A call option on \$ that expires in 90 days has an exercise price of Rs. 74 and a premium of Re. 0.10. Sun Limited has forecasted the spot rates for 90 days as below

Future Rate	Probability
₹72.50	25%
₹73.00	50%
₹74.50	25%

Which of the following strategies would be the most preferable to Sun Limited:

- (i) A Forward Contract;
- (ii) A Money Market hedge;
- (iii) An Option Contract;
- (iv) No Hedging.

Show your calculations in each case

[MAY 2019 → 8 MARKS]

Answer:

- (i) **Forward contract:**

Rupees needed in 90 days = \$5,00,000 × ₹ 73 = ₹ 3,65,00,000

- (ii) **Money market hedge:**

Amount in \$ to be invested = 5,00,000/1.0250 = ₹ 4,87,805

Amount of ₹ needed to convert into \$ = 4,87,805 × 71 = ₹ 3,46,34,155

Interest and principal on ₹ loan after 90 days

= ₹ 3,46,34,155 × 1.06 = ₹ 3,67,12,204

- (iii) **Call option:**

Expected Spot rate (1)	Prem./unit (2)	Exercise Option (3)	Total price per unit (4)	Total price for \$5,00,000 x (4) = (5)	Prob. Pi (6)	Pixi (5) x (6) (7)
72.50	0.10	No	72.60	3,63,00,000	0.25	90,75,000

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73.00	0.10	No	73.10	3,65,50,000	0.50	1,82,75,000
74.50	0.10	Yes	74.10*	3,70,50,000	0.25	92,62,500
						3,66,12,500
Add: Interest on Premium @ 6% (50,000 x 6%)						3,000
						3,66,15,500

* (₹ 74 + ₹ 0.10)

(iv) **No hedge option:**

Expected Future spot rate	₹ needed Xi	Prob. Pi	Pi xi
72.50	3,62,50,000	0.25	90,62,500
73.00	3,65,00,000	0.50	1,82,50,000
74.50	3,72,50,000	0.25	93,12,500
			3,66,25,000

Decision: Forward Contract Strategy is most preferable strategy because it requires the least amount to arrange \$5,00,000.

28. M/s. Parker & Co. is contemplating to borrow an amount of Rs. 60 crores for a Period of 3 months in the coming 6 month's time from now. The current rate of interest is 9% p.a., but it may go up in 6 month's time. The company wants to hedge itself against the likely increase in interest rate.

The Company's Bankers quoted an FRA (Forward Rate Agreement) at 9.30%p.a.

Analyze the effect of FRA and actual rate of interest cost to the company, if the actual rate of interest after 6 months happens to be (i) 9.60% p.a. and (ii) 8.80% p.a.

[MTP → MARCH 2018 → 8 MARKS | RTP → NOV 2018]

Answer:

Final settlement amount shall be computed by using formula:

$$= \frac{(N)(RR - FR)(dtm/DY)}{[1 + RR(dt/DY)]}$$

Where,

N = the notional principal amount of the agreement;

RR = Reference Rate for the maturity specified by the contract prevailing on the contract settlement date;

FR = Agreed-upon Forward Rate; and

dtm = maturity of the forward rate, specified in days (FRA Days)

DY = Day count basis applicable to money market transactions which could be 360 or 365 days.

Accordingly,

If actual rate of interest after 6 months happens to be 9.60%

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$$= \frac{(\text{₹ } 60 \text{ crore})(0.096 - 0.093)(3/12)}{[1 + 0.096(3/12)]}$$

$$= \frac{(\text{₹ } 60 \text{ crore})(0.00075)}{1.024} = \text{₹ } 4,39,453$$

Thus banker will pay Parker & Co. a sum of ₹ 4,39,453

If actual rate of interest after 6 months happens to be 8.80%

$$= \frac{(\text{₹ } 60 \text{ crore})(0.088 - 0.093)(3/12)}{[1 + 0.088(3/12)]}$$

$$= \frac{(\text{₹ } 60 \text{ crore})(-0.00125)}{1.022} = - \text{₹ } 7,33,855$$

Thus Parker & Co. will pay banker a sum of ₹ 7,33,855

Note: It might be possible that students may solve the question on basis of days instead of months (as considered in above calculations). Further there may be also possibility that the FRA days and Day Count convention may be taken in various plausible combinations such as 90 days/360 days, 90 days/ 365 days, 91 days/360 days or 91 days/365days.

29. Odessa Limited has proposed to expand its operations for which it requires funds of \$ 15 million, net of issue expenses which amount to 2% of the issue size. It proposed to raise the funds through a GDR issue. It considers the following factors in pricing the issue:

- (i) The expected domestic market price of the share is Rs. 300
- (ii) 3 shares underly each GDR
- (iii) Underlying shares are priced at 10% discount to the market price
- (iv) Expected exchange rate is Rs. 60/\$

Calculate the number of GDR's to be issued and cost of GDR to Odessa Limited, if 20% dividend is expected to be paid with a growth rate of 20%.

[MTP → MARCH 2018 & APRIL 2018 → 8 MARKS]

Answer:

Net Issue Size = \$15 million

$$\text{Gross Issue} = \frac{\$15 \text{ million}}{0.98} = \$15.306 \text{ million}$$

Issue Price per GDR in ₹ (300 × 3 × 90%) ₹ 810

Issue Price per GDR in \$ (₹ 810 / ₹ 60) \$13.50

Dividend Per GDR (D₁) = ₹ 2* × 3 = ₹ 6

* Assumed to be based on Face Value of ₹ 10 each share.

Net Proceeds Per GDR = ₹ 810 × 0.98 = ₹ 793.80

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- (a) Number of GDR to be issued

$$\frac{\$15.306 \text{ million}}{\$13.50} = 1.1338 \text{ million}$$

- (b) Cost of GDR to Odessa Ltd.

$$k_e = \frac{6.00}{793.80} + 0.20 = 20.76\%$$

30. XYZ Limited borrows £ 15 Million of six months LIBOR + 10.00% for a period of 24 months. The company anticipates a rise in LIBOR, hence it proposes to buy a Cap Option from its Bankers at the strike rate of 8.00%. The lump sum premium is 1.00% for the entire reset periods and the fixed rate of interest is 7.00% per annum. The actual position of LIBOR during the forthcoming reset period is as under:

Reset Period	LIBOR
1	9.00%
2	9.50%
3	10.00%

Analyze how far interest rate risk is hedged through Cap Option.

(For calculation, work out figures at each stage up to four decimal points and amount nearest to £.)

[MTP → APRIL 2018, AUGUST 2018 & OCTOBER 2019 → 8 MARKS]

Answer:

Analysis of hedging of interest rate risk thorough Cap Option

First of all we shall calculate premium payable to bank as follows:

$$P = \left[\frac{rp}{(1+i) - \frac{1}{i \times (1+i)^t}} \right] \times A \text{ or } \frac{rp}{PVA(3.5\% 4)} \times A$$

Where

P = Premium

A = Principal Amount

rp = Rate of Premium

i = Fixed Rate of Interest

t = Time

$$= \left[\frac{0.01}{(1/0.035) - \frac{1}{0.035 \times 1.035^4}} \right] \times £15,000,000 \text{ or } \frac{0.01}{(0.966 + 0.933 + 0.901 + 0.871)} \times £15,000,000$$

$$= \left[\frac{0.01}{(28.5714) - \frac{1}{0.04016}} \right] \times £15,000,000 \text{ or } \frac{£150,000}{3.671} = £ 40,861$$

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Please note above solution has been worked out on the basis of four decimal points at each stage.

Now we see the net payment received from bank

Reset Period	Additional interest due to rise in interest rate	Amount received from bank	Premium paid to bank	Net Amt. received from bank
1	£ 75,000	£ 75,000	£ 40,861	£34,139
2	£ 112,500	£ 112,500	£ 40,861	£71,639
3	£ 150,000	£ 150,000	£ 40,861	£109,139
TOTAL	£ 337,500	£ 337,500	£122,583	£ 214,917

Analysis: Thus, from above it can be seen that interest rate risk amount of £ 337,500 reduced by £ 214,917 by using of Cap option.

Note: It may be possible that student may compute upto three decimal points or may use different basis. In such case their answer is likely to be different.

31. Following information relates to AKC Ltd. which manufactures some parts of an electronics device which are exported to USA, Japan and Europe on 90 days credit terms.

Cost and Sales information:

	Japan	USA	Europe
Variable cost per unit	Rs.225	Rs.395	Rs.510
Export sale price per unit	Yen 650	US\$10.23	Euro 11.99
Receipts from sale due in 90 days	Yen 78,00,000	US\$1,02,300	Euro 95,920

Foreign exchange rate information:

	Yen/Rs.	US\$/Rs.	Euro/Rs.
Spot market	2.417-2.437	0.0214-0.0217	0.0177-0.0180
3 months forward	2.397-2.427	0.0213-0.0216	0.0176-0.0178
3 months spot	2.423-2.459	0.02144-0.02156	0.0177-0.0179

Advice AKC Ltd. by calculating average contribution to sales ratio whether it should hedge it's foreign currency risk or not.

[MTP → AUGUST 2018 → 8 MARKS]

Answer:

If foreign exchange risk is hedged

				Total (Rs.)
Sum due	Yen 78,00,000	US\$1,02,300	Euro 95,920	
Unit input price	Yen 650	US\$10.23	Euro 11.99	
Unit sold	12000	10000	8000	
Variable cost per unit	Rs.225/-	395	510	
Variable cost	Rs. 27,00,000	Rs. 39,50,000	Rs. 40,80,000	Rs. 1,07,30,000

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Three months forward rate for selling	2.427	0.0216	0.0178	
Rupee value of receipts	Rs.32,13,844	Rs. 47,36,111	Rs. 53,88,764	Rs. 1,33,38,719
Contribution	Rs.5,13,844	Rs. 7,86,111	Rs. 13,08,764	Rs. 26,08,719
Average contribution to sale ratio				19.56%
If risk is not hedged				
Rupee value of receipt	Rs.31,72,021	Rs. 47,44,898	Rs. 53,58,659	Rs. 1,32,75,578
Total contribution				Rs. 25,45,578
Average contribution to sale ratio				19.17%

AKC Ltd. Is advised to hedge its foreign currency exchange risk.

32. Discuss the types of Commodity Swaps

[MTP → AUGUST 2018 → 5 MARKS]

Answer:

There are two types of commodity swaps: fixed-floating or commodity-for-interest.

- (a) Fixed-Floating Swaps: They are just like the fixed-floating swaps in the interest rate swap market with the exception that both indices are commodity based indices.

General market indices in the international commodities market with which many people would be familiar include the S&P Goldman Sachs Commodities Index (S&PGSCI) and the Commodities Research Board Index (CRB). These two indices place different weights on the various commodities so they will be used according to the swap agent's requirements.

- (b) Commodity-for-Interest Swaps: They are similar to the equity swap in which a total return on the commodity in question is exchanged for some money market rate (plus or minus a spread).

33. XY Limited is engaged in large retail business in India. It is contemplating for expansion into a country of Africa by acquiring a group of stores having the same line of operation as that of India.

The exchange rate for the currency of the proposed African country is extremely volatile. Rate of inflation is presently 40% a year. Inflation in India is currently 10% a year. Management of XY Limited expects these rates likely to continue for the foreseeable future.

Estimated projected cash flows, in real terms, in India as well as African country for the first three years of the project are as follows:

	Year – 0	Year – 1	Year – 2	Year - 3
Cashflows in Indian Rs. (000)	-50,000	-1,500	-2,000	-2,500
Cash flows in African Rands (000)	-2,00,000	+50,000	+70,000	+90,000

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XY Ltd. assumes the year 3 nominal cash flows will continue to be earned each year indefinitely. It evaluates all investments using nominal cash flows and a nominal discounting rate. The present exchange rate is African Rand 6 to Rs. 1.

You are required to calculate the net present value of the proposed investment considering the following:

- African Rand cash flows are converted into rupees and discounted at a risk adjusted rate.
- All cash flows for these projects will be discounted at a rate of 20% to reflect it's high risk.
- Ignore taxation.

	Year - 1	Year - 2	Year - 3
PVIF @ 20%	.833	.694	.579

[MTP → AUGUST 2018 → 8 MARKS]

Answer:

Calculation of NPV

Year	0	1	2	3
Inflation factor in India	1.00	1.10	1.21	1.331
Inflation factor in Africa	1.00	1.40	1.96	2.744
Exchange Rate (as per IRP)	6.00	7.6364	9.7190	12.3696
Cash Flows in Rs.'000				
Real	-50000	-1500	-2000	-2500
Nominal (1)	-50000	-1650	-2420	-3327.50
Cash Flows in African Rand '000				
Real	-200000	50000	70000	90000
Nominal	-200000	70000	137200	246960
In Indian ₹ '000 (2)	-33333	9167	14117	19965
Net Cash Flow in Rs. '000 (1)+(2)	-83333	7517	11697	16637
PVF@20%	1	0.833	0.694	0.579
PV	-83333	6262	8118	9633

NPV of 3 years = -59320 (Rs. '000)

NPV of Terminal Value = $\frac{16637}{0.20} \times 0.579 = 48164$ (Rs.'000)

Total NPV of the Project = -59320 (Rs. '000) + 48164 (Rs.'000) = -11156 (Rs.'000)

34.A multinational company is planning to set up a subsidiary company in India (where hitherto it was exporting) in view of growing demand for its product and competition from other MNCs. The initial project cost (consisting of Plant and Machinery including installation) is estimated to be US\$ 500 million. The net working capital requirements are estimated at US\$ 50 million. The company follows straight line method of depreciation.

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Presently, the company is exporting two million units every year at a unit price of US\$ 80, its variable cost per unit being US\$ 40.

The Chief Financial Officer has estimated the following operating cost and other data in respect of proposed project:

- (i) Variable operating cost will be US \$ 20 per unit of production;
- (ii) Additional cash fixed cost will be US \$ 30 million p.a. and project's share of allocated fixed cost will be US \$ 3 million p.a. based on principle of ability to share;
- (iii) Production capacity of the proposed project in India will be 5 million units;
- (iv) Expected useful life of the proposed plant is five years with no salvage value;
- (v) Existing working capital investment for production & sale of two million units through exports was US \$ 15 million;
- (vi) Export of the product in the coming year will decrease to 1.5 million units in case the company does not open subsidiary company in India, in view of the presence of competing MNCs that are in the process of setting up their subsidiaries in India;
- (vii) Applicable Corporate Income Tax rate is 35%, and
- (viii) Required rate of return for such project is 12%.

ADVICE X Inc. to establish the proposed project in India.

Note:

1. There will be no variation in the exchange rate of two currencies and all profits will be repatriated, as there will be no withholding tax.
2. Present Value Interest Factors (PVIF) @ 12% for five years are as below:

Year	1	2	3	4	5
PVIF	0.8929	0.7972	0.7118	0.6355	0.5674

[MTP → OCTOBER 2018 → 8 MARKS | RTP → NOV 2018]

Answer:

Financial Analysis whether to set up the manufacturing units in India or not may be carried using NPV technique as follows:

I. Incremental Cash Outflows

	\$ Million
Cost of Plant and Machinery	500.00
Working Capital	50.00
Release of existing Working Capital	(15.00)
	535.00

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II. Incremental Cash Inflow after Tax (CFAT)

(a) Generated by investment in India for 5 years

	\$ Million
Sales Revenue (5 Million x \$80)	400.00
Less: Costs	
Variable Cost (5 Million x \$20)	100.00
Fixed Cost	30.00
Depreciation (\$500Million/5)	100.00
EBIT	170.00
Taxes@35%	59.50
EAT	110.50
Add: Depreciation	100.00
CFAT (1-5 years)	210.50
Cash flow at the end of the 5 years (Release of Working Capital)	35.00

(b) Cash generation by exports

	\$ Million
Sales Revenue (1.5 Million x \$80)	120.00
Less: Variable Cost (1.5 Million x \$40)	60.00
Contribution before tax	60.00
Tax@35%	21.00
CFAT (1-5 years)	39.00

(c) Additional CFAT attributable to Foreign Investment

	\$ Million
Through setting up subsidiary in India	210.50
Through Exports in India	39.00
CFAT (1-5 years)	171.50

III. Determination of NPV

Year	CFAT (\$ Million)	PVF@12%	PV(\$ Million)
1-5	171.50	3.6048	618.2232
5	35	0.5674	19.8590
			638.0822
Less: Initial Outflow			535.0000
			103.0822

Since NPV is positive the proposal should be accepted.

35. XYZ Inc. issues a £ 10 million floating rate loan on July 1, 2013 with resetting of coupon rate every 6 months equal to LIBOR + 50 bp. XYZ is interested in a collar strategy by selling a Floor and buying a Cap. XYZ buys the 3 years Cap and sell 3 years Floor as per the following details on July 1, 2013:

Notional Principal Amount

\$ 10 million

Reference Rate

6 months LIBOR

Strike Rate

4% for Floor and 7% for Cap

Premium

0*

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The actual LIBOR happened to at each reset date was as follows:

Reset Date	LIBOR (%)
31-12-2013	6.00
30-06-2014	7.50
31-12-2014	5.00
30-06-2015	4.00
31-12-2015	3.75
30-06-2016	4.25

Determine:

(i) Effective interest paid out at each of above reset date,

(ii) The average overall effective rate of interest p.a.

*Since Premium paid for Cap = Premium received for Floor

[MTP → OCTOBER 2018 → 8 MARKS | RTP → MAY 2019]

Answer:

(i) The pay-off of each leg shall be computed as follows:

Cap Receipt

$$\text{Max } \left\{ 0, \left[\frac{\text{Notional principal} \times (\text{LIBOR on Reset date} - \text{Cap Strike Rate}) \times \text{Number of days in the settlement period}}{365} \right] \right\}$$

Floor Pay-off

$$\text{Max } \left\{ 0, \left[\frac{\text{Notional principal} \times (\text{Floor Strike Rate} - \text{LIBOR on Reset date}) \times \text{Number of days in the settlement period}}{365} \right] \right\}$$

Statement showing effective interest on each re-set date

Reset Date	LIBOR (%)	Days	Interest Payment (\$) LIBOR+0.50%	Cap Receipts (\$)	Floor Pay-off (\$)	Effective Interest
31-12-2013	6.00	184	3,27,671	0	0	3,27,671
30-06-2014	7.50	181	3,96,712	24,795	0	3,71,917
31-12-2014	5.00	184	2,77,260	0	0	2,77,260
30-06-2015	4.00	181	2,23,151	0	0	2,23,151
31-12-2015	3.75	184	2,14,247	0	12,603	2,26,850
30-06-2016	4.25	182	2,36,849	0	0	2,36,849
Total		1096				16,63,698

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(ii) Average Annual Effective Interest Rate shall be computed as follows:

$$\frac{16,63,698}{1,00,00,000} \times \frac{365}{1096} \times 100 = 5.54\%$$

36. EFD Ltd. is an export business house. The company prepares invoice in customers' currency. Its debtors of US\$. 10,000,000 is due on April 1, 2015.

Market information as at January 1, 2015 is:

Exchange rates US\$/INR		Currency Futures US\$/INR	
Spot	0.016667	Contract size: Rs. 24,816,975	
1-month forward	0.016529	1-month	0.016519
3-months forward	0.016129	3-month	0.016118
Initial Margin		Interest rates in India	
1-Month	Rs. 17,500	6.5%	
3-Months	Rs. 22,500	7%	

On April 1, 2015 the spot rate US\$/INR is 0.016136 and currency future rate is 0.016134.

Recommend as to which of the following methods would be most advantageous to EFD Ltd.

- (i) Using forward contract
- (ii) Using currency futures
- (iii) Not hedging the currency risk

[MTP → MARCH 2019 → 7 MARKS]

Answer:

Receipts using a forward contract = \$10,000,000/0.016129 = Rs. 620,001,240

Receipts using currency futures

The number of contracts needed is (\$10,000,000/0.016118)/24,816,975 = 25

Initial margin payable is 25 contracts x Rs. 22,500 = Rs. 5,62,500

On April 1, 2015 Close at 0.016134

Receipts = US\$10,000,000/0.016136 = Rs. 619,732,276

Variation Margin =

[(0.016134 – 0.016118) x 25 x 24,816,975/-]/0.016136

CHAPTER 9: FOREIGN EXCHANGE EXPOSURE AND RISK MANAGEMENT

OR $(0.000016 \times 25 \times 24,816,975) / 0.016136 = 9926.79 / 0.016136$	=	Rs. 615,195
Less: Interest Cost – Rs. $5,62,500 \times 0.07 \times 3/12$	=	Rs. 9,844
Net Receipts		Rs. 620,337,627

Receipts under different methods of hedging

Forward contract	Rs. 620,001,240
Futures	Rs. 620,337,627
No hedge (US\$ 10,000,000/0.016136)	Rs. 619,732,276

The most advantageous option would have been to hedge with futures.

37. TM Fincorp has bought a 6 x 9 Rs. 100 crore Forward Rate Agreement (FRA) at 5.25%. On fixing date reference rate i.e. MIBOR turns out be as follows:

Period	Rate (%)
3 months	5.50
6 months	5.70
9 months	5.85

You are required to calculate:

- (i) Profit/Loss to TM Fincorp. in terms of basis points.**
- (ii) The settlement amount.**
- (Assume 360 days in a year)**

[MTP → MARCH 2019 → 8 MARKS]

Answer:

- (i) TM will make a profit of 25 basis points since a 6X9 FRA is a contract on 3-month interest rate in 6 months, which turns out to be 5.50% (higher than FRA price).
- (ii) The settlement amount shall be calculated by using the following formula:

$$\frac{N(RR - FR)(dtm / 360)}{1 + RR(dt / 360)}$$

Where

N	=	Notional Principal Amount
RR	=	Reference Rate
FR	=	Agreed upon Forward Rate
Dtm	=	FRA period specified in days.

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Accordingly:

$$\frac{100 \text{ crore } (5.50\% - 5.25\%) (92 \times 360)}{1 + 0.055(92 \times 360)} = \text{Rs. } 6,30,032$$

Hence there is profit of Rs. 6,30,032 to TM Fincorp.

* Alternatively, it can also be taken as 90 days.

38. On April 3, 2016, a Bank quotes the following:

Spot exchange Rate (US \$ 1)	INR 66.2525	INR 67.5945
2 months' swap points	70	90
3 months' swap points	160	186

In a spot transaction, delivery is made after two days.

Assume spot date as April 5, 2016.

Assume 1 swap point = 0.0001,

Calculate:

- swap points for 2 months and 15 days. (For June 20, 2016),
- foreign exchange rate for June 20, 2016, and
- the annual rate of premium/discount of US\$ on INR, on an average rate.

[MTP → MARCH 2019 → 8 MARKS]

Answer:

- Swap Points for 2 months and 15 days

	Bid	Ask
Swap Points for 2 months (a)	70	90
Swap Points for 3 months (b)	160	186
Swap Points for 30 days (c) = (b) – (a)	90	96
Swap Points for 15 days (d) = (c)/2	45	48
Swap Points for 2 months & 15 days (e) = (a) + (d)	115	138

- Foreign Exchange Rates for 20th June 2016

	Bid	Ask
Spot Rate (a)	66.2525	67.5945
Swap Points for 2 months & 15 days (b)	0.0115	0.0138
	66.2640	67.6083

- Annual Rate of Premium

	Bid	Ask
Spot Rate (a)	66.2525	67.5945
Foreign Exchange Rates for 20 th June 2016 (b)	66.2640	67.6083
Premium (c)	0.0115	0.0138

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Total (d) = (a) + (b)	132.5165	135.2028
Average (d) / 2	66.2583	67.6014
Premium	$\frac{0.0115}{66.2583} \times \frac{12}{2.5} \times 100$ = 0.0833%	$\frac{0.0138}{67.6014} \times \frac{12}{2.5} \times 100$ = 0.0980%

39. You have following quotes from Bank A and Bank B

	Bank A	Bank B
SPOT	USD/CHF 1.4650/55	USD/CHF 1.4653/60
3 months	5/10	
6 months	10/15	
SPOT	GBP/USD 1.7645/60	GBP/USD 1.7640/50
3 months	25/20	
6 months	35/25	

Calculate:

- How much minimum CHF amount you have to pay for 1 Million GBP spot?
- Considering the quotes from Bank A only, for GBP/CHF what are the Implied Swap points for Spot over 3 months?

[MTP → MARCH 2019 → 8 MARKS]

Answer:

- To Buy 1 Million GBP Spot against CHF

- First to Buy USD against CHF at the cheaper rate i.e. from Bank A. 1 USD = CHF 1.4655

- Then to Buy GBP against USD at a cheaper rate i.e. from Bank B 1 GBP=USD 1.7650

By applying chain rule buying rate would be

$$1 \text{ GBP} = 1.7650 \times 1.4655 \text{ CHF}$$

$$1 \text{ GBP} = \text{CHF } 2.5866$$

Amount payable CHF 2.5866 Million or CHF 25,86,600

- Spot rate Bid rate GBP 1 = CHF 1.4650 * 1.7645 = CHF 2.5850

Offer rate GBP 1 = CHF 1.4655 * 1.7660 = CHF 2.5881

GBP / USD 3 months swap points are at discount

Outright 3 Months forward rate GBP 1 = USD 1.7620 / 1.7640

USD / CHF 3 months swap points are at premium

Outright 3 Months forward rate USD 1 = CHF 1.4655 / 1.4665

Hence

Outright 3 Months forward rate GBP 1 = CHF 2.5822 / 2.5869

Spot rate GBP 1 = CHF 2.5850 / 2.5881

Therefore 3 month swap points are at discount of 28/12.

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40. If the present interest rate for 6 months borrowings in India is 9% per annum and the corresponding rate in USA is 2% per annum, and the US\$ is selling in India at Rs. 64.50/\$.

Then Recommend:

- (i) Will US \$ be at a premium or at a discount in the Indian forward market?
- (ii) The expected 6 month forward rate for US\$ in India.
- (iii) The rate of forward premium/discount.

[MTP → APRIL 2019 → 6 MARKS]

Answer:

(i) Under the given circumstances, the USD is expected to quote at a premium in India as the interest rate is higher in India.

(ii) Calculation of the forward rate:

$$\frac{1+R_h}{1+R_f} = \frac{F_1}{E_0}$$

Where: R_h is home currency interest rate, R_f is foreign currency interest rate, F_1 is end of the period forward rate, and E_0 is the spot rate.

$$\text{Therefore } \frac{1+(0.09/2)}{1+(0.02/2)} = \frac{1+(0.09/2)}{1+(0.02/2)} = \frac{F_1}{64.50}$$

$$\frac{1+0.045}{1+0.01} = \frac{F_1}{64.50}$$

$$\text{or } \frac{1.045}{1.01} \times 64.50 = F_1$$

$$\text{or } \frac{67.4025}{1.01} = F_1$$

$$\text{or } F_1 = \text{Rs. } 66.74$$

(iii) Rate of premium:

$$\frac{66.74 - 64.50}{64.50} \times \frac{12}{6} \times 100 = 6.94\%$$

41. With relaxation of norms in India for investment in international market upto \$ 2,50,000, Mr. X to hedge himself against the risk of declining Indian economy and weakening of Indian Rupee during last few years, decided to diversify in the International Market.

Accordingly, Mr. X invested a sum of Rs. 1.58 crore on 1.1.20x1 in Standard & Poor Index. On 1.1.20x2 Mr. X sold his investment. The other relevant data is given below:

	1.1.20x1	1.1.20x2
Index of Stock Market in India	7395	?
Standard & Poor Index	2028	1919
Exchange Rate (Rs./\$)	62.00/62.25	67.25/67.50

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You are required to Calculate:

- (i) The return for a US investor.
- (ii) Holding Period Return to Mr. X.
- (iii) The value of Index of Stock Market in India as on 1.1.20x2 at which Mr. X would be indifferent between investment in Standard & Poor Index and India Stock Market

[MTP → APRIL 2019 → 7 MARKS]

Answer:

- (i) Return of a US Investor

$$= \frac{\text{Ending Price} - \text{Initial Price}}{\text{Initial Price}} \times 100$$

$$= \frac{1919 - 2028}{2028} \times 100 = -5.37\%$$

- (ii) Return of Mr. X

Initial Investment (Rs.)	1.58 Crore
Applicable Exchange Rate on 1.1.20x1	Rs. 62.25
Equivalent US\$	US\$ 2,53,815.26
Purchase Price of Standard & Poor Index	2028
No. of Standard & Poor Indices Purchased	125.16
Ending Price of Standard & Poor Index	1919
Proceeds realised in US\$ on sale of Standard & Poor Index	US\$ 2,40,182.04
Applicable Exchange Rate on 1.1.20x2	Rs. 67.25
Proceeds realised in INR on sale of Standard & Poor Index	Rs. 1,61,52,242
Rate of Return $\left(\frac{16152242 - 15800000}{15800000} \times 100 \right)$	2.23%

- (iii) Rate of Return had the amount been invested in India

Initial Investment (Rs.)	1.58 Crore
Purchase Price of Indian Index	7395
No. of Indian Indices Purchased	2136.58
Let Ending Price of Indian Index	X
Then to be indifferent with return in International Market	$\frac{2136.58 \times X - 1.58}{1.58} \times 100 = 2.23$
Price of Indian Index to be indifferent	7559.90 say 7560

42. NP and Co. has imported goods for US \$ 7,00,000. The amount is payable after three months. The company has also exported goods for US \$ 4,50,000 and this amount is receivable in two months. For receivable amount a forward contract is already taken at Rs. 48.90.

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The market rates for Rupee and Dollar are as under:

Spot	Rs. 48.50/70
Two months	Rs. 48.25/30
Three months	Rs. 48.40/45

The company wants to cover the risk and it has two options as under:

- (A) To cover payables in the forward market and
 (B) To lag the receivables by one month and cover the risk only for the net amount. No interest for delaying the receivables is earned. Evaluate both the options if the cost of Rupee Funds is 12%. Which option is preferable?

[MTP → OCTOBER 2019 → 8 MARKS]

Answer:

- (A) To cover payable and receivable in forward Market

Amount payable after 3 months	\$7,00,000
Forward Rate	Rs. 48.45
Thus Payable Amount (Rs.) (A)	Rs. 3,39,15,000
Amount receivable after 2 months	\$ 4,50,000
Forward Rate	Rs. 48.90
Thus Receivable Amount (Rs.) (B)	Rs. 2,20,05,000
Interest @ 12% p.a. for 1 month (C)	Rs. 2,20,050
Net Amount Payable in (Rs.) (A) – (B) – (C)	Rs. 1,16,89,950

- (B) Assuming that since the forward contract for receivable was already booked it shall be cancelled if we lag the receivables. Accordingly any profit/ loss on cancellation of contract shall also be calculated and shall be adjusted as follows:

Amount Payable (\$)	\$ 7,00,000
Amount receivable after 3 months	<u>\$ 4,50,000</u>
Net Amount payable	<u>\$ 2,50,000</u>
Applicable Rate	Rs. 48.45
Amount payable in (Rs.) (A)	Rs. 1,21,12,500
Profit on cancellation of Forward cost (48.90 – 48.30) × 4,50,000 (B)	Rs. 2,70,000
Thus net amount payable in (Rs.) (A) + (B)	Rs. 1,18,42,500

Since net payable amount is least in case of first option, hence the company should cover payable and receivables in forward market.

43. Mercy is a Forex Dealer with XYZ Bank. She notices following information relating to Canadian Dollar (CAD) and German Deutschmark (DEM):

Exchange rate – CAD 0.775 per DEM (Spot)

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	CAD
Principal	1,000,000
Add: Interest @9% for 3 months	<u>22,500</u>
Total	<u>1,022,500</u>
Net arbitrage gain = CAD 1,024,065 – CAD 1,022,500 = CAD 1,565	

44. Your forex dealer had entered into a cross currency deal and had sold US \$ 10,00,000 against EURO at US \$ 1 = EURO 1.4400 for spot delivery.

However, later during the day, the market became volatile and the dealer in compliance with his management's guidelines had to square – up the position when the quotations were:

Spot US \$ 1	INR 31.4300/4500
1 month margin	25/20
2 months margin	45/35
Spot US \$ 1	EURO 1.4400/4450
1 month forward	1.4425/4490
2 months forward	1.4460/4530

What will be the gain or loss in the transaction?

[MTP → OCTOBER 2019 → 8 MARKS]

Answer:

The amount of EURO bought by selling US\$	
US\$ 10,00,000 * EURO 1.4400	= EURO 14,40,000
The amount of EURO sold for buying USD 10,00,000 * 1.4450	= <u>EURO 14,45,000</u>
Net Loss in the Transaction	= <u>EURO 5,000</u>

To acquire EURO 5,000 from the market @

(a) USD 1 = EURO 1.4400 &

(b) USD1 = INR 31.4500

Cross Currency buying rate of EUR/INR is Rs. 31.4500 / 1.440 i.e. Rs. 21.8403

Loss in the Transaction Rs. 21.8403 * 5000 = Rs. 1,09,201.50

Alternatively, if delivery to be affected then computation of loss shall be as follows:

EURO to be surrendered to acquire \$ 10,00,000	= EURO 14,45,000
EURO to be received after selling \$ 10,00,000	= <u>EURO 14,40,000</u>
Loss	= <u>EURO 5,000</u>

To acquire EURO 5,000 from market @

US \$ 1 = EURO 1.4400

US \$ 1 = INR 31.45

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$$\text{Cross Currency} = \frac{31.45}{1.440} = \text{Rs. } 21.8403$$

$$\text{Loss in Transaction (21.8403 x EURO 5,000)} = \text{Rs. } 1,09,201.50$$

45. Your bank's London office has surplus funds to the extent of USD 5,00,000/- for a period of 3 months. The cost of the funds to the bank is 4% p.a. It proposes to invest these funds in London, New York or Frankfurt and obtain the best yield, without any exchange risk to the bank. The following rates of interest are available at the three centres for investment of domestic funds there at for a period of 3 months.

London	5 % p.a.
New York	8% p.a.
Frankfurt	3% p.a.

The market rates in London for US dollars and Euro are as under:

London on New York

Spot	1.5350/90
1 month	15/18
2 month	30/35
3 months	80/85

London on Frankfurt

Spot	1.8260/90
1 month	60/55
2 month	95/90
3 month	145/140

RECOMMEND at which centre, the investment to be made & what will be the net gain (to the nearest pound) to the bank on the invested funds?

[RTP → MAY 2018]

Answer:

To determine the centre of investment by bank except New York (in whose currency the surplus is available) Arbitrage Profit for remaining two centres shall be computed as follows:

(a) If investment is made at London

Convert US\$ 5,00,000 at Spot Rate (5,00,000/1.5390)	= £ 3,24,886
Add: £ Interest for 3 months on £ 324,886 @ 5%	= £ 4,061
	= £ 3,28,947

Less: Amount Invested	\$ 5,00,000
Interest accrued thereon	\$ 5,000
	= \$ 5,05,000

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Equivalent amount of £ required to pay the above sum (\$ 5,05,000/1.5430)	= £ 3,27,285
Arbitrage Profit	= £ 1,662

(b) If investment is made at New York

Gain \$ 5,00,000 (8% - 4%) x 3/12	= \$ 5,000
Equivalent amount in £ 3 months (\$ 5,000/ 1.5475)	£ 3,231

(c) If investment is made at Frankfurt

Convert US\$ 500,000 at Spot Rate (Cross Rate) 1.8260/1.5390	= € 1.1865
Euro equivalent US\$ 500,000	= € 5,93,250
Add: Interest for 3 months @ 3%	= € 4,449
	= € 5,97,699
3 month Forward Rate of selling € (1/1.8150)	= £ 0.5510
Sell € in Forward Market € 5,97,699 x £ 0.5510	= £ 3,29,332
Less: Amount invested and interest thereon	= £ 3,27,285
Arbitrage Profit	= £ 2,047

Recommendation: Since out of three options the maximum profit is in case investment is made in New York. Hence it shall be opted and arbitrage gain would be £3,231.

46. Place the following strategies by different persons in the Exposure Management Strategies Matrix.

Strategy 1: Kuljeet a wholesaler of imported items imports toys from China to sell them in the domestic market to retailers. Being a sole trader, he is always so much involved in the promotion of his trade in domestic market and negotiation with foreign supplier that he never pays attention to hedge his payable in foreign currency and leaves his position unhedged.

Strategy 2: Moni, is in the business of exporting and importing brasswares to USA and European countries. In order to capture the market he invoices the customers in their home currency. Lavi enters into forward contracts to sell the foreign exchange only if he expects some profit out of it other-wise he leaves his position open.

Strategy 3: TSC Ltd. is in the business of software development. The company has both receivables and payables in foreign currency. The Treasury Manager of TSC Ltd. not only enters into forward contracts to hedge the exposure but carries out cancellation and extension of forward contracts on regular basis to earn profit out of the same. As a result management has started looking Treasury Department as Profit Centre.

Strategy 4: DNB Publishers Ltd. in addition to publishing books are also in the business of importing and exporting of books. As a matter of policy the movement company invoices

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the customer or receives invoice from the supplier immediately covers its position in the Forward or Future markets and hence never leave the exposure open even for a single day.

[RTP → NOV 2018]

Answer:

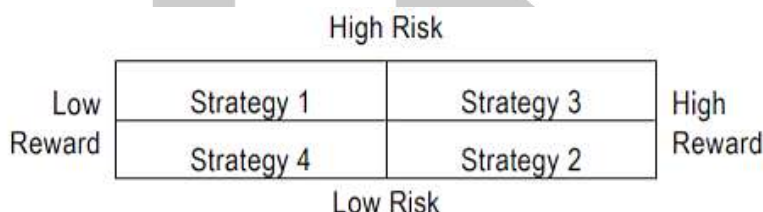
Strategy 1: This strategy is covered by High Risk: Low Reward category and worst as it leaves all exposures unhedged. Although this strategy does not involve any time and effort, it carries high risk.

Strategy 2: This strategy covers Low Risk: Reasonable reward category as the exposure is covered wherever there is anticipated profit otherwise it is left.

Strategy 3: This strategy is covered by High Risk: High Reward category as to earn profit, cancellations and extensions are carried out. Although this strategy leads to high gains but it is also accompanied by high risk.

Strategy 4: This strategy is covered by Low Risk : Low Reward category as company plays a very safe game.

Diagrammatically all these strategies can be depicted as follows



47. XYZ Ltd. is an export oriented business house based in Mumbai. The Company invoices in customers' currency. Its receipt of US \$ 1,00,000 is due on September 1, 2009.

Market information as at June 1, 2009 is:

Exchange Rates		Currency Futures		
US \$/₹		US \$/₹	Contract size	₹ 4,72,000
Spot	0.02140	June	0.02126	
1 Month Forward	0.02136	September	0.02118	
3 Months Forward	0.02127			
		Initial Margin		Interest Rates in India
June		₹ 10,000		7.50%
September		₹ 15,000		8.00%

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On September 1, 2009 the spot rate US \$Re. is 0.02133 and currency future rate is 0.02134. Comment which of the following methods would be most advantageous for XYZ Ltd.

- (a) Using forward contract
- (b) Using currency futures
- (c) Not hedging currency risks.

It may be assumed that variation in margin would be settled on the maturity of the futures contract.

[RTP → MAY 2019]

Answer:

Receipts using a forward contract $(1,00,000/0.02127)$	= ₹47,01,457
Receipts using currency futures	
The number of contracts needed is $(1,00,000/0.02118)/4,72,000 = 10$	
Initial margin payable is $10 \times ₹15,000 = ₹1,50,000$	
On September 1 Close at 0.02134	
Receipts = $US\$1,00,000/0.02133$	= 46,88,233
Variation Margin = $[(0.02134 - 0.02118) \times 10 \times 472000/-]/0.02133$	
OR $(0.00016 \times 10 \times 472000)/0.02133 = 755.2/0.02133$	<u>35,406</u>
	47,23,639
Less: Interest Cost – $1,50,000 \times 0.08 \times 3/12$	<u>₹3,000</u>
Net Receipts	<u>₹47,20,639</u>
Receipts under different methods of hedging	
Forward contract	₹47,01,457
Futures	₹47,20,639
No hedge	
$US\$ 1,00,000/0.02133$	₹46,88,233
The most advantageous option would have been to hedge with futures.	

48. An exporter is a UK based company. Invoice amount is \$3,50,000. Credit period is three months. Exchange rates in London are:

Spot Rate (\$/£) 1.5865 – 1.5905
 3-month Forward Rate (\$/£) 1.6100 – 1.6140

Rates of interest in Money Market:

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	Deposit	Loan
\$	7%	9%
£	5%	8%

Compute and show how a money market hedge can be put in place. Compare and contrast the outcome with a forward contract

[RTP → MAY 2019]

Answer:

Identify: Foreign currency is an asset. Amount \$ 3,50,000.

Create: \$ Liability.

Borrow: In \$. The borrowing rate is 9% per annum or 2.25% per quarter.

Amount to be borrowed: $3,50,000 / 1.0225 = \$ 3,42,298.29$

Convert: Sell \$ and buy £. The relevant rate is the Ask rate, namely, 1.5905 per £,

(**Note:** This is an indirect quote). Amount of £s received on conversion is 2,15,214.27 ($3,42,298.29 / 1.5905$).

Invest: £ 2,15,214.27 will be invested at 5% for 3 months and get £ 2,17,904.45

Settle: The liability of \$3,42,298.29 at interest of 2.25 per cent quarter matures to \$3,50,000 receivable from customer.

Using forward rate, amount receivable is $= 3,50,000 / 1.6140 = £2,16,852.54$

Amount received through money market hedge $= £2,17,904.45$

Gain $= 2,17,904.45 - 2,16,852.54 = £1,051.91$

So, money market hedge is beneficial for the exporter

49. Excel Exporters are holding an Export bill in United States Dollar (USD) 1,00,000 due 60 days hence. They are worried about the falling USD value which is currently at Rs. 45.60 per USD. The concerned Export Consignment has been priced on an Exchange rate of Rs. 45.50 per USD. The Firm's Bankers have quoted a 60-day forward rate of Rs. 45.20.

Calculate:

(i) Rate of discount quoted by the Bank

(ii) The probable loss of operating profit if the forward sale is agreed to

[RTP → NOV 2019]

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Answer:

(i) Rate of discount quoted by the bank

$$= \frac{(45.20 - 45.60) \times 365 \times 100}{45.60 \times 60} = 5.33\%$$

(ii) Probable loss of operating profit:

$$(45.20 - 45.50) \times 1,00,000 = ₹ 30,000$$

50. An Indian importer has to settle an import bill for \$ 1,30,000. The exporter has given the Indian exporter two options:

(i) Pay immediately without any interest charges.

(ii) Pay after three months with interest at 5 percent per annum.

The importer's bank charges 15 percent per annum on overdrafts. The exchange rates in the market are as follows:

Spot rate (Rs. / \$): 48.35 / 48.36

3-Months forward rate (Rs. / \$): 48.81 / 48.83

The importer seeks your advice. Give your advice.

[RTP → NOV 2019]

Answer:

If importer pays now, he will have to buy US\$ in Spot Market by availing overdraft facility. Accordingly, the outflow under this option will be

	₹
Amount required to purchase \$1,30,000 [\$1,30,000 × ₹48.36]	62,86,800
Add: Overdraft Interest for 3 months @15% p.a.	2,35,755
	65,22,555

If importer makes payment after 3 months then, he will have to pay interest for 3 months @ 5% p.a. for 3 month along with the sum of import bill. Accordingly, he will have to buy \$ in forward market. The outflow under this option will be as follows:

	\$
Amount of Bill	1,30,000
Add: Interest for 3 months @5% p.a.	1,625
	1,31,625

Amount to be paid in Indian Rupee after 3 month under the forward purchase contract

$$₹ 64,27,249 \text{ (US\$ } 1,31,625 \times ₹ 48.83)$$

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Since outflow of cash is least in (ii) option, it should be opted for.

51. Followings are the spot exchange rates quoted at three different forex markets:

USD/INR	48.30 in Mumbai
GBP/INR	77.52 in London
GBP/USD	1.6231 in New York

The arbitrageur has USD 1,00,00,000. Assuming that there are no transaction costs, explain whether there is any arbitrage gain possible from the quoted spot exchange rates.

[RTP → MAY 2020]

Answer:

The arbitrageur can proceed as stated below to realize arbitrage gains.

(i) Buy ₹ from USD 10,000,000 at Mumbai $48.30 \times 10,000,000 = ₹483,000,000$

(ii) Convert these ₹ to GBP at London $\left(\frac{₹ 483,000,000}{Rs. 77.52} \right) = \text{GBP } 6,230,650.155$

(iii) Convert GBP to USD at New York $\text{GBP } 6,230,650.155 \times 1.6231 \text{ USD } 10,112,968.26$

There is net gain of USD 10,112,968.26 less USD 10,000,000 i.e. USD 112,968.26

52. Nitrogen Ltd, a UK company is in the process of negotiating an order amounting to €4 million with a large German retailer on 6 months credit. If successful, this will be the first time that Nitrogen Ltd has exported goods into the highly competitive German market. The following three alternatives are being considered for managing the transaction risk before the order is finalized.

- Invoice the German firm in Sterling using the current exchange rate to calculate the invoice amount.
- Alternative of invoicing the German firm in € and using a forward foreign exchange contract to hedge the transaction risk.
- Invoice the German first in € and use sufficient 6 months sterling future contracts (to the nearly whole number) to hedge the transaction risk.

Following data is available:

Spot Rate	€ 1.1750 - €1.1770/£
6 months forward premium	0.55-0.60 Euro Cents
6 months future contract is currently trading at	€1.1760/£
6 months future contract size is	£62500
Spot rate and 6 months future rate	€1.1785/£

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Required:

- (a) Calculate to the nearest £ the receipt for Nitrogen Ltd, under each of the three proposals.
- (b) In your opinion, which alternative would you consider to be the most appropriate and the reason thereof

[RTP → MAY 2020]

Answer:

(i) Receipt under three proposals

(a) Invoicing in Sterling

$$\text{Invoicing in £ will produce} = \frac{€ 4 \text{ million}}{1.1770} = £3398471$$

(b) Use of Forward Contract

$$\text{Forward Rate} = €1.1770 + 0.0055 = 1.1825$$

$$\text{Using Forward Market hedge Sterling receipt would be} = \frac{€ 4 \text{ million}}{1.1825} = £ 3382664$$

(c) Use of Future Contract

The equivalent sterling of the order placed based on future price (€1.1760)

$$= \frac{€ 4.00 \text{ million}}{1.1760} = £ 3401360$$

$$\text{Number of Contracts} = \frac{£3401360}{62,500} = 54 \text{ Contracts (to the nearest whole number)}$$

$$\text{Thus, € amount hedged by future contract will be} = 54 \times £62,500 = £3375000$$

$$\text{Buy Future at} \quad \quad \quad €1.1760$$

$$\text{Sell Future at} \quad \quad \quad \underline{€1.1785}$$

$$\underline{€0.0025}$$

$$\text{Total profit on Future Contracts} = 54 \times £62,500 \times €0.0025 = €8438$$

After 6 months

$$\text{Amount Received} \quad \quad \quad €4000000$$

$$\text{Add: Profit on Future Contracts} \quad \quad \quad \underline{€ \quad 8438}$$

$$\underline{€ 4008438}$$

Sterling Receipts

$$\text{On sale of € at spot} = \frac{€ 4008438}{1.1785} = €3401305$$

- (ii) Proposal of option (c) is preferable because the option (a) & (b) produces least receipts.

CHAPTER 10: INTERNATIONAL FINANCIAL MANAGEMENT

10.

INTERNATIONAL FINANCIAL MANAGEMENT

ILLUSTRATIONS AND QUESTIONS FROM ICAI STUDY MATERIAL

1. Perfect Inc., a U.S. based Pharmaceutical Company has received an offer from Aidscore Ltd., a company engaged in manufacturing of drugs to cure Dengue, to set up a manufacturing unit in Baddi (H.P.), India in a joint venture.

As per the Joint Venture agreement, Perfect Inc. will receive 55% share of revenues plus a royalty @ US \$0.01 per bottle. The initial investment will be Rs. 200 crores for machinery and factory. The scrap value of machinery and factory is estimated at the end of five (5) year to be Rs. 5 crores. The machinery is depreciable @ 20% on the value net of salvage value using Straight Line Method. An initial working capital to the tune of Rs. 50 crores shall be required and thereafter Rs. 5 crores each year.

As per GOI directions, it is estimated that the price per bottle will be Rs. 7.50 and production will be 24 crores bottles per year. The price in addition to inflation of respective years shall be increased by Rs. 1 each year. The production cost shall be 40% of the revenues.

The applicable tax rate in India is 30% and 35% in US and there is Double Taxation Avoidance Agreement between India and US. According to the agreement tax credit shall be given in US for the tax paid in India. In both the countries, taxes shall be paid in the following year in which profit have arisen.

The Spot rate of \$ is Rs. 57. The inflation in India is 6% (expected to decrease by 0.50% every year) and 5% in US.

As per the policy of GOI, only 50% of the share can be remitted in the year in which they are earned and remaining in the following year.

Though WACC of Perfect Inc. is 13% but due to risky nature of the project it expects a return of 15%.

Determine whether Perfect Inc. should invest in the project or not (from subsidiary point of view)

Answer:

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Working Notes:

1. Estimated Exchange Rates (Using PPP Theory)

Year	0	1	2	3	4	5	6
Exchange rate *	57	57.54	57.82	57.82	57.54	56.99	56.18

2. Share in sales

Year	1	2	3	4	5
Annual Units in crores	24	24	24	24	24
Price per bottle (₹)	7.50	8.50	9.50	10.50	11.50
Price fluctuating Inflation Rate	6.00%	5.50%	5.00%	4.50%	4.00%
Inflated Price (₹)	7.95	8.97	9.98	10.97	11.96
Inflated Sales Revenue (₹ Crore)	190.80	215.28	239.52	263.28	287.04
Sales share @55%	104.94	118.40	131.74	144.80	157.87

3. Royalty Payment

Year	1	2	3	4	5
Annual Units in crores	24	24	24	24	24
Royalty in \$	0.01	0.01	0.01	0.01	0.01
Total Royalty (\$ Crore)	0.24	0.24	0.24	0.24	0.24
Exchange Rate	57.54	57.82	57.82	57.54	56.99
Total Royalty (₹ Crore)	13.81	13.88	13.88	13.81	13.68

4. Tax Liability

(₹ Crore)					
Year	1	2	3	4	5
Sales Share	104.94	118.40	131.74	144.80	157.87
Total Royalty	13.81	13.88	13.88	13.81	13.68
Total Income	118.75	132.28	145.61	158.61	171.55
Less: Expenses					
Production Cost (Sales share x 40%)	41.98	47.36	52.69	57.92	63.15
Depreciation (195 x 20%)	39.00	39.00	39.00	39.00	39.00
PBT	37.77	45.92	53.92	61.69	69.40
Tax on Profit @30%	11.33	13.78	16.18	18.51	20.82
Net Profit	26.44	32.14	37.74	43.18	48.58

5. Free Cash Flow

(₹ Crore)							
Year	0	1	2	3	4	5	6
Sales Share	0.00	104.94	118.40	131.74	144.80	157.87	0.00

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Total Royalty	0.00	13.81	13.88	13.88	13.81	13.68	0.00
Production Cost	0.00	-41.98	-47.36	-52.69	-57.92	-63.15	0.00
Initial Outlay	-200.00	0.00	0.00	0.00	0.00	0.00	0.00
Working Capital	-50.00	-5.00	-5.00	-5.00	-5.00	70.00	0.00
Scrap Value	0.00	0.00	0.00	0.00	0.00	5.00	0.00
Tax on Profit	0.00	0.00	-11.33	-13.78	-16.18	-18.51	-20.82
Free Cash Flow	-250.00	71.77	68.59	74.15	79.51	164.89	-20.82

6. Remittance of Cash Flows

(₹ Crore)							
Year	0	1	2	3	4	5	6
Free Cash Flow	-250.00	71.77	68.59	74.15	79.51	164.89	-20.82
50% of Current Year Cash Flow	0.00	35.89	34.29	37.07	39.76	82.45	0.00
Previous year remaining cash flow	0.00	0.00	35.88	34.30	37.08	39.75	82.44
Total Remittance	-250.00	35.88	70.17	71.37	76.84	122.20	61.62

NPV of Project under Appraisal

Year	0	1	2	3	4	5	6
Total Remittance (₹ Crore)	-250.00	35.88	70.17	71.37	76.84	122.20	61.62
Exchange Rate	57.00	57.54	57.82	57.82	57.54	56.99	56.18
Remittance (\$ mn)	-43.86	6.24	12.14	12.34	13.35	21.44	10.97
US Tax @35% (\$ mn)	0.00	0.00	2.18	4.25	4.32	4.67	7.50
Indian Tax (\$ mn)	0.00	0.00	1.96	2.38	2.82	3.25	3.71
Net Tax (\$ mn)	0.00	0.00	0.22	1.87	1.51	1.42	3.79
Net Cash Flow (\$ mn)	-43.86	6.24	11.92	10.47	11.84	20.02	7.18
PVF @ 15%	1.000	0.870	0.756	0.658	0.572	0.497	0.432
Present Value (\$ mn)	-43.86	5.43	9.01	6.89	6.77	9.95	3.10
Net Present Value (\$ mn)							= -2.71

Decision: Since NPV of the project is negative, Perfect inc. should not invest in the project.

* Estimated exchange rates have been calculated by using the following formula:

Expected spot rate = Current Spot Rate x expected difference in inflation rates

$$E(S_1) = S_0 \times \frac{(1 + I_d)}{(1 + I_f)}$$

Where

$E(S_1)$ is the expected Spot rate in time period 1

S_0 is the current spot rate (Direct Quote)

I_d is the inflation in the domestic country (home country)

I_f is the inflation in the foreign country

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2. Its Entertainment Ltd., an Indian Amusement Company is happy with the success of its Water Park in India. The company wants to repeat its success in Nepal also where it is planning to establish a Grand Water Park with world class amenities. The company is also encouraged by a marketing research report on which it has just spent Rs. 20,00,000 lacs.

The estimated cost of construction would be Nepali Rupee (NPR) 450 crores and it would be completed in one years time. Half of the construction cost will be paid in the beginning and rest at the end of year. In addition, working capital requirement would be NPR 65 crores from the year end one. The after tax realizable value of fixed assets after four years of operation is expected to be NPR 250 crores. Under the Foreign Capital Encouragement Policy of Nepal, company is allowed to claim 20% depreciation allowance per year on reducing balance basis subject to maximum capital limit of NPR 200 crore. The company can raise loan for theme park in Nepal @ 9%.

The water park will have a maximum capacity of 20,000 visitors per day. On an average, it is expected to achieve 70% capacity for first operational four years. The entry ticket is expected to be NPR 220 per person. In addition to entry tickets revenue, the company could earn revenue from sale of food and beverages and fancy gift items. The average sales expected to be NPR 150 per visitor for food and beverages and NPR 50 per visitor for fancy gift items. The sales margin on food and beverages and fancy gift items is 20% and 50% respectively. The park would open for 360 days a year.

The annual staffing cost would be NPR 65 crores per annum. The annual insurance cost would be NPR 5 crores. The other running and maintenance costs are expected to be NPR 25 crores in the first year of operation which is expected to increase NPR 4 crores every year. The company would apportion existing overheads to the tune of NPR 5 crores to the park.

All costs and receipts (excluding construction costs, assets realizable value and other running and maintenance costs) mentioned above are at current prices (i.e. 0 point of time) which are expected to increase by 5% per year.

The current spot rate is NPR 1.60 per Rs.. The tax rate in India is 30% and in Nepal it is 20%.

The current WACC of the company is 12%. The average market return is 11% and interest rate on treasury bond is 8%. The company's current equity beta is 0.45. The company's funding ratio for the Water Park would be 55% equity and 45% debt.

Being a tourist Place, the amusement industry in Nepal is competitive and very different from its Indian counterpart. The company has gathered the relevant information about its nearest competitor in Nepal. The competitor's market value of the equity is NPR 1850 crores and the debt is NPR 510 crores and the equity beta is 1.35.

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State whether Its Entertainment Ltd. should undertake Water Park project in Nepal or not.

Answer:

Working Notes:

1. Calculation of Cost of Funds/ Discount Rate

Competing Company's Information	
Equity Market Value	1850.00
Debt Market Value	510.00
Equity Beta	1.35

Assuming debt to be risk free i.e. beta is zero, the beta of competitor is un-gearred as follows:

$$\text{Asset Beta} = \text{Equity Beta} \times \frac{E}{E + D(1-t)} = 1.35 \times \frac{1850}{1850 + 510(1-0.20)} = 1.106$$

Equity beta for Its Entertainment Ltd. in Nepal

Assets beta in Nepal	1.106
Ratio of funding in Nepal	
Equity	55.00%
Debt	45.00%

$$1.106 = \text{Equity Beta} \times \frac{55}{55 + 45(1-0.30)}$$

$$\text{Equity Beta} = 1.74$$

Cost of Equity as per CAPM

$$\text{Market Return} = 11.00\%$$

$$\text{Risk free return} = 8.00\%$$

$$\begin{aligned} \text{Cost of Equity} &= \text{Risk free return} + \beta (\text{Market Return} - \text{Risk free return}) \\ &= 8.00\% + 1.74(11.00\% - 8.00\%) = 13.22\% \end{aligned}$$

$$\text{WACC} = 13.22\% \times 0.55 + 9\%(1-0.20) \times 0.45 = 10.51\%$$

2. Present Value Factors at the discount rate of 10.51%

Year	0	1	2	3	4	5
PVAF	1.000	0.905	0.819	0.741	0.670	0.607

3. Calculation of Capital Allowances

Year	1	2	3	4
Opening Balance (NPR Crore)	200.00	160.00	128.00	102.40
Less: Depreciation (NPR Crore)	40.00	32.00	25.60	20.48
Closing Balance (NPR Crore)	160.00	128.00	102.40	81.92

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Calculation of Present of Free Cash Flow

Year	0	1	2	3	4	5
Expected Annual visitors			5040000	5040000	5040000	5040000
Entry ticket price per visitor (NPR)			242.55	254.68	267.41	280.78
Profit from sale of Food and Beverages per visitor (NPR)			33.08	34.73	36.47	38.29
Profit from sale of Fancy Gift Items per visitor (NPR)			27.56	28.94	30.39	31.91
Revenue per visitor (NPR)			303.19	318.35	334.27	350.98
Total Revenue (NPR crores)			152.81	160.45	168.47	176.89
Less:						
Annual Staffing Cost (NPR crores)			71.66	75.25	79.01	82.96
Annual Insurance Costs (NPR crores)			5.51	5.79	6.08	6.38
Other running and maintenance costs (NPR crores)			25.00	29.00	33.00	37.00
Depreciation Allowances (NPR crores)			40.00	32.00	25.60	20.48
Total Expenses (NPR crores)			142.17	142.04	143.69	146.82
PBT (NPR crores)			10.64	18.41	24.78	30.07
Tax on Profit (NPR crores)			2.13	3.68	4.96	6.01
Net Profit (NPR crores)			8.51	14.73	19.82	24.06
Add: Depreciation Allowances (NPR crores)			40	32	25.6	20.48
Park Construction Cost (NPR crores)	-225	-225				
After tax assets realisation value (NPR crores)						250

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Working capital (NPR crores)		-65.00	-3.25	-3.41	-3.58	75.25
Net cash Flow (NPR crores)	-225.00	-290.00	45.26	43.32	41.84	369.79
PVF at discount rate	1.00	0.905	0.819	0.741	0.670	0.607
Present Values (NPR crores)	-225.00	-262.45	37.07	32.10	28.03	224.46
Net Present Value (NPR crores)						-165.79

3. Opus Technologies Ltd., an Indian IT company is planning to make an investment through a wholly owned subsidiary in a software project in China with a shelf life of two years. The inflation in China is estimated as 8 percent. Operating cash flows are received at the year end.

For the project an initial investment of Chinese Yuan (CN¥) 30,00,000 will be in land. The land will be sold after the completion of project at estimated value of CN¥ 35,00,000. The project also requires an office complex at cost of CN¥ 15,00,000 payable at the beginning of project. The complex will be depreciated on straight-line basis over two years to a zero salvage value. This complex is expected to fetch CN¥ 5,00,000 at the end of project.

The company is planning to raise the required funds through GDR issue in Mauritius. Each GDR will have 5 common equity shares of the company as underlying security which are currently trading at Rs. 200 per share (Face Value = Rs. 10) in the domestic market. The company has currently paid the dividend of 25% which is expected to grow at 10% p.a. The total issue cost is estimated to be 1 percent of issue size.

The annual sales is expected to be 10,000 units at the rate of CN¥ 500 per unit. The price of unit is expected to rise at the rate of inflation. Variable operating costs are 40 percent of sales. Fixed operating costs will be CN¥ 22,00,000 per year and expected to rise at the rate of inflation.

The tax rate applicable in China for income and capital gain is 25 percent and as per GOI Policy no further tax shall be payable in India. The current spot rate of CN¥ 1 is Rs. 9.50. The nominal interest rate in India and China is 12% and 10% respectively and the international parity conditions hold

You are required to

- Identify expected future cash flows in China and determine NPV of the project in CN¥.
- Determine whether Opus Technologies should go for the project or not assuming that there neither there is restriction on the transfer of funds from China to India nor any charges/taxes payable on the transfer of funds.

Answer:

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Working Notes:

1. Calculation of Cost of Capital (GDR)

Current Dividend (D_0)	2.50
Expected Dividend (D_1)	2.75
Net Proceeds (Rs. 200 per share – 1%)	198.00
Growth Rate	10.00%

$$k_e = \frac{2.75}{198} + 0.10 = 0.1139 \text{ i.e. } 11.39\%$$

2. Calculation of Expected Exchange Rate as per Interest Rate Parity

YEAR	EXPECTED RATE
1	$= 9.50 \times \frac{(1 + 0.12)}{(1 + 0.10)} = 9.67$
2	$= 9.50 \times \frac{(1 + 0.12)^2}{(1 + 0.10)^2} = 9.85$

3. Realization on the disposal of Land net of Tax

	CN¥
Sale value at the end of project	3500000.00
Cost of Land	3000000.00
Capital Gain	500000.00
Tax paid	125000.00
Amount realized net of tax	3375000.00

4. Realization on the disposal of Office Complex

	(CN¥)
Sale value at the end of project	500000.00
WDV	0.00
Capital Gain	500000.00
Tax paid	125000.00
Amount realized net of tax (A)	375000.00

5. Computation of Annual Cash Inflows

Year	1	2
Annual Units	10000	10000
Price per bottle (CN¥)	540.00	583.20
Annual Revenue (CN¥)	5400000.00	5832000.00
Less: Expenses		
Variable operating cost (CN¥)	2160000.00	2332800.00
Depreciation (CN¥)	750000.00	750000.00
Fixed Cost per annum (CN¥)	2376000.00	2566080.00

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PBT (CN¥)	114000.00	183120.00
Tax on Profit (CN¥)	28500.00	45780.00
Net Profit (CN¥)	85500.00	137340.00
Add: Depreciation (CN¥)	750000.00	750000.00
Cash Flow	835500.00	887340.00

(a) Computation of NPV of the project in CN¥

	(CN¥)		
Year	0	1	2
Initial Investment	-4500000.00		
Annual Cash Inflows		835500.00	887340.00
Realization on the disposal of Land net of Tax			3375000.00
Realization on the disposal of Office Complex			375000.00
Total	-4500000.00	835500.00	4637340.00
PVF @11.39%	1.000	0.898	0.806
PV of Cash Flows	-4500000.00	750279.00	3737696.00
NPV			-12,025

(b) Evaluation of Project from Opus Point of View

(i) Assuming that inflow funds are transferred in the year in which same are generated i.e. first year and second year.

Year	0	1	2
Cash Flows (CN¥)	-4500000.00	835500.00	4637340.00
Exchange Rate (₹/ CN¥)	9.50	9.67	9.85
Cash Flows (₹)	-42750000.00	8079285.00	45677799.00
PVF @ 12%	1.00	0.893	0.797
	-42750000.00	7214802.00	36405206.00
NPV			870008.00

(ii) Assuming that inflow funds are transferred at the end of the project i.e. second year.

Year	0	2
Cash Flows (CN¥)	-4500000.00	5472840.00
Exchange Rate (₹/ CN¥)	9.50	9.85
Cash Flows (₹)	-42750000.00	53907474.00
PVF	1.00	0.797
	-42750000.00	42964257.00
NPV		214257.00

Though in terms of CN¥ the NPV of the project is negative but in Rs. it has positive NPV due to weakening of Rs. in comparison of CN¥. Thus, Opus can accept the project.

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4. X Ltd. is interested in expanding its operation and planning to install manufacturing plant at US. For the proposed project it requires a fund of \$ 10 million (net of issue expenses/ floatation cost). The estimated floatation cost is 2%. To finance this project it proposes to issue GDRs.

You as financial consultant is required to compute the number of GDRs to be issued and cost of the GDR with the help of following additional information.

1. Expected market price of share at the time of issue of GDR is Rs. 250 (Face Value Rs. 100)
2. Shares shall underly each GDR and shall be priced at 10% discount to market price.
3. Expected exchange rate Rs. 60/\$.
4. Dividend expected to be paid is 20% with growth rate 12%.

[ALSO ASKED IN MAY 2018 EXAMS → 8 MARKS]

Answer:

Net Issue Size = \$10 million

$$\text{Gross Issue} = \frac{\$10 \text{ million}}{0.98} = \$ 10.204 \text{ million}$$

Issue Price per GDR in ₹ (200 x 2 x 90%) ₹ 450

Issue Price per GDR in \$ (₹ 450/ ₹ 60) \$ 7.50

Dividend Per GDR (D_1) (₹ 20 x 2) ₹ 40

Net Proceeds Per GDR (₹ 450 x 0.98) ₹ 441.00

(a) Number of GDR to be issued

$$\frac{\$10.204 \text{ million}}{\$7.50} = 1.3605 \text{ million}$$

(b) Cost of GDR to Odessa Ltd.

$$k_e = \frac{60.00}{441.00} + 0.12 = 21.07\%$$

5. Write a short note on Instruments of International Finance.

Answer:

Indian companies have been able to tap global markets to raise foreign currency funds by issuing various types of financial instruments which are discussed as follows:

1. Foreign Currency Convertible Bonds (FCCBs)

A type of convertible bond issued in a currency different than the issuer's domestic currency. In other words, the money being raised by the issuing company is in the form of a foreign currency. A convertible bond is a mix between a debt and equity instrument. It acts like a bond by making regular coupon and principal payments, but these bonds also give the bondholder the option to convert the bond into stock

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2. American Depositary Receipts (ADRs)

Depository receipts issued by a company in the United States of America (USA) is known as American Depositary Receipts (ADRs). Such receipts must be issued in accordance with the provisions stipulated by the Securities and Exchange Commission of USA (SEC) which are very stringent.

An ADR is generally created by the deposit of the securities of a non-United States company with a custodian bank in the country of incorporation of the issuing company. The custodian bank informs the depository in the United States that the ADRs can be issued. ADRs are United States dollar denominated and are traded in the same way as are the securities of United States companies. The ADR holder is entitled to the same rights and advantages as owners of the underlying securities in the home country. Several variations on ADRs have developed over time to meet more specialized demands in different markets. One such variation is the GDR which are identical in structure to an ADR, the only difference being that they can be traded in more than one currency and within as well as outside the United States.

3. Global Depositary Receipts (GDRs)

A depository receipt is basically a negotiable certificate, denominated in a currency not native to the issuer, that represents the company's publicly - traded local currency equity shares. Most GDRs are denominated in USD, while a few are denominated in Euro and Pound Sterling. The Depository Receipts issued in the US are called American Depositary Receipts (ADRs), which anyway are denominated in USD and outside of USA, these are called GDRs. In theory, though a depository receipt can also represent a debt instrument, in practice it rarely does. DRs (depository receipts) are created when the local currency shares of an Indian company are delivered to the depository's local custodian bank, against which the Depository bank (such as the Bank of New York) issues depository receipts in US dollar. These depository receipts may trade freely in the overseas markets like any other dollar-denominated security, either on a foreign stock exchange, or in the over-the-counter market, or among a restricted group such as Qualified Institutional Buyers (QIBs). Indian issues have taken the form of GDRs to reflect the fact that they are marketed globally, rather than in a specific country or market.

4. Euro-Convertible Bonds (ECBs)

A convertible bond is a debt instrument which gives the holders of the bond an option to convert the bond into a predetermined number of equity shares of the company. Usually, the price of the equity shares at the time of conversion will have a premium element. The bonds carry a fixed rate of interest

5. Other Sources

- **Euro Bonds:** Plain Euro-bonds are nothing but debt instruments. These are not very attractive for an investor who desires to have valuable additions to his investments.
- **Euro-Convertible Zero Bonds:** These bonds are structured as a convertible bond. No interest is payable on the bonds. But conversion of bonds takes place on maturity at a predetermined price. Usually there is a 5 years maturity period and they are treated as a deferred equity issue.

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- **Euro-bonds with Equity Warrants:** These bonds carry a coupon rate determined by the market rates. The warrants are detachable. Pure bonds are traded at a discount. Fixed income funds' managements may like to invest for the purposes of regular income.
- **Syndicated bank loans:** One of the earlier ways of raising funds in the form of large loans from banks with good credit rating, can be arranged in reasonably short time and with few formalities. The maturity of the loan can be for a duration of 5 to 10 years. The interest rate is generally set with reference to an index, say, LIBOR plus a spread which depends upon the credit rating of the borrower. Some covenants are laid down by the lending institution like maintenance of key financial ratios.
- **Euro-bonds:** These are basically debt instruments denominated in a currency issued outside the country of that currency for examples Yen bond floated in France. Primary attraction of these bonds is the refuge from tax and regulations and provide scope for arbitraging yields. These are usually bearer bonds and can take the form of
 - (i) Traditional fixed rate bonds.
 - (ii) Floating rate Notes.(FRNs)
 - (iii) Convertible Bonds.
- **Foreign Bonds:** Foreign bonds are denominated in a currency which is foreign to the borrower and sold at the country of that currency. Such bonds are always subject to the restrictions and are placed by that country on the foreigners funds.
- **Euro Commercial Papers:** These are short term money market securities usually issued at a discount, for maturities less than one year.
- **Credit Instruments:** The foregoing discussion relating to foreign exchange risk management and international capital market shows that foreign exchange operations of banks consist primarily of purchase and sale of credit instruments. There are many types of credit instruments used in effecting foreign remittances. They differ in the speed, with which money can be received by the creditor at the other end after it has been paid in by the debtor at his end. The price or the rate of each instrument, therefore, varies with extent of the loss of interest and risk of loss involved. There are, therefore, different rates of exchange applicable to different types of credit instruments.

6. What is the impact of GDRs on Indian Capital Market?

Answer:

Impact of GDRs on Indian Capital Market

Since the inception of GDRs a remarkable change in Indian capital market has been observed as follows:

- (i) Indian stock market to some extent is shifting from Bombay to Luxemburg.
- (ii) There is arbitrage possibility in GDR issues.
- (iii) Indian stock market is no longer independent from the rest of the world. This puts additional strain on the investors as they now need to keep updated with world wide economic events.
- (iv) Indian retail investors are completely sidelined. GDRs/Foreign Institutional Investors' placements + free pricing implies that retail investors can no longer expect to make easy money on heavily discounted rights/public issues.

As a result of introduction of GDRs a considerable foreign investment has flown into India.

CHAPTER 10: INTERNATIONAL FINANCIAL MANAGEMENT

MTP & RTP QUESTIONS

1. Explain different constituents of International Financial Centre (IFC)

[MTP → AUGUST 2018 → 4 MARKS]

Answer:

Although there are many constituents for IFC but some of the important constituent are as follows:

- (i) Highly developed Infrastructure: - A leading edge infrastructure is prerequisite for creating a platform to offer internationally complete financial services.
- (ii) Stable Political Environment: - Destabilized political environment brings country risk investment by foreign nationals. Hence, to accelerate foreign participation in growth of financial center, stable political environment is prerequisite.
- (iii) Strategic Location: - The geographical location of the finance center should be strategic such as near to airport, seaport and should have friendly weather.
- (iv) Quality Life: - The quality of life at the center should be good as center retains highly paid professional from own country as well from outside.
- (v) Rationale Regulatory Framework: - Rationale legal regulatory framework is another prerequisite of international finance center as it should be fair and transparent.
- (vi) Sustainable Economy: - The economy should be sustainable and should possess capacity to absorb all the shocks as it will boost investors' confidence.

2. A foreign based company is planning to set up a software development unit in India. Software developed at the Indian unit will be bought back by the foreign parent company at a transfer price of US \$10 millions. The unit will remain in existence in India for one year; the software is expected to get developed within this time frame.

The foreign based company will be subject to corporate tax of 30 per cent and a withholding tax of 10 per cent in India and will not be eligible for tax credit. The software developed will be sold in the international market for US \$ 12.0 millions. Other estimates are as follows:

Rent for fully furnished unit with necessary hardware in India Rs. 20,00,000

Man power cost (80 software professional will be working for 10 hours each day)
Rs. 540 per man hour

Administrative and other costs Rs. 16,20,000

The rupee-dollar rate is Rs.65/\$.

ADVISE the foreign company on the financial viability of the project.

Assumption: 365 days in a year.

[RTP → MAY 2018]

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

Answer:**Proforma profit and loss account of the Indian software development unit**

	₹	₹
Revenue		65,00,00,000
Less: Costs:		
Rent	20,00,000	
Manpower (₹540 x 80 x 10 x 365)	15,76,80,000	
Administrative and other costs	16,20,000	16,13,00,000
Earnings before tax		48,87,00,000
Less: Tax		14,66,10,000
Earnings after tax		34,20,90,000
Less: Withholding tax		3,42,09,000
Repatriation amount (in rupees)		30,78,81,000
Repatriation amount (in dollars)		\$4.7366 million

Advise: The cost of development software in India for the foreign based company is \$5.3 million. As the USA based Company is expected to sell the software in the international market at \$12.0 million, it is advised to develop the software in India.

3. The directors of Implant Inc. wishes to make an equity issue to finance a \$10 m (million) expansion scheme which has an excepted Net Present Value of \$2.2m and to re-finance an existing \$6 m 15% Bonds due for maturity in 5 years time. For early redemption of these bonds there is a \$3,50,000 penalty charges. The Co. has also obtained approval to suspend these pre-emptive rights and make a \$15 m placement of shares which will be at a price of \$0.5 per share. The floatation cost of issue will be 4% of Gross proceeds. Any surplus funds from issue will be invested in IDRs which is currently yielding 10% per year.

The Present capital structure of Co. is as under:

	'000
Ordinary Share (\$1 per share)	7,000
Share Premium	10,500
Free Reserves	25,500
	43,000
15% Term Bonds	6,000
11% Debenture (2012-2020)	8,000
	57,000

CHAPTER 10: INTERNATIONAL FINANCIAL MANAGEMENT

Current share price is \$2 per share and debenture price is \$ 103 per debenture. Cost of capital of Co. is 10%. It may be further presumed that stock market is semi-strong form efficient and no information about the proposed use of funds from the issue has been made available to the public. You are required to calculate expected share price of company once full details of the placement and to which the finance is to be put, are announced.

[RTP → MAY 2019]

Answer:

In semi-strong form of stock market, the share price should accurately reflect new relevant information when it is made publicly available including Implant Inc. expansion scheme and redemption of the term loan.

The existing Market Value \$ 2 x 7,000,000		\$ 14,000,000
The new investment has an expected NPV		\$ 2,200,000
Proceeds of New Issue		\$ 15,000,000
Issue Cost of		(\$ 600,000)
PV of Benefit of early redemption		
Interest of \$ 900,000 (\$ 6,000,000 x 15 %)x 3.791	3,411,900	
PV of Repayment in 5 years \$ 6,000,000 x 0.621	<u>3,726,000</u>	
	7,137,900	
Redemption Cost Now	(6,000,000)	
Penalty charges	(350,000)	787,900
Expected Total Market value		31,387,900
New No. of shares (30 Million + 7 Million)		37,00,000
Expected Share Price of Company		\$ 0.848

4. ABC Ltd. is considering a project in US, which will involve an initial investment of US \$ 1,10,00,000. The project will have 5 years of life. Current spot exchange rate is Rs. 48 per US \$. The risk free rate in US is 8% and the same in India is 12%. Cash inflow from the project is as follows:

Year	Cash inflow
1	US \$ 20,00,000
2	US \$ 25,00,000
3	US \$ 30,00,000
4	US \$ 40,00,000
5	US \$ 50,00,000

Calculate the NPV of the project using foreign currency approach. Required rate of return on this project is 14%.

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[RTP → NOV 2019]**Answer:**

$$(1 + 0.12) (1 + \text{Risk Premium}) = (1 + 0.14)$$

$$\text{Or, } 1 + \text{Risk Premium} = 1.14/1.12 = 1.0179$$

$$\text{Therefore, Risk adjusted dollar rate is} = 1.0179 \times 1.08 = 1.099 - 1 = 0.099$$

Calculation of NPV

Year	Cash flow (Million) US\$	PV Factor at 9.9%	P.V.
1	2.00	0.910	1.820
2	2.50	0.828	2.070
3	3.00	0.753	2.259
4	4.00	0.686	2.744
5	5.00	0.624	<u>3.120</u>
			12.013
		Less: Investment	<u>11.000</u>
		NPV	<u>1.013</u>

Therefore, Rupee NPV of the project is = ₹ (48 × 1.013) Million
= ₹48.624 Million

5. XYZ Ltd., a company based in India, manufactures very high quality modern furniture and sells to a small number of retail outlets in India and Nepal. It is facing tough competition. Recent studies on marketability of products have clearly indicated that the customer is now more interested in variety and choice rather than exclusivity and exceptional quality. Since the cost of quality wood in India is very high, the company is reviewing the proposal for import of woods in bulk from Nepalese supplier.

The estimate of net Indian (Rs.) and Nepalese Currency (NC) cash flows in Nominal terms for this proposal is shown below:

	Net Cash Flow (in millions)			
Year	0	1	2	3
NC	-25.000	2.600	3.800	4.100
Indian (₹)	0	2.869	4.200	4.600

The following information is relevant:

- (i) XYZ Ltd. evaluates all investments by using a discount rate of 9% p.a. All Nepalese customers are invoiced in NC. NC cash flows are converted to Indian (Rs.) at the forward rate and discounted at the Indian rate.

CHAPTER 10:
INTERNATIONAL FINANCIAL MANAGEMENT

(ii) Inflation rates in Nepal and India are expected to be 9% and 8% p.a. respectively. The current exchange rate is Rs. 1= NC 1.6

Assuming that you are the finance manager of XYZ Ltd., calculate the net present value (NPV) and modified internal rate of return (MIRR) of the proposal.

You may use following values with respect to discount factor for Rs. 1 @ 9%

	Present Value	Future Value
Year 1	0.917	1.188
Year 2	0.842	1.090
Year 3	0.772	1

[RTP → MAY 2020]

Answer:

Working Notes:

(i) Computation of Forward Rates

End of Year	NC	NC/₹
1	$NC1.60 \times \left(\frac{(1+0.09)}{(1+0.08)} \right)$	1.615
2	$NC1.615 \times \left(\frac{(1+0.09)}{(1+0.08)} \right)$	1.630
3	$NC1.630 \times \left(\frac{(1+0.09)}{(1+0.08)} \right)$	1.645

(ii) NC Cash Flows converted in Indian Rupees

Year	NC (Million)	Conversion Rate	₹ (Million)
0	-25.00	1.600	-15.625
1	2.60	1.615	1.61
2	3.80	1.630	2.33
3	4.10	1.645	2.49

Net Present Value

(₹ Million)					
Year	Cash Flow in India	Cash Flow in Nepal	Total	PVF @ 9%	PV
0	---	-15.625	-15.625	1.000	-15.625
1	2.869	1.61	4.479	0.917	4.107

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

2	4.200	2.33	6.53	0.842	5.498
3	4.600	2.49	7.09	0.772	5.473
					-0.547

Modified Internal Rate of Return

	Year			
	0	1	2	3
Cash Flow (₹ Million)	-15.625	4.479	6.53	7.09
Year 1 Cash Inflow reinvested for 2 years (1.188 x 4.479)				5.32
Year 2 Cash Inflow reinvested for 1 years (1.090 x 6.53)				7.12
				19.53

$$MIRR = \sqrt[n]{\frac{\text{Terminal Cash Flow}}{\text{Initial Outlay}}} - 1 = \sqrt[3]{\frac{19.53}{15.625}} - 1 = 0.0772 \text{ say } 7.72\%$$

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CHAPTER 11: INTEREST RATE RISK MANAGEMENT

11.

INTEREST RATE RISK MANAGEMENT

QUESTIONS FROM ICAI STUDY MATERIAL & RTP

1. Write a short note on Forward Rate Agreements

Answer:

A Forward Rate Agreement (FRA) is an agreement between two parties through which a borrower/lender protects itself from the unfavourable changes to the interest rate. Unlike futures FRAs are not traded on an exchange thus are called OTC product. Following are main features of FRA.

- Normally it is used by banks to fix interest costs on anticipated future deposits or interest revenues on variable-rate loans indexed to LIBOR.
- It is an off Balance Sheet instrument.
- It does not involve any transfer of principal. The principal amount of the agreement is termed "notional" because, while it determines the amount of the payment, actual exchange of the principal never takes place.
- It is settled at maturity in cash representing the profit or loss. A bank that sells an FRA agrees to pay the buyer the increased interest cost on some "notional" principal amount if some specified maturity of LIBOR is above a stipulated "forward rate" on the contract maturity or settlement date. Conversely, the buyer agrees to pay the seller any decrease in interest cost if market interest rates fall below the forward rate.
- Final settlement of the amounts owed by the parties to an FRA is determined by the formula

$$\text{Payment} = \frac{(N)(RR - FR)(dtm/DY)}{[1 + RR(dt/DY)]} \times 100$$

Where,

N = the notional principal amount of the agreement;

RR = Reference Rate for the maturity specified by the contract prevailing on the contract settlement date; typically LIBOR or MIBOR

FR = Agreed-upon Forward Rate; and

dtm = maturity of the forward rate, specified in days (FRA Days)

DY = Day count basis applicable to money market transactions which could be 360 or 365 days.

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If $\text{LIBOR} > \text{FR}$ the seller owes the payment to the buyer, and if $\text{LIBOR} < \text{FR}$ the buyer owes the seller the absolute value of the payment amount determined by the above formula.

- The differential amount is discounted at post change (actual) interest rate as it is settled in the beginning of the period not at the end.

2. What do you know about swaptions and their uses?

Answer:

An interest rate swaption is simply an option on an interest rate swap. It gives the holder the right but not the obligation to enter into an interest rate swap at a specific date in the future, at a particular fixed rate and for a specified term.

There are two types of swaption contracts: -

- A **fixed rate payer swaption** gives the owner of the swaption the right but not the obligation to enter into a swap where they pay the fixed leg and receive the floating leg.
- A **fixed rate receiver swaption** gives the owner of the swaption the right but not the obligation to enter into a swap in which they will receive the fixed leg, and pay the floating leg.

Uses of Swaptions

- Swaptions can be applied in a variety of ways for both active traders as well as for corporate treasurers.
- Swap traders can use them for speculation purposes or to hedge a portion of their swap books.
- Swaptions have become useful tools for hedging embedded optionality which is common to the natural course of many businesses.
- Swaptions are useful to borrowers targeting an acceptable borrowing rate.
- Swaptions are also useful to those businesses tendering for contracts.
- Swaptions also provide protection on callable/puttable bond issues.

3. Derivative Bank entered into a plain vanilla swap through on OIS (Overnight Index Swap) on a principal of Rs. 10 crores and agreed to receive MIBOR overnight floating rate for a fixed payment on the principal. The swap was entered into on Monday, 2nd August, 2010 and was to commence on 3rd August, 2010 and run for a period of 7 days.

Respective MIBOR rates for Tuesday to Monday were:

7.75%, 8.15%, 8.12%, 7.95%, 7.98%, 8.15%.

If Derivative Bank received Rs. 317 net on settlement, calculate Fixed rate and interest under both legs.

CHAPTER 11: INTEREST RATE RISK MANAGEMENT

Notes:

(i) Sunday is Holiday.

(ii) Work in rounded rupees and avoid decimal working

Answer:

Day	Principal (₹)	MIBOR (%)	Interest (₹)
Tuesday	10,00,00,000	7.75	21,233
Wednesday	10,00,21,233	8.15	22,334
Thursday	10,00,43,567	8.12	22,256
Friday	10,00,65,823	7.95	21,795
Saturday & Sunday (*)	10,00,87,618	7.98	43,764
Monday	10,01,31,382	8.15	<u>22,358</u>
Total Interest @ Floating			1,53,740
Less: Net Received			<u>317</u>
Expected Interest @ fixed			<u>1,53,423</u>
Thus Fixed Rate of Interest			0.07999914
Approx.			8%

(*) i.e. interest for two days.

Note: Alternatively, answer can also be calculated on the basis of 360 days in a year.

4. M/s. Parker & Co. is contemplating to borrow an amount of Rs.60 crores for a Period of 3 months in the coming 6 month's time from now. The current rate of interest is 9% p.a., but it may go up in 6 month's time. The company wants to hedge itself against the likely increase in interest rate.

The Company's Bankers quoted an FRA (Forward Rate Agreement) at 9.30%p.a.

What will be the Final settlement amount, if the actual rate of interest after 6 months happens to be (i) 9.60% p.a. and (ii) 8.80% p.a.?

Answer:

Final settlement amount shall be computed by using formula:

$$= \frac{(N)(RR - FR)(dtm/DY)}{[1 + RR(dt m/DY)]}$$

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

Where,

N = the notional principal amount of the agreement;

RR = Reference Rate for the maturity specified by the contract prevailing on the contract settlement date;

FR = Agreed-upon Forward Rate; and

dtm = maturity of the forward rate, specified in days (FRA Days)

DY = Day count basis applicable to money market transactions which could be 360 or 365 days.

Accordingly,

If actual rate of interest after 6 months happens to be 9.60%

$$= \frac{(\text{₹ } 60 \text{ crore})(0.096 - 0.093)(3/12)}{[1 + 0.096(3/12)]}$$

$$= \frac{(\text{₹ } 60 \text{ crore})(0.00075)}{1.024} = \text{₹ } 4,39,453$$

Thus banker will pay Parker & Co. a sum of ₹ 4,39,453

If actual rate of interest after 6 months happens to be 8.80%

$$= \frac{(\text{₹ } 60 \text{ crore})(0.088 - 0.093)(3/12)}{[1 + 0.088(3/12)]}$$

$$= \frac{(\text{₹ } 60 \text{ crore})(-0.00125)}{1.022} = - \text{₹ } 7,33,855$$

Thus Parker & Co. will pay banker a sum of ₹ 7,33,855

Note: It might be possible that students may solve the question on basis of days instead of months (as considered in above calculations). Further there may be also possibility that the FRA days and Day Count convention may be taken in various plausible combinations such as 90 days/360 days, 90 days/ 365 days, 91 days/360 days or 91 days/365days.

5. Electraspace is consumer electronics wholesaler. The business of the firm is highly seasonal in nature. In 6 months of a year, firm has a huge cash deposits and especially near Christmas time and other 6 months firm cash crunch, leading to borrowing of money to cover up its exposures for running the business.

It is expected that firm shall borrow a sum of €50 million for the entire period of slack season in about 3 months.

A Bank has given the following quotations:

Spot	5.50% - 5.75%
3 × 6 FRA	5.59% - 5.82%
3 × 9 FRA	5.64% - 5.94%

CHAPTER 11: INTEREST RATE RISK MANAGEMENT

3 month €50,000 future contract maturing in a period of 3 months is quoted at 94.15 (5.85%).

ADVISE:

- (i) How a FRA, shall be useful if the actual interest rate after 3 months turnout to be:
(a) 4.5% (b) 6.5%
- (ii) How 3 months Future contract shall be useful for company if interest rate turns out as mentioned in part (a) above.

[RTP → MAY 2018]

Answer:

- (i) By entering into an FRA, firm shall effectively lock in interest rate for a specified future in the given it is 6 months. Since, the period of 6 months is starting in 3 months, the firm shall opt for 3 × 9 FRA locking borrowing rate at 5.94%.

In the given scenarios, the net outcome shall be as follows:

	If the rate turns out to be 4.50%	If the rate turns out to be 6.50%
FRA Rate	5.94%	5.94%
Actual Interest Rate	4.50%	6.50%
Loss/ (Gain)	1.44%	(0.56%)
FRA Payment / (Receipts)	€50 m × 1.44% × ½ = €360,000	€50m × 0.56% × ½ = (€140,000)
Interest after 6 months on €50 Million at actual rates	= €50m × 4.5% × ½ = €1,125,000	= €50m × 6.5% × ½ = €1,625,000
Net Out Flow	€ 1,485,000	€1,485,000

Thus, by entering into FRA, the firm has committed itself to a rate of 5.94% shown as follows:

$$\frac{€ 1,485,000}{€ 50,000,000} \times 100 \times \frac{12}{6} = 5.94\%$$

- (ii) Since firm is a borrower it will like to off-set interest cost by profit on Future Contract. Accordingly, if interest rate rises it will gain hence it should sell interest rate futures.

$$\begin{aligned} \text{No. of Contracts} &= \frac{\text{Amount of Borrowing}}{\text{Contract Size}} \times \frac{\text{Duration of Loan}}{3 \text{ months}} \\ &= \frac{€ 50,000,000}{€ 50,000} \times \frac{6}{3} = 2000 \text{ Contracts} \end{aligned}$$

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

The final outcome in the given two scenarios shall be as follows:

	If the interest rate turns out to be 4.5%	If the interest rate turns out to be 6.5%
<i>Future Course Action:</i>		
Sell to open	94.15	94.15
Buy to close	95.50 (100 - 4.5)	93.50 (100 - 6.5)
Loss/ (Gain)	1.35%	(0.65%)
Cash Payment (Receipt) for Future Settlement	$€50,000 \times 2000 \times 1.35\% \times \frac{3}{12}$ = €337,500	$€50,000 \times 2000 \times 0.65\% \times \frac{3}{12}$ = (€162,500)
Interest for 6 months on €50 million at actual rates	$€50 \text{ million} \times 4.5\% \times \frac{1}{2}$ = €11,25,000	$€50 \text{ million} \times 6.5\% \times \frac{1}{2}$ = €16,25,000
	€1,462,500	€1,462,500

Thus, the firm locked itself in interest rate of 5.85% shown as follows:

$$\frac{€1,462,500}{€50,000,000} \times 100 \times \frac{12}{6} = 5.85\%$$

6. Two companies ABC Ltd. and XYZ Ltd. approach the DEF Bank for FRA (Forward Rate Agreement). They want to borrow a sum of Rs. 100crores after 2 years for a period of 1 year. Bank has calculated Yield Curve of both companies as follows:

Year	XYZ Ltd.	ABC Ltd.*
1	3.86	4.12
2	4.20	5.48
3	4.48	5.78

*The difference in yield curve is due to the lower credit rating of ABC Ltd. compared to XYZ Ltd.

- You are required to calculate the rate of interest DEF Bank would quote under 2V3 FRA, using the company's yield information as quoted above.
- Suppose bank offers Interest Rate Guarantee for a premium of 0.1% of the amount of loan, you are required to calculate the interest payable by XYZ Ltd. if interest rate in 2 years turns out to be
 - 4.50%
 - 5.50%

[RTP → NOV 2019]

Answer:

CHAPTER 11:
INTEREST RATE RISK MANAGEMENT

- (i) DEF Bank will fix interest rate for 2V3 FRA after 2 years as follows:

XYZ Ltd.

$$(1+r) (1+0.0420)^2 = (1+0.0448)^3$$

$$(1+r) (1.0420)^2 = (1.0448)^3$$

$$r = 5.04\%$$

Bank will quote 5.04% for a 2V3 FRA.

ABC Ltd.

$$(1+r) (1+0.0548)^2 = (1+0.0578)^3$$

$$(1+r) (1.0548)^2 = (1.0578)^3$$

$$r = 6.38\%$$

Bank will quote 6.38% for a 2V3 FRA.

- (ii)

		4.50% - Allow to Lapse	5.50%-Exercise
Interest	₹ 100 crores X 4.50%	₹ 4.50 crores	-
	₹ 100 crores X 5.04%	-	₹ 5.04 crores
Premium (Cost of Option)	₹ 100 crores X 0.1%	₹ 0.10 crores	₹ 0.10 crores
		<u>4.60 crores</u>	<u>5.14 crores</u>

7. A Inc. and B Inc. intend to borrow \$200,000 and \$200,000 in ₹ respectively for a time horizon of one year. The prevalent interest rates are as follows:

Company	₹ Loan	\$ Loan
A Inc	5%	9%
B Inc	8%	10%

The prevalent exchange rate is \$1 = ₹120.

They entered in a currency swap under which it is agreed that B Inc will pay A Inc @ 1% over the ₹ Loan interest rate which the later will have to pay as a result of the agreed currency swap whereas A Inc will reimburse interest to B Inc only to the extent of 9%. Keeping the exchange rate invariant, quantify the opportunity gain or loss component of the ultimate outcome, resulting from the designed currency swap

[RTP → MAY 2020]

Answer:

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

Opportunity gain of A Inc under currency swap	Receipt	Payment	Net
Interest to be remitted to B. Inc in \$ 2,00,000x9%=\$18,000 Converted into (\$18,000 x ₹120)		₹21,60,000	
Interest to be received from B. Inc in \$ converted into ₹ (6%x\$2,00,000 x ₹120)	₹14,40,000	-	
Interest payable on ₹ loan	-	₹12,00,000	
	₹14,40,000	₹33,60,000	
Net Payment	₹19,20,000	-	
	₹33,60,000	₹33,60,000	
\$ equivalent paid ₹19,20,000 x(1/₹120)			\$16,000
Interest payable without swap in \$			\$18,000
Opportunity gain in \$			\$ 2,000

Opportunity gain of B Inc under currency swap	Receipt	Payment	Net
Interest to be remitted to A Inc in (\$ 2,00,000 x 6%)		\$12,000	
Interest to be received from A. Inc in ₹ converted into \$ =₹21,60,000/₹120	\$18,000		
Interest payable on \$ loan@10%	-	\$20,000	
	\$18,000	\$32,000	
Net Payment	\$14,000	-	
	\$32,000	\$32,000	
₹ equivalent paid \$14,000 X ₹120			₹16,80,000
Interest payable without swap in ₹ (\$2,00,000X₹120X8%)			₹19,20,000
Opportunity gain in ₹			₹ 2,40,000

Alternative Solution

Cash Flows of A Inc

(i) At the time of exchange of principal amount

Transactions		Cash Flows
Borrowings	\$2,00,000 x ₹120	+ ₹240,00,000
Swap		- ₹240,00,000
Swap		+ \$2,00,000
Net Amount		+ \$2,00,000

(ii) At the time of exchange of interest amount

Transactions		Cash Flows
Interest to the lender	₹240,00,000X5%	₹12,00,000
Interest Receipt from B Inc.	₹2,00,000X120X6%	₹14,40,000
Net Saving (in \$)	₹2,40,000/₹120	\$2,000
Interest to B Inc.	\$2,00,000X9%	-\$18,000
Net Interest Cost		-\$16,000

CHAPTER 11: INTEREST RATE RISK MANAGEMENT

A Inc. used \$2,00,000 at the net cost of borrowing of \$16,000 i.e. 8%. If it had not opted for swap agreement the borrowing cost would have been 9%. Thus there is saving of 1%.

Cash Flows of B Inc

(i) At the time of exchange of principal amount

Transactions		Cash Flows
Borrowings		+ \$2,00,000
Swap		- \$2,00,000
Swap	\$2,00,000X¥120	<u>+¥240,00,000</u>
Net Amount		<u>+¥240,00,000</u>

(ii) At the time of exchange of interest amount

Transactions		Cash Flows
Interest to the lender	\$2,00,000X10%	- \$20,000
Interest Receipt from A Inc.		+\$18,000
Net Saving (in ¥)	-\$2,000X¥120	- ¥2,40,000
Interest to A Inc.	\$2,00,000X6%X¥120	<u>- ¥14,40,000</u>
Net Interest Cost		<u>- ¥16,80,000</u>

B Inc. used ¥240,00,000 at the net cost of borrowing of ¥16,80,000 i.e. 7%. If it had not opted for swap agreement the borrowing cost would have been 8%. Thus there is saving of 1%.

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12.

CORPORATE VALUATION

ILLUSTRATIONS & QUESTIONS FROM ICAI STUDY MATERIAL

1. There is a privately held company X Pvt. Ltd that is operating into the retail space, and is now scouting for angel investors. The details pertinent to valuing X Pvt. Ltd are as follows –

The company has achieved break even this year and has an EBITDA of 90. The unleveraged beta based on the industry in which it operates is 1.8, and the average debt to equity ratio is hovering at 40:60. The rate of return provided by liquid bonds is 5%. The EV is to be taken at a multiple of 5 on EBITDA. The accountant has informed that the EBITDA of 90 includes an extraordinary gain of 10 for the year, and a potential write off of preliminary sales promotion costs of 20 are still pending. The internal assessment of rate of market return for the industry is 11%. The FCFs for the next 3 years are as follows:

	Y1	Y2	Y3
Future Cash flows	100	120	150

The pre-tax cost of debt will be 12%. Assume a tax regime of 30%.

What is the potential value to be placed on X Pvt. Ltd?

Answer:

The levered beta of the company will be $1.8[1+(1-0.3)*40/60] = 2.64$

The adjusted EBITDA would be $90 - 10 - 20 = 60$

The EV will be multiple of 5 on the 60 obtained above = 300

The Cost of equity in accordance with CAPM = $r(f) + \beta(R_m - R_f)$

$= 5\% + 2.64(11\% - 5\%) = 20.84\%$

The WACC = Cost of Equity + Cost of Debt

$= 20.84(60/100) + 12.0(1-0.3)(40/100) = 15.864$

CHAPTER 12: CORPORATE VALUATION

Finally, the future cash flows can be discounted at the WACC obtained above as under –

	Y1	Y2	Y3
Future Cash flows	100	120	150
Discount factor	0.863	0.745	0.643
PVs of cash flows	86.30	89.40	96.45
VALUE OF THE FIRM			272.15

2. Compute EVA of A Ltd. with the following information:

Profit and Loss Statement		Balance Sheet	
Revenue	1000	PPE	1000
Direct Costs	-490	Current Assets	300
SGA	-200		1300
EBIT	310	Equity	700
Interest	-10	Reserves	100
EBT	300	Non Current Borrowings	100
Tax Expense	-100	Current Liabilities & Provisions	400
EAT	200		1300

Assume bad debts provision of 20 is included in the SGA, and 20 reduced from the trade receivables in current assets.

Also assume that the pre-tax Cost of Debt is 12%, Tax Rate is 33.33% and Cost of Equity (i.e. the expected shareholder's return) is 8.45%.

Answer:

Step I: Computation of NOPAT

<u>NOPAT</u>	
EBIT	400
Less: Taxes	-100
Add: Non Cash Expenses	20
NOPAT	320

Step II: Finding out the Invested Capital:

<u>Invested Capital</u>	
Total Assets	1300
Less: Non Interest bearing liabilities	-400
	900
Add: Non Cash adjustment	20
	920

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

Note: It is assumed that the current liabilities also include the 100 of tax liability.

Step III: Compute the WACC

WACC = Cost of equity + Cost of debt

In this case, $WACC = (800/900 \times 8.45\%) + [100/900 \times 12\% (1 - 0.3333)] = 8.40\%$

Step IV: Find out the Capital Charge

Capital Charge = Invested Capital * WACC = $920 \times 8.40\% = 77.28$

Step V:

EVA = NOPAT – Capital Charge = $320 - 77.28 = 242.72$

The 'MVA' (Market Value Added) simply means the Current Market Value of the firm minus the Invested Capital that we obtained above. Let the current MV of the firm be 1000. Hence MVA will be –

$1000 - 920 = 80.$

3. Relative Valuation is the method to arrive at a 'relative' value using a 'comparative' analysis to its peers or similar enterprises. Elaborate this statement

Answer:

The three approaches that we saw to arriving at the value of an enterprise viz. the asset based, the earnings based and the cash flow based are for arriving at the 'intrinsic value' of the same. Relative Valuation is the method to arrive at a 'relative' value using a 'comparative' analysis to its peers or similar enterprises. However, increasingly the contemporary financial analysts are using relative valuation in conjunction to the afore-stated approaches to validate the intrinsic value arrived earlier.

The Relative valuation, also referred to as 'Valuation by multiples,' uses financial ratios to derive at the desired metric (referred to as the 'multiple') and then compares the same to that of comparable firms. (Comparable firms would mean the ones having similar asset and risk dispositions, and assumed to continue to do so over the comparison period). In the process, there may be extrapolations set to the desired range to achieve the target set.

4. ABC Company is considering acquisition of XYZ Ltd. which has 1.5 crores shares outstanding and issued. The market price per share is Rs. 400 at present. ABC's average cost of capital is 12%. Available information from XYZ indicates its expected cash accruals for the next 3 years as follows:

Year	Rs. Cr.
1	250
2	300
3	400

CHAPTER 12:
CORPORATE VALUATION

Calculate the range of valuation that ABC has to consider. (PV factors at 12% for years 1 to 3 respectively: 0.893, 0.797 and 0.712).

Answer:

VALUATION BASED ON MARKET PRICE

Market Price per share Rs. 400

Thus value of total business is (Rs. 400 x 1.5 Cr.) Rs. 600 Cr.

VALUATION BASED ON DISCOUNTED CASH FLOW

Present Value of cash flows

(Rs. 250 cr x 0.893) + (Rs. 300 cr. X 0.797) + (Rs. 400 cr. X 0.712) = Rs. 747.15 Cr.

Value of per share (Rs. 747.15 Cr. / 1.5 Cr) Rs. 498.10 per share

RANGE OF VALUATION		
	Per Share ₹	Total ₹ Cr.
Minimum	400.00	600.00
Maximum	498.10	747.15

5. Eagle Ltd. reported a profit of Rs. 77 lakhs after 30% tax for the financial year 2011-12. An analysis of the accounts revealed that the income included extraordinary items of Rs. 8 lakhs and an extraordinary loss of Rs.10 lakhs. The existing operations, except for the extraordinary items, are expected to continue in the future. In addition, the results of the launch of a new product are expected to be as follows:

	₹ In lakhs
Sales	70
Material costs	20
Labour costs	12
Fixed costs	10

You are required to:

- (iii) Calculate the value of the business, given that the capitalization rate is 14%.
(iv) Determine the market price per equity share, with Eagle Ltd.'s share capital being comprised of 1,00,000 13% preference shares of Rs. 100 each and 50,00,000 equity shares of Rs. 10 each and the P/E ratio being 10 times.

[ALSO ASKED IN RTP → NOV 2018]

Answer:

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

(i) Computation of Business Value

	(₹ Lakhs)
Profit before tax $\frac{77}{1-0.30}$	110
Less: Extraordinary income	(8)
Add: Extraordinary losses	<u>10</u>
	112
Profit from new product (₹ Lakhs)	
Sales	70
Less: Material costs	20
Labour costs	12
Fixed costs	<u>10</u>
	(42)
	<u>28</u>
	140.00
Less: Taxes @30%	<u>42.00</u>
Future Maintainable Profit after taxes	<u>98.00</u>
Relevant Capitalisation Factor	0.14
Value of Business (₹98/0.14)	700

Determination of Market Price of Equity Share

Future maintainable profits (After Tax)	₹ 98,00,000
Less: Preference share dividends 1,00,000 shares of ₹ 100 @ 13%	<u>₹ 13,00,000</u>
Earnings available for Equity Shareholders	<u>₹ 85,00,000</u>
No. of Equity Shares	50,00,000
Earning per share = $\frac{₹ 85,00,000}{50,00,000}$ =	₹ 1.70
PE ratio	10
Market price per share	₹ 17

6. H Ltd. agrees to buy over the business of B Ltd. effective 1st April, 2012. The summarized Balance Sheets of H Ltd. and B Ltd. as on 31st March 2012 are as follows:

Balance sheet as at 31st March, 2012 (In Crores of Rupees)

<u>Liabilities:</u>	H. Ltd	B. Ltd.
Paid up Share Capital		
-Equity Shares of ₹100 each	350.00	
-Equity Shares of ₹10 each		6.50
Reserve & Surplus	950.00	25.00
Total	1,300.00	31.50

CHAPTER 12: CORPORATE VALUATION

Assets:		
Net Fixed Assets	220.00	0.50
Net Current Assets	1,020.00	29.00
Deferred Tax Assets	60.00	2.00
Total	1,300.00	31.50

H Ltd. proposes to buy out B Ltd. and the following information is provided to you as part of the scheme of buying:

- (1) The weighted average post tax maintainable profits of H Ltd. and B Ltd. for the last 4 years are Rs. 300 crores and Rs. 10 crores respectively.
- (2) Both the companies envisage a capitalization rate of 8%.
- (3) H Ltd. has a contingent liability of Rs. 300 crores as on 31st March, 2012.
- (4) H Ltd. to issue shares of Rs. 100 each to the shareholders of B Ltd. in terms of the exchange ratio as arrived on a Fair Value basis. (Please consider weights of 1 and 3 for the value of shares arrived on Net Asset basis and Earnings capitalization method respectively for both H Ltd. and B Ltd.)

You are required to arrive at the value of the shares of both H Ltd. and B Ltd. under:

- (i) Net Asset Value Method
- (ii) Earnings Capitalisation Method
- (iii) Exchange ratio of shares of H Ltd. to be issued to the shareholders of B Ltd. on a Fair value basis (taking into consideration the assumption mentioned in point 4 above.)

Answer:

- (i) Net asset value

H Ltd.	$\frac{\text{₹ 1300 Crores} - \text{₹ 300 Crores}}{3.50 \text{ Crores}} = \text{₹ 285.71}$
B Ltd.	$\frac{\text{₹ 31.50 Crores}}{0.65 \text{ Crores}} = \text{₹ 48.46}$

- (ii) Earning capitalization value

H Ltd.	$\frac{\text{₹ 300 Crores} / 0.08}{3.50 \text{ Crores}} = \text{₹ 1071.43}$
B Ltd.	$\frac{\text{₹ 10 Crores} / 0.08}{0.65 \text{ Crores}} = \text{₹ 192.31}$

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(iii) Fair value

H Ltd.	$\frac{₹ 285.71 \times 1 + ₹ 1071.43 \times 3}{4} = ₹ 875$
B Ltd.	$\frac{₹ 48.46 \times 1 + ₹ 192.31 \times 3}{4} = ₹ 156.3475$

Exchange ratio $₹ 156.3475 / ₹ 875 = 0.1787$

H Ltd should issue its 0.1787 share for each share of B Ltd.

Note: In above solution it has been assumed that the contingent liability will materialize at its full amount.

7. The valuation of Hansel Limited has been done by an investment analyst. Based on an expected free cash flow of Rs. 54 lakhs for the following year and an expected growth rate of 9 percent, the analyst has estimated the value of Hansel Limited to be Rs. 1800 lakhs. However, he committed a mistake of using the book values of debt and equity.

The book value weights employed by the analyst are not known, but you know that Hansel Limited has a cost of equity of 20 percent and post tax cost of debt of 10 percent. The value of equity is thrice its book value, whereas the market value of its debt is nine-tenths of its book value. What is the correct value of Hansel Ltd?

[ALSO ASKED IN RTP → MAY 2019]

Answer:

Cost of capital by applying Free Cash Flow to Firm (FCFF) Model is as follows:-

$$\text{Value of Firm} = V_0 = \frac{\text{FCFF}_1}{K_c - g_n}$$

Where –

FCFF_1 = Expected FCFF in the year 1

K_c = Cost of capital

g_n = Growth rate forever

Thus, ₹ 1800 lakhs = ₹ 54 lakhs / ($K_c - g$)

Since $g = 9\%$, then $K_c = 12\%$

Now, let X be the weight of debt and given cost of equity = 20% and cost of debt = 10%, then $20\% (1 - X) + 10\% X = 12\%$

Hence, $X = 0.80$, so book value weight for debt was 80%

∴ Correct weight should be 60 of equity and 40 of debt.

∴ Cost of capital = $K_c = 20\% (60/100) + 10\% (40/100) = 14.5455\%$ and correct firm's value

= ₹ 54 lakhs / (0.1454 - 0.09) = ₹ 974.73 lakhs.

CHAPTER 12: CORPORATE VALUATION

PAST EXAMINATION, MTP & RTP QUESTIONS

8. Herbal World is a small, but profitable producer of beauty cosmetics using the plant Aloe Vera. Though it is not a high-tech business, yet Herbal's earnings have averaged around Rs. 18.5 lakh after tax, mainly on the strength of its patented beauty cream to remove the pimples.

The patent has nine years to run, and Herbal has been offered Rs. 50 lakhs for the patent rights. Herbal's assets include Rs. 50 lakhs of property, plant and equipment and Rs. 25 lakhs of working capital. However, the patent is not shown in the books of Herbal World. Assuming Herbal's cost of capital being 14 percent, calculate its Economic Value Added (EVA).

[MAY 2018 → 5 MARKS]

Answer:

EVA = NOPAT – WACC x Capital Employed.

Capital Employed:	Rs. lacs
Property, etc.	50
Working Capital	25
Patent Value	<u>50</u>
Effective or Invested Capital	<u>125</u>

WACC x CE = 14% x Rs. 125 lacs = Rs. 17.5 lacs

EVA = Rs. 18.5 lacs – Rs. 17.5 lacs = Rs. 1 lac

9. An established company is going to be de merged in two separate entities. The valuation of the company is done by a well-known analyst. He has estimated a value of Rs. 5,000 lakhs, based on the expected free cash flow for next year of Rs. 200 lakhs and an expected growth rate of 5%. While going through the valuation procedure, it was found that the analyst has made the mistake of using the book values of debt and equity in his calculation. While you do not know the book value weights he used, you have been provided with the following information:
- (i) The market value of equity is 4 times the book value of equity, while the market value of debt is equal to the book value of debt,
 - (ii) Company has a cost of equity of 12%,
 - (iii) After tax cost of debt is 6%.

You are required to advise the correct value of the company.

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[MAY 2018 → 8 MARKS]

Answer:

Value of the Company = $\frac{\text{Free Cash Flow at year end 1}}{K_c - g}$, where K_c = weighted average cost of capital.

$$\text{Value of the company} = 5000 = \frac{200}{K_c - 5}$$

$$K_c - 5 = 200/5000 = 4\%$$

$$K_c = 4\% + 5\% = 9\%$$

We do not know the weights the analyst had taken for arriving at the cost of capital. Let w be the proportion of equity. Then, $(1-w)$ will be the proportion of debt.

$$K_c = 9 = w \times 12 + (1-w) \times 6$$

$$9 = 6 + 6w$$

$$6w = 3.$$

$$\text{Hence } w = 3/6 = 0.5 = 50\% \text{ or } 1:1$$

The weights are equal i.e. 1:1 for equity and debt.

The correct weights should be market value of equity : market value of debts.

i.e. 4 times book value of equity : book value of debts. i.e. 4:1 equity : debt

$$\text{Revised } K_c = 4/5 \times 12 + 1/5 \times 6 = 10.8\%$$

$$\text{Revised value of the company} = \frac{200}{10.8 - 5} = 200 / 5.8\% = 3448.28 \text{ lacs.}$$

10. Compute Economic Value Added (EVA) of Good luck Ltd. from the following information:

Profit & Loss Statement

Particulars	(₹ in Lakh)
(a) Income - Revenue from Operations	2000
(b) Expenses - Direct Expenses	800
Indirect Expenses	400
(c) Profit before interest & tax (a-b)	800
(d) Interest	30
(e) Profit before tax (c - d)	770
(f) Tax	231
(g) Profit after tax (e - f)	539

CHAPTER 12: CORPORATE VALUATION

Balance Sheet

Particulars	(₹ in Lakh)
Equity and Liabilities :	
(a) Shareholder's Fund -	
Equity Share Capital	1000
Reserve and Surplus	600
(b) Non- Current Liabilities -	
Long Term Borrowings	200
(c) Current Liabilities	800
Total	2600
Assets :	
(a) Non - Current Assets	2000
(b) Current Assets	600
Total	2600

Other Information:

- (1) Cost of Debts is 15%.
- (2) Cost of Equity (i.e. shareholders' expected return) is 12%.
- (3) Tax Rate is 30%.
- (4) Bad Debts Provision of Rs. 40 lakhs is included in indirect expenses and Rs. 40 lakhs reduced from receivables in current assets.

[MAY 2019 → 8 MARKS]

Answer:

$$\text{EVA} = \text{NOPAT} - (\text{Invested Capital} \times \text{WACC})$$

$$\text{NOPAT} = \text{EBIT} - \text{Tax} + \text{Non-Cash Expenses}$$

$$= 800 \text{ lakhs} - 231 \text{ lakhs} + 40 \text{ lakhs}$$

$$= ₹ 609 \text{ lakh}$$

(OR)

$$\text{Operating Income} = \text{Taxable Income} + \text{Interest} + \text{Non-cash Expenses}$$

$$= 539 + 30 + 40 = ₹ 609 \text{ lakh}$$

$$\text{Invested Capital} = 1000 + 600 + 200 = 1800$$

$$= 1800 + 40 \text{ (Non-cash expenses)}$$

$$= ₹ 1840 \text{ lakhs}$$

$$\text{WACC} = \frac{1600}{1800} \times 12\% + \frac{200}{1800} \times 15\% (1 - 0.3)$$

$$= 10.67\% + 1.17\% = 11.84\%$$

$$\text{Now, EVA} = 609 - (1840 \times 11.84\%)$$

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$$= 609 - 217.86$$

$$= ₹ 391.14 \text{ lakhs}$$

OR

$$\text{WACC} = \frac{1000}{1200} \times 12\% + \frac{200}{1200} \times 15\% (1-0.3)$$

$$= 10.00\% + 1.75\% = 11.75\%$$

Now, EVA = 609 - (1840 x 11.75%)

$$= 609 - 216.20$$

$$= ₹ 392.80 \text{ lakhs}$$

11. The following information is given for 3 companies that are identical except for their capital structure:

	Orange	Grape	Apple
Total invested capital	1,00,000	1,00,000	1,00,000
Debt/assets ratio	0.8	0.5	0.2
Shares outstanding	6,100	8,300	10,000
Pre tax cost of debt	16%	13%	15%
Cost of equity	26%	22%	20%
Operating Income (EBIT)	25,000	25,000	25,000
Net Income	8,970	12,350	14,950

The tax rate is uniform 35% in all cases.

- Calculate the Weighted average cost of capital for each company. (2 Marks)
- Calculate the Economic Value Added (EVA) for each company. (2 Marks)
- Recommend on the basis of EVA, which company would be considered for best investment by giving reasons. (1 Mark)

[MTP → MARCH 2018 & OCTOBER 2019]

Answer:

- Working for calculation of WACC

	Orange	Grape	Apple
Total debt	80,000	50,000	20,000
Post tax Cost of debt	10.4%	8.45%	9.75%
Equity Fund	20,000	50,000	80,000

WACC

Orange: $(10.4 \times 0.8) + (26 \times 0.2) = 13.52\%$

Grape: $(8.45 \times 0.5) + (22 \times 0.5) = 15.225\%$

Apple: $(9.75 \times 0.2) + (20 \times 0.8) = 17.95\%$

CHAPTER 12:
CORPORATE VALUATION

(ii)

	Orange	Grape	Apple
WACC	13.52	15.225	17.95
EVA [EBIT (1-T) - (WACC x Invested Capital)]	2,730	1,025	-1,700

(iii) Orange would be considered as the best investment since the EVA of the company is highest and its weighted average cost of capital is the lowest

(iv) Estimated Price of each company shares

	Orange	Grape	Apple
EBIT (₹)	25,000	25,000	25,000
Interest (₹)	12,800	6,500	3,000
Taxable Income (₹)	12,200	18,500	22,000
Tax 35% (₹)	4,270	6,475	7,700
Net Income (₹)	7,930	12,025	14,300
Shares	6,100	8,300	10,000
EPS (₹)	1.3	1.448795	1.43
Stock Price (EPS x PE Ratio) (₹)	14.30	15.94	15.73

Since the three entities have different capital structures they would be exposed to different degrees of financial risk. The PE ratio should therefore be adjusted for the risk factor.

Alternative Answer

	Orange	Grape	Apple
Net Income (Given) (₹)	8,970	12,350	14,950
Shares	6,100	8,300	10,000
EPS (₹)	1.4705	1.488	1.495
Stock Price (EPS x PE Ratio) (₹)	16.18	16.37	16.45

(v) Market Capitalisation

Estimated Stock Price (₹)	14.30	15.94	15.73
No. of shares	6,100	8,300	10,000
Estimated Market Cap (₹)	87,230	1,32,302	1,57,300

Alternative Answer

Estimated Stock Price (₹)	16.18	16.37	16.45
No. of shares	6,100	8,300	10,000
Estimated Market Cap (₹)	98,698	1,35,871	1,64,500

12. Delta Ltd.'s current financial year's income statement reports its net income as Rs. 15,00,000. Delta's marginal tax rate is 40% and its interest expense for the year was Rs. 15,00,000. The company has Rs. 1,00,00,000 of invested capital, of which 60% is debt. In addition, Delta Ltd. tries to maintain a Weighted Average Cost of Capital (WACC) of 12.6%.

- Calculate the operating income or EBIT earned by Delta Ltd. in the current year.
- Calculate the Delta Ltd.'s Economic Value Added (EVA) for the current year?
- Delta Ltd. has 2,50,000 equity shares outstanding. According to the EVA you calculated in (ii), Evaluate how much can Delta pay in dividend per share before the value of the

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company would start to decrease? If Delta does not pay any dividends, Evaluate what would you expect to happen to the value of the company?

[MTP → MARCH 2019 → 8 MARKS]

Answer:

(i) Taxable income = Net Income / (1 – 0.40)
 or, Taxable income = Rs. 15,00,000 / (1 – 0.40) = Rs. 25,00,000
 Again, taxable income = EBIT – Interest
 or, EBIT = Taxable Income + Interest
 = Rs. 25,00,000 + Rs. 15,00,000 = Rs. 40,00,000

(ii) EVA = EBIT (1 – T) – (WACC × Invested capital)
 = Rs. 40,00,000 (1 – 0.40) – (0.126 × Rs. 1,00,00,000)
 = Rs. 24,00,000 – Rs. 12,60,000 = Rs. 11,40,000

(iii) EVA Dividend = Rs. 11,40,000 / 2,50,000 = Rs. 4.56

If Delta Ltd. does not pay a dividend, we would expect the value of the firm to increase because it will achieve higher growth, hence a higher level of EBIT. If EBIT is higher, then all else equal, the value of the firm will increase.

13. BRS Inc deals in computer and IT hardwares and peripherals. The expected revenue for the next 8 years is as follows:

Years	Sales Revenue (\$ Million)
1	8
2	10
3	15
4	22
5	30
6	26
7	23
8	20

Summarized financial position as on 31 March 2012 was as follows:

\$ Million

Liabilities	Amount	Assets	Amount
Equity Stocks	12	Fixed Assets (Net)	17
12% Bonds	8	Current Assets	3
	20		20

CHAPTER 12: CORPORATE VALUATION

Additional Information:

- (a) Its variable expenses is 40% of sales revenue and fixed operating expenses (cash) are estimated to be as follows:

Period	Amount (\$ Million)
1- 4 years	1.6
5-8 years	2

- (b) An additional advertisement and sales promotion campaign shall be launched requiring expenditure as per following details:

Period	Amount (\$ Million)
1 year	0.50
2-3 years	1.50
4-6 years	3.00
7-8 years	1.00

- (c) Fixed assets are subject to depreciation at 15% as per WDV method.
(d) The company has planned additional capital expenditures (in the beginning of each year) for the coming 8 years as follows:

Period	Amount (\$ Million)
1	0.50
2	0.80
3	2.00
4	2.50
5	3.50
6	2.50
7	1.50
8	1.00

- (e) Investment in Working Capital is estimated to be 20% of Revenue.
(f) Applicable tax rate for the company is 30%.
(g) Cost of Equity is estimated to be 16%.
(h) The Free Cash Flow of the firm is expected to grow at 5% per annum after 8 years.

CALCULATE:

- (i) Value of Firm
(ii) Value of Equity

[RTP → MAY 2018]

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

Answer:**Working Notes:**

(a) Determination of Weighted Average Cost of Capital

Sources of funds	Cost (%)	Proportions	Weights	Weighted Cost
Equity Stock	16	12/20	0.60	9.60
12% Bonds	$12\%(1-0.30) = 8.40$	8/20	0.40	3.36
				12.96 say 13

(b) Schedule of Depreciation

\$ Million

Year	Opening Balance of Fixed Assets	Addition during the year	Total	Depreciation @ 15%
1	17.00	0.50	17.50	2.63
2	14.87	0.80	15.67	2.35
3	13.32	2.00	15.32	2.30
4	13.02	2.50	15.52	2.33
5	13.19	3.50	16.69	2.50
6	14.19	2.50	16.69	2.50
7	14.19	1.50	15.69	2.35
8	13.34	1.00	14.34	2.15

(c) Determination of Investment

\$ Million

Year	Investment Required			Existing Investment in CA	Additional Investment required
	For Capital Expenditure	CA (20% of Revenue)	Total		
1	0.50	1.60	2.10	3.00	0.00
2	0.80	2.00	2.80	2.50*	0.30
3	2.00	3.00	5.00	2.00**	3.00
4	2.50	4.40	6.90	3.00	3.90
5	3.50	6.00	9.50	4.40	5.10
6	2.50	5.20	7.70	6.00	1.70
7	1.50	4.60	6.10	5.20	0.90
8	1.00	4.00	5.00	4.60	0.40

* Balance of CA in Year 1 (\$3 Million) – Capital Expenditure in Year 1(\$ 0.50 Million)

** Similarly balance of CA in Year 2 (\$2.80) – Capital Expenditure in Year 2(\$ 0.80 Million)

(d) Determination of Present Value of Cash Inflows

\$ Million

Particulars	Years							
	1	2	3	4	5	6	7	8
Revenue (A)	8.00	10.00	15.00	22.00	30.00	26.00	23.00	20.00

CHAPTER 12:
CORPORATE VALUATION

Less: Expenses								
Variable Costs	3.20	4.00	6.00	8.80	12.00	10.40	9.20	8.00
Fixed cash operating cost	1.60	1.60	1.60	1.60	2.00	2.00	2.00	2.00
Advertisement Cost	0.50	1.50	1.50	3.00	3.00	3.00	1.00	1.00
Depreciation	2.63	2.35	2.30	2.33	2.50	2.50	2.35	2.15
Total Expenses (B)	7.93	9.45	11.40	15.73	19.50	17.90	14.55	13.15
EBIT (C) = (A) - (B)	0.07	0.55	3.60	6.27	10.50	8.10	8.45	6.85
Less: Taxes@30% (D)	0.02	0.16	1.08	1.88	3.15	2.43	2.53	2.06
NOPAT (E) = (C) - (D)	0.05	0.39	2.52	4.39	7.35	5.67	5.92	4.79
Gross Cash Flow (F) = (E) + Dep	2.68	2.74	4.82	6.72	9.85	8.17	8.27	6.94
Less: Investment in Capital Assets								
plus Current Assets (G)	0	0.30	3.00	3.90	5.10	1.70	0.90	0.40
Free Cash Flow (H) = (F) - (G)	2.68	2.44	1.82	2.82	4.75	6.47	7.37	6.54
PVF@13% (I)	0.885	0.783	0.693	0.613	0.543	0.480	0.425	0.376
PV (H)(I)	2.371	1.911	1.261	1.729	2.579	3.106	3.132	2.46

Total present value = \$ 18.549 million

(e) Determination of Present Value of Continuing Value (CV)

$$CV = \frac{FCF_g}{k-g} = \frac{\$6.54 \text{ million}(1.05)}{0.13-0.05} = \frac{\$6.867 \text{ million}}{0.08} = \$85.8375 \text{ million}$$

Present Value of Continuing Value (CV) = \$85.8376 million X PVF_{13%,8} = \$85.96875 million X 0.376 = \$32.2749 million

(i) Value of Firm

	\$ Million
Present Value of cash flow during explicit period	18.5490
Present Value of Continuing Value	32.2749
Total Value	50.8239

(ii) Value of Equity

	\$ Million
Total Value of Firm	50.8239
Less: Value of Debt	8.0000
Value of Equity	42.8239

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

14. A valuation done of an established company by a well-known analyst has estimated a value of Rs. 500 lakhs, based on the expected free cash flow for next year of Rs. 20 lakhs and an expected growth rate of 5%.

While going through the valuation procedure, you found that the analyst has made the mistake of using the book values of debt and equity in his calculation. While you do not know the book value weights he used, you have been provided with the following information:

- (i) Company has a cost of equity of 12%,
- (ii) After tax cost of debt is 6%,
- (iii) The market value of equity is three times the book value of equity, while the market value of debt is equal to the book value of debt.

You are required to estimate the correct value of the company

[RTP → NOV 2019]

Answer:

Cost of capital by applying Free Cash Flow to Firm (FCFF) Model is as follows:-

$$\text{Value of Firm} = V_0 = \frac{\text{FCFF}_1}{K_c - g_n}$$

Where –

FCFF_1 = Expected FCFF in the year 1

K_c = Cost of capital

g_n = Growth rate forever

Thus, ₹ 500 lakhs = ₹ 20 lakhs / $(K_c - g)$

Since $g = 5\%$, then $K_c = 9\%$

Now, let X be the weight of debt and given cost of equity = 12% and cost of debt = 6%, then $12\% (1 - X) + 6\% X = 9\%$

Hence, $X = 0.50$, so book value weight for debt was 50%

∴ Correct weight should be 150% of equity and 50% of debt.

∴ Cost of capital = $K_c = 12\% (0.75) + 6\% (0.25) = 10.50\%$

and correct firm's value = ₹ 20 lakhs / $(0.105 - 0.05) = ₹ 363.64$ lakhs.

**CHAPTER 13:
MERGERS, ACQUISITIONS & CORPORATE RESTRUCTURING**

13.**MERGERS, ACQUISITIONS & CORPORATE RESTRUCTURING****ILLUSTRATIONS & QUESTIONS FROM ICAI STUDY MATERIAL**

1. The following is the Balance-sheet of XYZ Company Ltd as on March 31st, 2013. (Rs. in lakh)

Liabilities	Amount	Assets	Amount
6 lakh equity shares of ₹100/- each	600	Land & Building	200
2 lakh 14% Preference shares of ₹100/- each	200	Plant & Machinery	300
13% Debentures	200	Furniture & Fixtures	50
Debenture Interest accrued and Payable	26	Inventory	150
Loan from Bank	74	Sundry debtors	70
Trade Creditors	300	Cash at Bank	130
		Preliminary Expenses	10
		Cost of Issue of debentures	5
		Profit & Loss A/c	485
	1,400		1,400

The XYZ Company did not perform well and has suffered sizable losses during the last few years. However, it is now felt that the company can be nursed back to health by proper financial restructuring and consequently the following scheme of reconstruction has been devised:

- (i) Equity shares are to be reduced to Rs. 25/- per share, fully paid up;
- (ii) Preference shares are to be reduced (with coupon rate of 10%) to equal number of shares of Rs.50 each, fully paid up.
- (iii) Debenture holders have agreed to forego interest accrued to them. Beside this, they have agreed to accept new debentures carrying a coupon rate of 9%.
- (iv) Trade creditors have agreed to forgo 25 per cent of their existing claim; for the balance sum they have agreed to convert their claims into equity shares of Rs. 25/- each.
- (v) In order to make payment for bank loan and augment the working capital, the company issues 6 lakh equity shares at Rs. 25/- each; the entire sum is required to be paid on application. The existing shareholders have agreed to subscribe to the new issue.
- (vi) While Land and Building is to be revalued at Rs. 250 lakh, Plant & Machinery is to be written down to Rs. 104 lakh. A provision amounting to Rs. 5 lakh is to be made for bad and doubtful debts.

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

You are required to show the impact of financial restructuring/re-construction. Also, prepare the new balance sheet assuming the scheme of re-construction is implemented in letter and spirit.

Answer:

Impact of Financial Restructuring

(i) Benefits to XYZ Ltd.

		₹ in lakhs
(a)	Reduction of liabilities payable	
	Reduction in equity share capital (6 lakh shares x ₹75 per share)	450
	Reduction in preference share capital (2 lakh shares x ₹50 per share)	100
	Waiver of outstanding debenture Interest	26
	Waiver from trade creditors (₹300 lakhs x 0.25)	<u>75</u>
		<u>651</u>
(b)	Revaluation of Assets	
	Appreciation of Land and Building (₹250 lakhs - ₹200 lakhs)	<u>50</u>
		<u>701</u>

(ii) Amount of ₹701 lakhs utilized to write off losses, fictitious assets and over-valued assets.

	₹ in lakhs
Writing off profit and loss account	485
Cost of issue of debentures	5
Preliminary expenses	10
Provision for bad and doubtful debts	5
Revaluation of Plant and Machinery (₹300 lakhs – ₹104 lakhs)	<u>196</u>
	<u>701</u>

Balance sheet of XYZ Ltd as at _____ (after re-construction)

(₹ in lakhs)

Liabilities	Amount	Assets	Amount
21 lakhs equity shares of ₹25/- each	525	Land & Building	250
2 lakhs 10% Preference shares of ₹50/- each	100	Plant & Machinery	104
9% Debentures	200	Furnitures & Fixtures	50
		Inventory	150
		Sundry debtors	70
			<u>-5</u>
		Cash-at-Bank (Balancing figure)*	206
	<u>825</u>		<u>825</u>

*Opening Balance of ₹130/- lakhs + Sale proceeds from issue of new equity shares ₹150/- lakhs – Payment of bank loan of ₹74/- lakhs = ₹206 lakhs.

CHAPTER 13: MERGERS, ACQUISITIONS & CORPORATE RESTRUCTURING

2. Company X is contemplating the purchase of Company Y, Company X has 3,00,000 shares having a market price of Rs. 30 per share, while Company Y has 2,00,000 shares selling at Rs. 20 per share. The EPS are Rs. 4.00 and Rs. 2.25 for Company X and Y respectively. Managements of both companies are discussing two alternative proposals for exchange of shares as indicated below:

- (i) in proportion to the relative earnings per share of two companies.
(ii) 0.5 share of Company X for one share of Company Y (0.5:1).

You are required:

- (i) to calculate the Earnings Per share (EPS) after merger under two alternatives; and
(ii) to show the impact of EPS for the shareholders of two companies under both the alternatives.

Answer:

Working Notes: Calculation of total earnings after merger

Particulars	Company X	Company Y	Total
Outstanding shares	3,00,000	2,00,000	
EPS (₹)	4	2.25	
Total earnings (₹)	12,00,000	4,50,000	16,50,000

- (i) (a) Calculation of EPS when exchange ratio is in proportion to relative EPS of two companies

Company X	3,00,000
Company Y $2,00,000 \times 2.25/4$	1,12,500
Total number of shares after merger	4,12,500

Company X

EPS before merger	= ₹ 4
EPS after merger = ₹ 16,50,000/4,12,500 shares	= ₹ 4

Company Y

EPS before merger	= ₹ 2.25
EPS after merger	
= EPS of Merged Entity after merger x Share Exchange ratio on EPS basis	= ₹ 2.25
$= ₹ 4 \times \frac{2.25}{4}$	

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

(ii) Impact of merger on EPS for shareholders of Company X and Company Y

(a) Impact on Shareholders of Company X

	(₹)
EPS before merger	4.000
EPS after merger	4.125
Increase in EPS	0.125

(b) Impact on Shareholders of Company Y

	(₹)
Equivalent EPS before merger	2.2500
Equivalent EPS after merger	2.0625
Decrease in EPS	0.1875

3. A Ltd. is studying the possible acquisition of B Ltd. by way of merger. The following data are available:

Firm	After-tax earnings	No. of equity shares	Market price per share
A Ltd.	₹ 10,00,000	2,00,000	₹ 75
B Ltd.	₹ 3,00,000	50,000	₹ 60

- (i) If the merger goes through by exchange of equity shares and the exchange ratio is set according to the current market prices, what is the new earnings per share for A Ltd..
- (ii) B Ltd. wants to be sure that its earning per share is not diminished by the merger. What exchange ratio is relevant to achieve the objective?

Answer:

- (i) The current market price is the basis of exchange of equity shares, in the proposed merger, shareholders of B Ltd. will get only 40,000 shares in all or 4 shares of A Ltd. for every 5 shares held by them, i.e.,

$$(50,000 \times 60) / 75 = 40,000$$

The total number of shares in A Ltd. will then be 2,40,000 and, ignoring any synergistic effect, the profit will be Rs. 13,00,000. The new earning per share (EPS) of A Ltd. will be Rs. 5.42, i.e., Rs. 13,00,000/2,40,000.

- (ii) The present earnings per share of B Ltd. is Rs.6/- (Rs. 3,00,000 ÷ 50,000) and that of A Ltd. is Rs.5/-, i.e., Rs. 10,00,000 ÷ 2,00,000. If B Ltd. wants to ensure that, even after merger, the earning per share of its shareholders should remain unaffected, then the exchange ratio will be 6 shares for every 5 shares.

The total number of shares of A Ltd. that will produce Rs. 3,00,000 profit is 60,000, (3,00,000 ÷ 5), to be distributed among, shareholders of B Ltd., giving a ratio of 6 shares in A for 5 shares in B.

CHAPTER 13: MERGERS, ACQUISITIONS & CORPORATE RESTRUCTURING

Proof:

The shareholders of B Ltd. will get in all 60,000 share for 50,000 shares. It means after merger, their earning per share will be Rs. 5/-, i.e. (Rs. 13,00,000 / 2,60,000).

In all they will get Rs.3,00,000, i.e., 60,000 x 5, as before.

4. Simpson Ltd. is considering a merger with Wilson Ltd. The data below are in the hands of both Board of Directors. The issue at hand is how many shares of Simpson should be exchanged for Wilson Ltd. Both boards are considering three possibilities 20,000, 25,000 and 30,000 shares. You are required to construct a table demonstrating the potential impact of each scheme on each set of shareholders:

		Simpson Ltd.	Wilson Ltd.	Combined Post merger Firm 'A'
1.	Current earnings per year	2,00,000	1,00,000	3,50,000
2.	Shares outstanding	50,000	10,000	?
3.	Earnings per share (₹) (1 ÷ 2)	4	10	?
4.	Price per share (₹)	40	100	?
5.	Price-earning ratio [4 ÷ 3]	10	10	10
6.	Value of firm (₹)	20,00,000	10,00,000	35,00,000
7.	Expected Annual growth rate in earnings in foreseeable future	0	0	0

Answer:

The following table demonstrates the potential impact of the three possible schemes, on each set of shareholders:-

Number of Simpson Ltd.'s shares issued to shareholders of Wilson Ltd.	Exchange ratio [(1)/10,000 shares of Wilson Ltd.]	Number of Simpson Ltd.'s shares outstanding after merger [50,000+(1)]	Fraction of Simpson Ltd. (Post merger) owned by Wilson Ltd.'s shareholders [(1)/(3)]	Value of shares owned by Wilson Ltd.'s shareholders [(4)x 35,00,000]	Fraction of Simpson Ltd. (combined Post-merger) owned by Simpson Ltd.'s shareholders [50,000/(3)]	Value of shares owned by Simpson Ltd.'s shareholders [(6) x 35,00,000]
(1)	(2)	(3)	(4)	(5)	(6)	(7)
20,000	2	70,000	2/7	10,00,000	5/7	25,00,000
25,000	2.5	75,000	1/3	11,66,667	2/3	23,33,333
30,000	3	80,000	3/8	13,12,500	5/8	21,87,500

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

5. Explain synergy in the context of Mergers and Acquisitions

Answer:**Synergistic operating economics:** Synergy May be defined as follows:

$$V(AB) > V(A) + V(B).$$

In other words the combined value of two firms or companies shall be more than their individual value. Synergy is the increase in performance of the combined firm over what the two firms are already expected or required to accomplish as independent firms (Mark L Sirower of Boston Consulting Group, in his book "The Synergy Trap"). This may be result of complimentary services economics of scale or both.

A good example of complimentary activities can a company may have a good networking of branches and other company may have efficient production system. Thus the merged companies will be more efficient than individual companies.

On similar lines, economies of large scale is also one of the reasons for synergy benefits. The main reason is that, the large scale production results in lower average cost of production e.g. reduction in overhead costs on account of sharing of central services such as accounting and finances, office executives, top level management, legal, sales promotion and advertisement etc.

These economies can be "real" arising out of reduction in factor input per unit of output, whereas pecuniary economics are realized from paying lower prices for factor inputs for bulk transactions.

6. What is take over by reverse bid or Reverse Merger.

Answer:

In ordinary case, the company taken over is the smaller company; in a 'reverse takeover', a smaller company gains control of a larger one. The concept of takeover by reverse bid, or of reverse merger, is thus not the usual case of amalgamation of a sick unit which is non-viable with a healthy or prosperous unit but is a case whereby the entire undertaking of the healthy and prosperous company is to be merged and vested in the sick company which is non-viable. A company becomes a sick industrial company when there is erosion in its net worth. This alternative is also known as taking over by reverse bid.

The three tests should be fulfilled before an arrangement can be termed as a reverse takeover is specified as follows:

- (i) the assets of the transferor company are greater than the transferee company,
- (ii) equity capital to be issued by the transferee company pursuant to the acquisition exceeds its original issued capital, and
- (iii) the change of control in the transferee company through the introduction of a minority holder or group of holders.

CHAPTER 13: MERGERS, ACQUISITIONS & CORPORATE RESTRUCTURING

This type of merger is also known as 'back door listing'. This kind of merger has been started as an alternative to go for public issue without incurring huge expenses and passing through cumbersome process. Thus, it can be said that reverse merger leads to the following benefits for acquiring company:

- Easy access to capital market.
- Increase in visibility of the company in corporate world.
- Tax benefits on carry forward losses acquired (public) company.
- Cheaper and easier route to become a public company.

7. What is an equity carve out? How does it differ from a spin off.

Answer:

This is like spin off, however, some shares of the new company are sold in the market by making a public offer, so this brings cash. More and more companies are using equity carve-outs to boost shareholder value. A parent firm makes a subsidiary public through an initial public offering (IPO) of shares, amounting to a partial sell-off. A new publicly-listed company is created, but the parent keeps a controlling stake in the newly traded subsidiary.

A carve-out is a strategic avenue a parent firm may take when one of its subsidiaries is growing faster and carrying higher valuations than other businesses owned by the parent. A carve-out generates cash because shares in the subsidiary are sold to the public, but the issue also unlocks the value of the subsidiary unit and enhances the parent's shareholder value.

The new legal entity of a carve-out has a separate board, but in most carve-outs, the parent retains some control over it. In these cases, some portion of the parent firm's board of directors may be shared. Since the parent has a controlling stake, meaning that both firms have common shareholders, the connection between the two is likely to be strong. That said, sometimes companies carve-out a subsidiary not because it is doing well, but because it is a burden. Such an intention won't lead to a successful result, especially if a carved-out subsidiary is too loaded with debt or trouble, even when it was a part of the parent and lacks an established track record for growing revenues and profits.

8. Write a short note on Horizontal Merger and Vertical Merger

Answer:

A merger is generally understood to be a fusion of two companies. The term "merger" means and signifies the dissolution of one or more companies or firms or proprietorships to form or get absorbed into another company. By concept, merger increases the size of the undertakings.

- (i) **Horizontal Merger:** The two companies which have merged are in the same industry, normally the market share of the new consolidated company would be larger and it is possible that it may move closer to being a monopoly or a near monopoly to avoid competition.
- (ii) **Vertical Merger:** This merger happens when two companies that have 'buyer-seller' relationship (or potential buyer-seller relationship) come together.

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

9. B Ltd. is a highly successful company and wishes to expand by acquiring other firms. Its expected high growth in earnings and dividends is reflected in its PE ratio of 17. The Board of Directors of B Ltd. has been advised that if it were to take over firms with a lower PE ratio than it own, using a share-for-share exchange, then it could increase its reported earnings per share. C Ltd. has been suggested as a possible target for a takeover, which has a PE ratio of 10 and 1,00,000 shares in issue with a share price of Rs. 15. B Ltd. has 5,00,000 shares in issue with a share price of Rs. 12.

Calculate the change in earnings per share of B Ltd. if it acquires the whole of C Ltd. by issuing shares at its market price of Rs.12. Assume the price of B Ltd. shares remains constant.

Answer:

Total market value of C Ltd is = 1,00,000 x Rs. 15 = Rs. 15,00,000
 PE ratio (given) = 10
 Therefore, earnings = Rs. 15,00,000 / 10
 = Rs. 1,50,000

Total market value of B Ltd. is = 5,00,000 x Rs. 12 = Rs. 60,00,000
 PE ratio (given) = 17
 Therefore, earnings = Rs. 60,00,000 / 17
 = Rs. 3,52,941

The number of shares to be issued by B Ltd.

Rs. 15,00,000 ÷ 12 = 1,25,000
 Total number of shares of B Ltd = 5,00,000 + 1,25,000
 = 6,25,000
 The EPS of the new firm is = (Rs. 3,52,941 + Rs. 1,50,000) / 6,25,000 = Rs. 0.80
 The present EPS of B Ltd is = Rs. 3,52,941 / 5,00,000
 = Rs. 0.71

So the EPS of B will increase from Rs. 0.71 to Rs. 0.80 as a result of merger

10. Elrond Limited plans to acquire Doom Limited. The relevant financial details of the two firms prior to the merger announcement are:

	Elrond Limited	Doom Limited
Market price per share	₹ 50	₹ 25
Number of outstanding shares	20 lakhs	10 Lakhs

The merger is expected to generate gains, which have a present value of Rs.200 lakhs. The exchange ratio agreed to is 0.5.

**CHAPTER 13:
MERGERS, ACQUISITIONS & CORPORATE RESTRUCTURING**

What is the true cost of the merger from the point of view of Elrond Limited?

Answer:

Shareholders of Doom Ltd. will get 5 lakh share of Elrond Limited, so they will get:

$$= 5 \text{ Lakh} / (20 \text{ Lakh} + 5 \text{ Lakh}) = 20\% \text{ of shares Elrond Limited}$$

The value of Elrond Ltd. after merger will be:

$$= \text{Rs. } 50 \times 20 \text{ lakh} + \text{Rs. } 25 \times 10 \text{ lakh} + \text{Rs. } 200 \text{ lakh}$$

$$= \text{Rs. } 1000 \text{ lakh} + \text{Rs. } 250 \text{ lakh} + \text{Rs. } 200 \text{ lakh} = \text{Rs. } 1450 \text{ lakh}$$

True Cost of Merger will be:

$$(\text{Rs. } 1450 \times 20\%) \text{ Rs. } 290 \text{ lakhs} - \text{Rs. } 250 \text{ lakhs} = \text{Rs. } 40 \text{ lakhs}$$

11. A Ltd. wants to acquire T Ltd. and has offered a swap ratio of 1:2 (0.5 shares for every one share of T Ltd.). Following information is provided:

	A Ltd.	T. Ltd.
Profit after tax	₹18,00,000	₹3,60,000
Equity shares outstanding (Nos.)	6,00,000	1,80,000
EPS	₹3	₹2
PE Ratio	10 times	7 times
Market price per share	₹30	₹14

Required:

- The number of equity shares to be issued by A Ltd. for acquisition of T Ltd.
- What is the EPS of A Ltd. after the acquisition?
- Determine the equivalent earnings per share of T Ltd.
- What is the expected market price per share of A Ltd. after the acquisition, assuming its PE multiple remains unchanged?
- Determine the market value of the merged firm.

Answer:

- (i) The number of shares to be issued by A Ltd.:**

The Exchange ratio is 0.5

$$\text{So, new Shares} = 1,80,000 \times 0.5 = 90,000 \text{ shares.}$$

- (ii) EPS of A Ltd. After a acquisition:**

Total Earnings (Rs. 18,00,000 + Rs. 3,60,000)

Rs. 21,60,000

No. of Shares (6,00,000 + 90,000)

6,90,000

EPS (Rs. 21,60,000)/6,90,000)

Rs. 3.13

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

(iii) Equivalent EPS of T Ltd.:

No. of new Shares	0.5
EPS	Rs. 3.13
Equivalent EPS (Rs. 3.13 x 0.5)	Rs. 1.57

(iv) New Market Price of A Ltd. (P/E remaining unchanged):

Present P/E Ratio of A Ltd.	10 times
Expected EPS after merger	Rs. 3.13
Expected Market Price (Rs. 3.13 x 10)	Rs. 31.30

(v) Market Value of merged firm:

Total number of Shares	6,90,000
Expected Market Price	Rs. 31.30
Total value (6,90,000 x 31.30)	Rs. 2,15,97,000

12. XYZ Ltd., is considering merger with ABC Ltd. XYZ Ltd.'s shares are currently traded at Rs. 20. It has 2,50,000 shares outstanding and its earnings after taxes (EAT) amount to Rs. 5,00,000. ABC Ltd., has 1,25,000 shares outstanding; its current market price is Rs. 10 and its EAT are Rs. 1,25,000. The merger will be effected by means of a stock swap (exchange). ABC Ltd., has agreed to a plan under which XYZ Ltd., will offer the current market value of ABC Ltd.'s shares:

- What is the pre-merger earnings per share (EPS) and P/E ratios of both the companies?
- If ABC Ltd.'s P/E ratio is 6.4, what is its current market price? What is the exchange ratio? What will XYZ Ltd.'s post-merger EPS be?
- What should be the exchange ratio; if XYZ Ltd.'s pre-merger and post-merger EPS are to be the same?

Answer:

- Pre-merger EPS and P/E ratios of XYZ Ltd. and ABC Ltd.

Particulars	XYZ Ltd.	ABC Ltd.
Earnings after taxes	5,00,000	1,25,000
Number of shares outstanding	2,50,000	1,25,000
EPS	2	1
Market Price per share	20	10
P/E Ratio (times)	10	10

- Current Market Price of ABC Ltd. if P/E ratio is 6.4 = ₹ 1 × 6.4 = ₹ 6.40

$$\text{Exchange ratio} = \frac{\text{₹ } 20}{\text{₹ } 6.40} = 3.125 \text{ or } \frac{\text{₹ } 6.40}{\text{₹ } 20} = 0.32$$

CHAPTER 13: MERGERS, ACQUISITIONS & CORPORATE RESTRUCTURING

Post merger EPS of XYZ Ltd.

$$= \frac{₹ 5,00,000 + ₹ 1,25,000}{2,50,000 + (1,25,000/3.125)}$$

$$= \frac{₹ 6,25,000}{2,90,000} = 2.16$$

(iii) **Desired Exchange Ratio**

Total number of shares in post-merged company

$$= \frac{\text{Post-merger earnings}}{\text{Pre-merger EPS of XYZ Ltd}} = \frac{₹ 6,25,000}{2} = 3,12,500$$

Number of shares required to be issued

$$= 3,12,500 - 2,50,000 = 62,500$$

Therefore, the exchange ratio is

$$62,500 : 1,25,000$$

$$= \frac{62,500}{1,25,000} = 0.50$$

13. Company X is contemplating the purchase of Company Y. Company X has 3,00,000 shares having a market price of Rs. 30 per share, while Company Y has 2,00,000 shares selling at Rs. 20 per share. The EPS are Rs. 4.00 and Rs. 2.25 for Company X and Y respectively. Managements of both companies are discussing two alternative proposals for exchange of shares as indicated below:

- (i) In proportion to the relative earnings per share of two companies.
- (ii) 0.5 share of Company X for one share of Company Y (0.5 : 1).

You are required:

- (i) To calculate the Earnings Per Share (EPS) after merger under two alternatives; and
- (ii) To show the impact on EPS for the shareholders of two companies under both the alternatives.

Answer:

(i) **Exchange ratio in proportion to relative EPS** (in ₹)

Company	Existing No. of shares	EPS	Total earnings
X	3,00,000	4.00	12,00,000
Y	2,00,000	2.25	<u>4,50,000</u>
		Total earnings	<u>16,50,000</u>

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No. of shares after merger $3,00,000 + 1,12,500 = 4,12,500$

Note: 1,12,500 may be calculated as $= \left(2,00,000 \times \frac{2.25}{4.00} \right)$

EPS for Co. X after merger $= \frac{16,50,000}{4,12,500} = ₹ 4.00$

Impact on EPS

Equivalent EPS of Co. Y

Before merger ₹ 2.25

After merger (EPS before merger X Share exchange ratio on EPS basis)

₹ 4.00 X 0.5625 = ₹ 2.25

(ii) Merger effect on EPS with share exchange ratio of 0.5 : 1

Total earnings after merger ₹ 16,50,000

No. of shares post merger $(3,00,000 + 1,00,000 (0.5 \times 2,00,000))$ 4,00,000

EPS $16,50,000 \div 4,00,000$ 4.125

Impact on EPS

Co. X' shareholders ₹

EPS before merger 4.00

EPS after merger i.e. $(16,50,000 \div 4,00,000)$ 4.125

Increase in EPS 0.125

Co. Y' Shareholders

EPS before merger 2.2500

Equivalent EPS after the merger 4.125×0.5 2.0625

Decrease in EPS 0.1875

14. M Co. Ltd. is studying the possible acquisition of N Co. Ltd., by way of merger. The following data are available in respect of the companies:

Particulars	M Co. Ltd.	N Co. Ltd.
Earnings after tax (₹)	80,00,000	24,00,000
No. of equity shares	16,00,000	4,00,000
Market value per share (₹)	200	160

(i) If the merger goes through by exchange of equity and the exchange ratio is based on the current market price, what is the new earning per share for M Co. Ltd.?

(ii) N Co. Ltd. wants to be sure that the earnings available to its shareholders will not be diminished by the merger. What should be the exchange ratio in that case?

Answer:

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- (i) Calculation of new EPS of M Co. Ltd.

No. of equity shares to be issued by M Co. Ltd. to N Co. Ltd.

$$= 4,00,000 \text{ shares} \times \frac{\text{₹ } 160}{\text{₹ } 200} = 3,20,000 \text{ shares}$$

Total no. of shares in M Co. Ltd. after acquisition of N Co. Ltd.

$$= 16,00,000 + 3,20,000 = 19,20,000$$

Total earnings after tax [after acquisition]

$$= 80,00,000 + 24,00,000 = 1,04,00,000$$

$$\text{EPS} = \frac{\text{₹ } 1,04,00,000}{19,20,000 \text{ equity shares}} = \text{₹ } 5.42$$

- (ii) Calculation of exchange ratio which would not diminish the EPS of N Co. Ltd. after its merger with M Co. Ltd.

Current EPS:

$$\text{M Co. Ltd.} = \frac{\text{₹ } 80,00,000}{16,00,000 \text{ equity shares}} = \text{₹ } 5$$

$$\text{N Co. Ltd.} = \frac{\text{₹ } 24,00,000}{4,00,000 \text{ equity shares}} = \text{₹ } 6$$

$$\text{Exchange ratio} = 6/5 = 1.20$$

No. of new shares to be issued by M Co. Ltd. to N Co. Ltd.

$$= 4,00,000 \times 1.20 = 4,80,000 \text{ shares}$$

Total number of shares of M Co. Ltd. after acquisition

$$= 16,00,000 + 4,80,000 = 20,80,000 \text{ shares}$$

$$\text{EPS [after merger]} = \frac{\text{₹ } 1,04,00,000}{20,80,000 \text{ shares}} = \text{₹ } 5$$

Total earnings in M Co. Ltd. available to new shareholders of N Co. Ltd.

$$= 4,80,000 \times \text{₹ } 5 = \text{₹ } 24,00,000$$

Recommendation: The exchange ratio (6 for 5) based on market shares is beneficial to shareholders of 'N' Co. Ltd.

15. Simple Ltd. and Dimple Ltd. are planning to merge. The total value of the companies are dependent on the fluctuating business conditions. The following information is given for the total value (debt + equity) structure of each of the two companies.

Business Condition	Probability	Simple Ltd. ₹ Lacs	Dimple Ltd. ₹ Lacs
High Growth	0.20	820	1050
Medium Growth	0.60	550	825
Slow Growth	0.20	410	590

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The current debt of Dimple Ltd. is Rs. 65 lacs and of Simple Ltd. is Rs. 460 lacs.

Calculate the expected value of debt and equity separately for the merged entity.

Answer:

Compute Value of Equity

Simple Ltd.

₹ in Lacs

	High Growth	Medium Growth	Slow Growth
Debit + Equity	820	550	410
Less: Debt	460	460	460
Equity	360	90	-50

Since the Company has limited liability the value of equity cannot be negative therefore the value of equity under slow growth will be taken as zero because of insolvency risk and the value of debt is taken at 410 lacs. The expected value of debt and equity can then be calculated as:

Simple Ltd.

₹ in Lacs

	High Growth		Medium Growth		Slow Growth		Expected Value
	Prob.	Value	Prob.	Value	Prob.	Value	
Debt	0.20	460	0.60	460	0.20	410	450
Equity	0.20	360	0.60	90	0.20	0	126
		820		550		410	576

Dimple Ltd.

₹ in Lacs

	High Growth		Medium Growth		Slow Growth		Expected Value
	Prob.	Value	Prob.	Value	Prob.	Value	
Equity	0.20	985	0.60	760	0.20	525	758
Debt	0.20	65	0.60	65	0.20	65	65
		1050		825		590	823

Expected Values

₹ in Lacs

Equity		Debt	
Simple Ltd.	126	Simple Ltd.	450
Dimple Ltd.	758	Dimple Ltd.	65
	884		515

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16. Yes Ltd. wants to acquire No Ltd. and the cash flows of Yes Ltd. and the merged entity are given below:

	(₹ In lakhs)				
Year	1	2	3	4	5
Yes Ltd.	175	200	320	340	350
Merged Entity	400	450	525	590	620

Earnings would have witnessed 5% constant growth rate without merger and 6% with merger on account of economies of operations after 5 years in each case. The cost of capital is 15%.

The number of shares outstanding in both the companies before the merger is the same and the companies agree to an exchange ratio of 0.5 shares of Yes Ltd. for each share of No Ltd.

PV factor at 15% for years 1-5 are 0.870, 0.756; 0.658, 0.572, 0.497 respectively.

You are required to:

- (i) Compute the Value of Yes Ltd. before and after merger.
- (ii) Value of Acquisition and
- (iii) Gain to shareholders of Yes Ltd.

[ALSO ASKED IN RTP → NOV 2018]

Answer:

- (i) **Working Notes:**

Present Value of Cash Flows (CF) upto 5 years

Year End	CF of Yes Ltd. (₹ lakhs)	PVF @15%	PV of CF (₹ lakhs)	CF of Merged Entity (₹ lakhs)	PV of CF of Merged Entity (₹ lakhs)
1	175	0.870	152.25	400	348.00
2	200	0.756	151.20	450	340.20
3	320	0.658	210.56	525	345.45
4	340	0.572	194.48	590	337.48
5	350	0.497	<u>173.95</u>	620	<u>308.14</u>
			<u>882.44</u>		<u>1679.27</u>

PV of Cash Flows of Yes Ltd. after the forecast period

$$TV_5 = \frac{CF_5(1+g)}{K_e - g} = \frac{350(1+0.05)}{0.15 - 0.05} = \frac{367.50}{0.10} = ₹3675 \text{ lakhs}$$

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PV of $TV_5 = ₹3675 \text{ lakhs} \times 0.497 = ₹1826.475 \text{ lakhs}$

PV of Cash Flows of Merged Entity after the forecast period

$$TV_5 = \frac{CF_5(1+g)}{K_e - g} = \frac{620(1+0.06)}{0.15 - 0.06} = \frac{657.20}{0.09} = ₹7302.22 \text{ lakhs}$$

PV of $TV_5 = ₹7302.22 \text{ lakhs} \times 0.497 = ₹3629.20 \text{ lakhs}$

Value of Yes Ltd.

	Before merger (₹lakhs)	After merger (₹lakhs)
PV of CF (1-5 years)	882.440	1679.27
Add: PV of TV_5	<u>1826.475</u>	<u>3629.20</u>
	<u>2708.915</u>	<u>5308.47</u>

(ii) Value of Acquisition

= Value of Merged Entity – Value of Yes Ltd.

= ₹5308.47 lakhs – ₹2708.915 lakhs = ₹2599.555 lakhs

(iii) Gain to Shareholders of Yes Ltd.

Share of Yes Ltd. in merged entity = ₹5308.47 lakhs $\times \frac{1}{1.5} = ₹3538.98 \text{ lakhs}$

Gain to shareholder = Share of Yes Ltd. in merged entity – Value of Yes Ltd. before merger

= ₹3538.98 lakhs - ₹2708.915 = ₹830.065 lakhs

17. The following information is provided relating to the acquiring company Efficient Ltd. and the target Company Healthy Ltd.

	Efficient Ltd.	Healthy Ltd.
No. of shares (F.V. ₹ 10 each)	10.00 lakhs	7.5 lakhs
Market capitalization	500.00 lakhs	750.00 lakhs
P/E ratio (times)	10.00	5.00
Reserves and Surplus	300.00 lakhs	165.00 lakhs
Promoter's Holding (No. of shares)	4.75 lakhs	5.00 lakhs

Board of Directors of both the Companies have decided to give a fair deal to the shareholders and accordingly for swap ratio the weights are decided as 40%, 25% and 35% respectively for Earning, Book Value and Market Price of share of each company:

- Calculate the swap ratio and also calculate Promoter's holding % after acquisition.
- What is the EPS of Efficient Ltd. after acquisition of Healthy Ltd.?
- What is the expected market price per share and market capitalization of Efficient Ltd. after acquisition, assuming P/E ratio of Firm Efficient Ltd. remains unchanged.
- Calculate free float market capitalization of the merged firm

Answer:

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Swap Ratio

	Efficient Ltd.	Healthy Ltd.
Market capitalization	500 lakhs	750 lakhs
No. of shares	10 lakhs	7.5 lakhs
Market Price per share	₹ 50	₹ 100
P/E ratio	10	5
EPS	₹ 5	₹ 20
Profit	₹ 50 lakh	₹ 150 lakh
Share capital	₹ 100 lakh	₹ 75 lakh
Reserves and surplus	₹ 300 lakh	₹ 165 lakh
Total	₹ 400 lakh	₹ 240 lakh
Book Value per share	₹ 40	₹ 32

(i) Calculation of Swap Ratio

EPS	1 : 4 i.e.	$4.0 \times 40\%$	1.6
Book value	1 : 0.8 i.e.	$0.8 \times 25\%$	0.2
Market price	1 : 2 i.e.	$2.0 \times 35\%$	<u>0.7</u>
		Total	<u>2.5</u>

Swap ratio is for every one share of Healthy Ltd., to issue 2.5 shares of Efficient Ltd. Hence, total no. of shares to be issued $7.5 \text{ lakh} \times 2.5 = 18.75 \text{ lakh shares}$.

Promoter's holding = $4.75 \text{ lakh shares} + (5 \times 2.5 = 12.5 \text{ lakh shares}) = 17.25 \text{ lakh}$
i.e. Promoter's holding % is $(17.25 \text{ lakh} / 28.75 \text{ lakh}) \times 100 = 60\%$.

Calculation of EPS, Market price, Market capitalization and free float market capitalization.

- (ii) Total No. of shares $10 \text{ lakh} + 18.75 \text{ lakh} = 28.75 \text{ lakh}$
Total capital $100 \text{ lakh} + 187.5 \text{ lakh} = ₹ 287.5 \text{ lakh}$

$$\text{EPS} = \frac{\text{Total profit}}{\text{No. of shares}} = \frac{50 \text{ lakh} + 150 \text{ lakh}}{28.75 \text{ lakh}} = \frac{200}{28.75} = ₹ 6.956$$

- (iii) Expected market price $\text{EPS } 6.956 \times \text{P/E } 10 = ₹ 69.56$
Market capitalization $= ₹ 69.56 \text{ per share} \times 28.75 \text{ lakh shares}$
 $= ₹ 1,999.85 \text{ lakh}$

- (iv) Free float of market capitalization $= ₹ 69.56 \text{ per share} \times (28.75 \text{ lakh} \times 40\%)$
 $= ₹ 799.94 \text{ lakh}$

18. T Ltd. and E Ltd. are in the same industry. The former is in negotiation for acquisition of the latter. Important information about the two companies as per their latest financial statements is given below:

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	T Ltd.	E Ltd.
₹ 10 Equity shares outstanding	12 Lakhs	6 Lakhs
Debt:		
10% Debentures (₹ Lakhs)	580	--
12.5% Institutional Loan (₹ Lakhs)	--	240
Earning before interest, depreciation and tax (EBIDAT) (₹ Lakhs)	400.86	115.71
Market Price/share (₹)	220.00	110.00

T Ltd. plans to offer a price for E Ltd., business as a whole which will be 7 times EBIDAT reduced by outstanding debt, to be discharged by own shares at market price.

E Ltd. is planning to seek one share in T Ltd. for every 2 shares in E Ltd. based on the market price. Tax rate for the two companies may be assumed as 30%.

Calculate and show the following under both alternatives - T Ltd.'s offer and E Ltd.'s plan:

- Net consideration payable.
- No. of shares to be issued by T Ltd.
- EPS of T Ltd. after acquisition.
- Expected market price per share of T Ltd. after acquisition.
- State briefly the advantages to T Ltd. from the acquisition.

Calculations (except EPS) may be rounded off to 2 decimals in lakhs.

[ASKED IN NOV 2018 → 12 MKS | MTP OCTOBER 2018 → 8 MKS | RTP → MAY 2018]

Answer:

As per T Ltd.'s Offer

	₹ in lakhs
(i) Net Consideration Payable	
7 times EBIDAT, i.e. 7 x ₹ 115.71 lakh	809.97
Less: Debt	<u>240.00</u>
	<u>569.97</u>
(ii) No. of shares to be issued by T Ltd	
₹ 569.97 lakh/₹ 220 (rounded off) (Nos.)	2,59,000
(iii) EPS of T Ltd after acquisition	
Total EBIDT (₹ 400.86 lakh + ₹ 115.71 lakh)	516.57
Less: Interest (₹ 58 lakh + ₹ 30 lakh)	<u>88.00</u>
	428.57
Less: 30% Tax	<u>128.57</u>
Total earnings (NPAT)	<u>300.00</u>
Total no. of shares outstanding (12 lakh + 2.59 lakh)	14.59 lakh

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EPS (₹ 300 lakh/ 14.59 lakh)	₹ 20.56
(iv) Expected Market Price:	

	₹ in lakhs
Pre-acquisition P/E multiple:	
EBIDAT	400.86
Less: Interest $(580 \times \frac{10}{100})$	<u>58.00</u>
	342.86
Less: 30% Tax	<u>102.86</u>
	<u>240.00</u>
No. of shares (lakhs)	12.00
EPS	₹ 20.00
Hence, PE multiple $\frac{220}{20}$	11
Expected market price after acquisition (₹ 20.56 x 11)	₹ 226.16

As per E Ltd's Plan

	₹ in lakhs
(i) Net consideration payable 6 lakhs shares x ₹ 110	660
(ii) No. of shares to be issued by T Ltd ₹ 660 lakhs ÷ ₹ 220	3 lakh
(iii) EPS of T Ltd after Acquisition NPAT (as per earlier calculations)	300.00
Total no. of shares outstanding (12 lakhs + 3 lakhs)	15 lakh
Earning Per Share (EPS) ₹ 300 lakh/15 lakh	₹ 20.00
(iv) Expected Market Price (₹ 20 x 11)	220.00

(v) Advantages of Acquisition to T Ltd

Since the two companies are in the same industry, the following advantages could accrue:

- Synergy, cost reduction and operating efficiency.
- Better market share.
- Avoidance of competition

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

PAST EXAMINATION, MTP & RTP QUESTIONS

19. Tatu Ltd. wants to takeover Mantu Ltd. and has offered a swap ratio of 1:2 (0.5 shares for everyone share of Mantu Ltd.). Following information is provided

	Tatu Ltd.	Mantu Ltd.
Profit after tax	₹ 24,00,000	₹ 4,80,000
Equity shares outstanding (Nos.)	8,00,000	2,40,000
EPS	₹ 3	₹ 2
PE Ratio	10 times	7 times
Market price per share	₹ 30	₹ 14

You are required to calculate:

- The number of equity shares to be issued by Tatu Ltd. for acquisition of Mantu Ltd.
- What is the EPS of Tatu Ltd. after the acquisition?
- Determine the equivalent earnings per share of Mantu Ltd.
- What is the expected market price per share of Tatu Ltd. after the acquisition, assuming its PE multiple remains unchanged?
- Determine the market value of the merged firm.

[MAY 2018 → 8 MARKS]

Answer:

- The number of shares to be issued by Tatu Ltd.:**
The Exchange ratio is 0.5
So, new Shares = 2,40,000 x 0.5 = 1,20,000 shares.
- EPS of Tatu Ltd. after acquisition:**

Total Earnings (Rs. 24,00,000 + Rs. 4,80,000)	Rs. 28,80,000
No. of Shares (8,00,000 + 1,20,000)	9,20,000
EPS (Rs. 28,80,000) / 9,20,000	Rs. 3.13
- Equivalent EPS of Mantu Ltd.:**

No. of new Shares	0.5
EPS	Rs. 3.13
Equivalent EPS (Rs. 3.13 x 0.5)	Rs. 1.57
- New Market Price of Tatu Ltd. (P/E remaining unchanged)**

Present P/E Ratio of A Ltd.	10 times
Expected EPS after merger	Rs. 3.13

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Expected Market Price (Rs. 3.13 x 10)

Rs. 31.30

(v) Market Value of merged firm:

Total number of Shares

9,20,000

Expected Market Price

Rs. 31.30

Total value (9,20,000 x 31.30)

Rs. 2,87,96,000

20. Given is the following information:

The shares of Day Ltd. and Night Ltd. trade at 20 and 15 times their respective P/E ratios.

Day Ltd. considers taking over Night Ltd. By paying Rs. 55 crores considering that the market price of Night Ltd. reflects its true value. It is considering both the following options:

- I. Takeover is funded entirely in cash.
- II. Takeover is funded entirely in stock.

You are required to calculate the cost of the takeover and advise Day Ltd. on the best alternative.

[MAY 2019 → 8 MARKS]

Answer:

Working Notes:

	Day Ltd.	Night Ltd.
Net Earnings	₹ 5 crores	₹ 3.5 crores
No. of Equity Shares	10,00,000	7,00,000
EPS	50	50
P/E	20 times	15 times
MPS	₹ 1000	₹ 750
Market Value	1,00,00,00,000	52,50,00,000

(i) If takeover is funded by Cash

Since Market Price of Night Ltd. reflects its full value, cost of takeover to Day Ltd is 55 crore – 52.50 crore = Rs. 2.5 crore.

(ii) If the takeover is funded by stock

Number of shares to be issued to Night Ltd.
= Rs. 55 Crore/ Rs. 1000 = 550000 Lakhs

Market Value of Merged Firm

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$$= \text{Rs. } 1,00,00,00,000 + \text{Rs. } 52,50,00,000$$

$$= \text{Rs. } 1,52,50,00,000 \text{ i.e. Rs. } 152.50 \text{ Crore}$$

Proportion that Night Ltd.'s shareholders get in Day Ltd.'s Capital Structure will be:
 $= 5.5 \text{ Lakhs} / (5.5 \text{ Lakhs} + 10 \text{ Lakhs}) = 0.3548$

$$\text{True Cost of Merger} = \text{Rs. } 152.50 \text{ Crore} \times 0.3548 - \text{Rs. } 55 \text{ Crore}$$

$$= - \text{Rs. } 0.893 \text{ Crore}$$

Since true cost is negative in case of funding from stock, Day Ltd. would better off by funding the takeover by stock.

21. Reliable Industries Ltd. (RIL) is considering a takeover of Sunflower Industries Ltd. (SIL). The particulars of 2 companies are given below:

Particulars	Reliable Industries Ltd	Sunflower Industries Ltd.
Earnings After Tax (EAT)	₹ 20,00,000	₹ 10,00,000
Equity shares O/s	10,00,000	10,00,000
Earnings per share (EPS)	2	1
PE Ratio (Times)	10	5

- Calculate the market value of each Company before merger. (3 Marks)
- Calculate the market value of the Post-merger RIL assuming that the management of the shareholders of SIL will accept an offer of one share of RIL for four shares of SIL and there are no synergic effects. Also, calculate the new price per share. (4 Marks)
- Evaluate whether the shareholders of RIL better or worse off than they were before the merger. (1 Mark)
- Calculate the new post-merger EPS and Price per share if the management of RIL estimates that the earnings will increase by 20% due to synergic effects. (3 Marks)
- Evaluate whether the shareholders are better off or worse off than before the merger. (1 Mark)

[MTP → MARCH 2018 | RTP → MAY 2019]

Answer:

- (i) Market value of Companies before Merger

Particulars	RIL	SIL
EPS	₹ 2	Re.1
P/E Ratio	10	5
Market Price Per Share	₹ 20	₹ 5
Equity Shares	10,00,000	10,00,000
Total Market Value	2,00,00,000	50,00,000

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(ii) Post Merger Effects on RIL

	₹
Post merger earnings	30,00,000
Exchange Ratio	1:4
No. of equity shares o/s (10,00,000 + 2,50,000)	12,50,000
EPS: 30,00,000/12,50,000	2.4
PE Ratio	10
Market Value 10 x 2.4	24
Total Value (12,50,000 x 24)	3,00,00,000
Gains From Merger:	₹
Post-Merger Market Value of the Firm	3,00,00,000
Less: Pre-Merger Market Value	
RIL 2,00,00,000	
SIL <u>50,00,000</u>	<u>2,50,00,000</u>
Total gains from Merger	<u>50,00,000</u>

Apportionment of Gains between the Shareholders:

Particulars	RIL (₹)	SIL (₹)
Post Merger Market Value:		
10,00,000 x 24	2,40,00,000	--
2,50,000 x 24	-	60,00,000
Less: Pre-Merger Market Value	2,00,00,000	50,00,000
Gains from Merger:	40,00,000	10,00,000

Thus, the shareholders of both the companies (RIL + SIL) are better off than before

(iii) Post-Merger Earnings:

Increase in Earnings by 20%

New Earnings: ₹ 30,00,000 x (1+0.20) ₹ 36,00,000

No. of equity shares outstanding: 12,50,000

EPS (₹ 36,00,000/12,50,000) ₹ 2.88

PE Ratio 10

Market Price Per Share: = ₹2.88 x 10 ₹ 28.80

∴ Shareholders will be better-off than before the merger situation.

22. BA Ltd. and DA Ltd. both the companies operate in the same industry. Both companies are in the process of negotiating a merger through exchange of equity shares. The Financial statements of both the companies for the current financial year are as follows:

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Balance Sheet

Particulars	BA Ltd. (Rs.)	DA Ltd. (Rs.)
Current Assets	14,00,000	10,00,000
Fixed Assets (Net)	<u>10,00,000</u>	<u>5,00,000</u>
Total (Rs.)	<u>24,00,000</u>	<u>15,00,000</u>
Equity capital (Rs.10 each)	10,00,000	8,00,000
Retained earnings	2,00,000	--
14% long-term debt	5,00,000	3,00,000
Current liabilities	<u>7,00,000</u>	<u>4,00,000</u>
Total (Rs.)	<u>24,00,000</u>	<u>15,00,000</u>

Income Statement

	BA Ltd. (Rs.)	DA Ltd. (Rs.)
Net Sales	34,50,000	17,00,000
Cost of Goods sold	<u>27,60,000</u>	<u>13,60,000</u>
Gross profit	6,90,000	3,40,000
Operating expenses	2,00,000	1,00,000
Interest	<u>70,000</u>	<u>42,000</u>
Earnings before taxes	4,20,000	1,98,000
Taxes @ 50%	<u>2,10,000</u>	<u>99,000</u>
Earnings after taxes (EAT)	<u>2,10,000</u>	<u>99,000</u>
Additional Information :		
No. of Equity shares	1,00,000	80,000
Dividend payment ratio (D/P)	40%	60%
Market price per share	Rs.40	Rs.15

- (i) Calculate the EPS, P/E Ratio, ROE and Book value/ Intrinsic Value Per Share of both companies. (6 Marks)
- (ii) Calculate future EPS growth rates for each company. (2 Marks)
- (iii) Evaluate the justifiable equity share exchange ratios that can be offered by BA Ltd. to the shareholders of DA Ltd. (2 Mark)
- (iv) Calculate the post-merger EPS based on an exchange ratio of 0.4: 1 being offered by BA Ltd. and indicate the immediate EPS accretion or dilution, if any, that will occur for each group of shareholders. (2 Marks)

[MTP → APRIL 2018]

Answer:

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Market price per share (MPS) = EPS X P/E ratio or P/E ratio = MPS/EPS

(i) Calculation of EPS, P/E ratio, ROE and BVPS of BA Ltd. and DA Ltd.

		BA Ltd.	DA Ltd.
Earnings After Tax	(EAT)	Rs. 2,10,000	Rs. 99,000
No. of Shares	(N)	100000	80000
EPS	(EAT/N)	Rs. 2.10	Rs. 1.2375
Market price per share	(MPS)	40	15
P/E Ratio	(MPS/EPS)	19.05	12.12
Equity Funds	(EF)	Rs. 12,00,000	Rs. 8,00,000
BVPS	(EF/N)	12	10
ROE	(EAT/EF) × 100	17.50%	12.37%

(ii) Calculation of growth rates in EPS for BA Ltd. and DA Ltd.

Retention Ratio	(1-D/P ratio)	0.6	0.4
Growth Rate	(ROE × Retention Ratio)	10.50%	4.95%

(iii) Evaluation of justifiable equity shares exchange ratio

- (a) Intrinsic value based = Rs.20 / Rs.40 = 0.5:1 (upper limit)
 (b) Market price based = MPS_{DA}/MPS_{BA} = Rs.15 / Rs.40 = 0.375:1 (lower limit)

Since, BA Ltd. has a higher EPS, ROE, P/E ratio and even higher EPS growth expectations, the negotiable terms would be expected to be closer to the lower limit, based on the existing share prices.

(iv) Calculation of post-merger EPS and its effects

Particulars			BA Ltd.	DA Ltd.	Combined
EAT	(Rs.)	(i)	2,10,000	99,000	3,09,000
Share outstanding		(ii)	100000	80000	132000*
EPS	(Rs.)	(i) / (ii)	2.1	1.2375	2.341
EPS Accretion (Dilution)	(Re.)		0.241	(0.301**)	

* Shares outstanding (combined) = 100000 shares + (.40 × 80000) = 132000 shares

** EPS claim per old share = Rs.2.34 × 0.4 = Rs. 0.936

EPS dilution = Rs.1.2375 – Rs. 0.936 = Rs. 0.3015

23. Following information is provided relating to the acquiring company Mani Ltd. and the target company Ratnam Ltd:

	Mani Ltd.	Ratnam Ltd.
Earnings after tax (Rs. lakhs)	2,000	4,000
No. of shares outstanding (lakhs)	200	1,000
P/E ratio (No. of times)	10	5

Required:

- (i) What is the swap ratio based on current market prices?
 (ii) What is the EPS of Mani Ltd. after the acquisition?

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- (iii) What is the expected market price per share of Mani Ltd. after the acquisition, assuming its P/E ratio is adversely affected by 10%?
- (iv) Determine the market value of the merged Co.
- (v) Calculate gain/loss for the shareholders of the two independent entities, due to the merger.

[MTP → AUGUST 2018 → 8 MARKS | RTP → NOV 2019]

Answer:

- (i) SWAP ratio based on current market prices:

EPS before acquisition:

Mani Ltd. : Rs.2,000 lakhs / 200 lakhs: Rs.10

Ratnam Ltd.: Rs.4,000 lakhs / 1,000 lakhs: Rs. 4

Market price before acquisition:

Mani Ltd.: Rs.10 × 10 Rs.100

Ratnam Ltd.: Rs.4 × 5 Rs. 20

SWAP ratio: 20/100 or 1/5 i.e. 0.20

- (ii) EPS after acquisition:

$$\frac{\text{Rs. (2,000 + 4,000) Lakhs}}{(200 + 200) \text{ Lakhs}} = \text{Rs.15.00}$$

- (iii) Market Price after acquisition:

EPS after acquisition : Rs.15.00

P/E ratio after acquisition 10×0.9 9

Market price of share (Rs. 15 X 9) Rs.135.00

- (iv) Market value of the merged Co.:

Rs.135 × 400 lakhs shares Rs. 540.00 Crores
or Rs. 54,000 Lakhs

- (v) Gain/loss per share:

	Mani Ltd.	Ratnam Ltd.
Total value before Acquisition	200	200
Value after acquisition	270	270
Gain (Total)	70	70
No. of shares (pre-merger) (lakhs)	200	1,000
Gain per share (Rs.)	35	7

24. Using the chop-shop approach (or Break-up value approach), assign a value for Cranberry Ltd. whose stock is currently trading at a total market price of €4 million. For Cranberry Ltd, the accounting data set forth three business segments: consumer wholesale, retail and general centers. Data for the firm's three segments are as follows:

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Business Segment	Segment Sales	Segment Assets	Segment Operating Income
Wholesale	€225,000	€600,000	€75,000
Retail	€720,000	€500,000	€150,000
General	€ 2,500,000	€4,000,000	€700,000

Industry data for “pure-play” firms have been compiled and are summarized as follows:

Business Segment	Capitalization/Sales	Capitalization/Assets	Capitalization/Operating Income
Wholesale	0.85	0.7	9
Retail	1.2	0.7	8
General	0.8	0.7	4

[MTP → AUGUST 2018 → 5 MARKS]

Answer:

Business Segment	Capital-to-Sales	Segment Sales	Theoretical Values
Wholesale	0.85	€225000	€191250
Retail	1.2	€720000	€864000
General	0.8	€2500000	<u>€2000000</u>
Total value			<u>€3055250</u>

Business Segment	Capital-to-Assets	Segment Assets	Theoretical Values
Wholesale	0.7	€600000	€420000
Retail	0.7	€500000	€350000
General	0.7	€4000000	<u>€2800000</u>
Total value			<u>€3570000</u>

Business Segment	Capital-to- Operating Income	Operating Income	Theoretical Values
Wholesale	9	€75000	€675000
Retail	8	€150000	€1200000
General	4	€700000	<u>€2800000</u>
Total value			<u>€4675000</u>

$$\text{Average theoretical value} = \frac{3055250 + 3570000 + 4675000}{3} = 3766750$$

Average theoretical value of Cranberry Ltd. = €3766750

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25. The following is the Balance-sheet of Grape Fruit Company Ltd as at March 31st, 2011.

Liabilities	(Rs. in lakhs)	Assets	(Rs. in lakhs)
Equity shares of Rs. 100 each	600	Land and Building	200
14% preference shares of Rs. 100/- each	200	Plant and Machinery	300
13% Debentures	200	Furniture and Fixtures	50
Debenture interest accrued and payable	26	Inventory	150
Loan from bank	74	Sundry debtors	70
Trade creditors	340	Cash at bank	130
		Preliminary expenses	10
		Cost of issue of debentures	5
		Profit and Loss account	525
	1440		1440

The Company did not perform well and has suffered sizable losses during the last few years. However, it is felt that the company could be nursed back to health by proper financial restructuring. Consequently the following scheme of reconstruction has been drawn up :

- (1) Equity shares are to be reduced to Rs. 25/- per share, fully paid up;
- (2) Preference shares are to be reduced (with coupon rate of 10%) to equal number of shares of Rs. 50 each, fully paid up.
- (3) Debenture holders have agreed to forgo the accrued interest due to them. In the future, the rate of interest on debentures is to be reduced to 9 percent.
- (4) Trade creditors will forego 25 percent of the amount due to them.
- (5) The company issues 6 lakh of equity shares at Rs. 25 each and the entire sum was to be paid on application. The entire amount was fully subscribed by promoters.
- (6) Land and Building was to be revalued at Rs. 450 lakhs, Plant and Machinery was to be written down by Rs. 120 lakhs and a provision of Rs.15 lakhs had to be made for bad and doubtful debts.

Required:

- (i) Show the impact of financial restructuring on the company's activities.
- (ii) Prepare the fresh balance sheet after the reconstructions is completed on the basis of the above proposals.

[MTP → AUGUST 2018 → 8 MARKS]

Answer:

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Impact of Financial Restructuring

(i) Benefits to Grape Fruit Ltd.

(a) Reduction of liabilities payable

	<i>Rs. in lakhs</i>
Reduction in equity share capital (6 lakh shares x Rs.75 per share)	450
Reduction in preference share capital (2 lakh shares x Rs.50 per share)	100
Waiver of outstanding debenture Interest	26
Waiver from trade creditors (Rs.340 lakhs x 0.25)	<u>85</u>
	<u>661</u>
(b) <i>Revaluation of Assets</i>	
Appreciation of Land and Building (Rs.450 lakhs - Rs.200 lakhs)	<u>250</u>
Total (A)	<u>911</u>

Amount of Rs.911 lakhs utilized to write off losses, fictitious assets and over- valued assets.

Writing off profit and loss account	525
Cost of issue of debentures	5
Preliminary expenses	10
Provision for bad and doubtful debts	15
Revaluation of Plant and Machinery (Rs.300 lakhs – Rs.180 lakhs)	120
Total (B)	<u>675</u>
Capital Reserve (A) – (B)	236

(ii) Balance sheet of Grape Fruit Ltd as at 31st March 2011 (after re-construction)

(Rs. in lakhs)

Liabilities	Amount	Assets	Amount
12 lakhs equity shares of Rs. 25/- each	300	Land & Building	450
10% Preference shares of Rs. 50/- each	100	Plant & Machinery	180
Capital Reserve	236	Furnitures & Fixtures	50
9% debentures	200	Inventory	150
Loan from Bank	74	Sundry debtors	70
Trade Creditors	255	Prov. for Doubtful Debts	<u>-15</u>
		Cash-at-Bank (Balancing figure)*	280
	<u>1165</u>		<u>1165</u>

*Opening Balance of Rs.130/- lakhs + Sale proceeds from issue of new equity shares Rs.150/- lakhs.

26. The Nishan Ltd. has 35,000 shares of equity stock outstanding with a book value of Rs.20 per share. It owes debt Rs. 15,00,000 at an interest rate of 12%. Selected financial results are as follows.

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Income and Cash Flow

EBIT	Rs. 80,000
Interest	<u>1,80,000</u>
EBT	(Rs. 1,00,000)
Tax	<u>0</u>
EAT	(Rs. 1,00,000)
Depreciation	Rs. 50,000
Principal repayment	<u>(Rs. 75,000)</u>
Cash Flow	<u>(Rs. 1,25,000)</u>

Capital

Debt	Rs. 1,500,000
Equity	<u>7,00,000</u>
	Rs. 2,200,000

Evaluate and Restructure the financial line items shown assuming a composition in which creditors agree to convert two thirds of their debt into equity at book value. Assume Nishan will pay tax at a rate of 15% on income after the restructuring, and that principal repayments are reduced proportionately with debt. Demonstrate as to who will control the company and by how big a margin after the restructuring?

[MTP → MARCH 2019 → 8 MARKS]

Answer:

Creditors would convert Rs. 10,00,000 in debt to equity by accepting Rs. 1,000,000/Rs. 20= 50,000 shares of stock.

The remaining Rs. 500,000 of debt would generate interest of

Rs. $500,000 \times 0.12 = \text{Rs. } 60,000$

Repayment of principal would be reduced by two thirds to Rs. 25,000 per year.

The result is as follows

Income and Cash Flow

EBIT	Rs. 80,000
Interest	<u>60,000</u>
EBT	Rs. 20,000
Tax	<u>3,000</u>
EAT	Rs. 17,000
Depreciation	50,000
Principal repayment	<u>(25,000)</u>
Cash Flow	<u>Rs. 42,000</u>

Capital

Debt	Rs. 500,000
Equity	<u>Rs. 1,700,000</u>
	<u>Rs. 2,200,000</u>

After the restructuring there will be a total of $(35,000 + 50,000) = 85,000$ shares of equity stock outstanding. The original shareholders will still own 35,000 shares (approximately 41%), while the

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creditors will own 50,000 shares (59%). Hence the creditors will control the company by a substantial majority.

27. What is Reverse Stock Split up and why companies resort it.

[MTP → APRIL 2019 → 5 MARKS]

Answer:

A '**Reverse Stock Split**' is a process whereby a company decreases the number of shares outstanding by combining current shares into fewer or lesser number of shares. For example, in a 5 : 1 reverse split, a company would take back 5 shares and will replace them with one share.

Although, reverse stock split does not result in change in Market value or Market Capitalization of the company but it results in increase in price per share.

Considering above mentioned ratio, if company has 100 million shares outstanding having Market Capitalisation of Rs. 500 crore before split up, the number of shares would be equal to 20 million after the reverse split up and market price per share shall increase from Rs. 50 to Rs. 250.

Reasons for Reverse Split Up

Although Reverse Split up is not so popular especially in India but company carries out reverse split up due to following reasons:

- (i) **Avoiding delisting from stock exchange:** Sometimes as per the stock exchange regulations if the price of shares of a company goes below a certain limit it can be delisted. To avoid such delisting company may resort to reverse stock split up.
- (ii) **Avoiding removal from constituents of Index:** If company's share is one of the constituents of the market index then to avoid their removal of scrip from this list due to persistent fall in the prices of share, the company may take reverse split up route.
- (iii) **To avoid the tag of "Penny Stock":** If the price of shares of a company goes below a limit it may be called "Penny Stock". In order to improve the image of the company and avoiding this stage, the company may go for Reverse Stock Split.
- (iv) **To attract Institutional Investors and Mutual Funds:** It might be possible that institutional investors may be shying away from acquiring low value shares and hence to attract these investors the company may adopt the route of Reverse Stock Split up to increase the price per share.

28. During the audit of the Weak Bank (W), RBI has suggested that the Bank should either merge with another bank or may close down. Strong Bank (S) has submitted a proposal of merger of Weak Bank with itself. The relevant information and Balance Sheets of both the companies are as under:

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

Particulars	Weak Bank (W)	Strong Bank (S)	Assigned Weights (%)
Gross NPA (%)	40	5	30
Capital Adequacy Ratio (CAR)	5	16	28
Total Capital/ Risk Weight Asset			
Market price per Share (MPS)	12	96	32
Book value			10
Trading on Stock Exchange	Irregular	Frequent	

Balance Sheet (Rs. in Lakhs)

Particulars	Weak Bank (W)	Strong Bank (S)
Paid up Share Capital (Rs. 10 per share)	150	500
Reserves & Surplus	80	5,500
Deposits	4,000	44,000
Other Liabilities	890	2,500
Total Liabilities	5,120	52,500
Cash in Hand & with RBI	400	2,500
Balance with Other Banks	-	2,000
Investments	1,100	19,000
Advances	3,500	27,000
Other Assets	70	2,000
Preliminary Expenses	50	-
Total Assets	5,120	52,500

You are required to

- Calculate Swap ratio based on the above weights;
- Ascertain the number of Shares to be issued to Weak Bank;
- Prepare Balance Sheet after merger; and
- Calculate CAR and Gross NPA of Strong Bank after merger.

[MTP → OCTOBER 2019 → 8 MARKS]

Answer:

(i) Swap Ratio

Gross NPA	5:40	$5/40 \times 30\%$	0.0375
CAR	5:16	$5/16 \times 28\%$	0.0875
Market Price	12:96	$12/96 \times 32\%$	0.0400
Book Value Per Share	12:120	$12/120 \times 10\%$	0.0100
			0.1750

Thus for every share of Weak Bank, 0.1750 share of Strong Bank shall be issued.

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Calculation of Book Value Per Share

Particulars	Weak Bank (W)	Strong Bank (S)
Share Capital (Rs. Lakhs)	150	500
Reserves & Surplus (Rs. Lakhs)	80	5,500
	230	6,000
Less: Preliminary Expenses (Rs. Lakhs)	50	--
Net Worth or Book Value (Rs. Lakhs)	180	6,000
No. of Outstanding Shares (Lakhs)	15	50
Book Value Per Share (Rs.)	12	120

(ii) No. of equity shares to be issued:

$$\frac{150}{10} \times 0.1750 = 2.625 \text{ lakh shares}$$

(iii) **Balance Sheet after Merger**

Calculation of Capital Reserve

Book Value of Shares	Rs. 180.00 lac
Less: Value of Shares issued	<u>Rs. 26.25 lac</u>
Capital Reserve	<u>Rs. 153.75 lac</u>

Balance Sheet

	Rs. lac		Rs. lac
Paid up Share Capital	526.25	Cash in Hand & RBI	2900.00
Reserves & Surplus	5500.00	Balance with other banks	2000.00
Capital Reserve	153.75	Investment	20100.00
Deposits	48000.00	Advances	30500.00
Other Liabilities	3390.00	Other Assets	2070.00
	57570.00		57570.00

(iv) **Calculation of CAR & Gross NPA % of Bank 'S' after merger**

$$\text{CAR / CRWAR} = \frac{\text{Total Capital}}{\text{Risky Weighted Assets}}$$

	Weak Bank	Strong Bank	Merged
	5%	16%	
Total Capital	Rs. 180 lac	Rs. 6000 lac	Rs. 6180 lac
Risky Weighted Assets	Rs. 3600 lac	Rs. 37500 lac	Rs. 41100 lac

$$\text{CAR} = \frac{6180}{41100} \times 100 = 15.04\%$$

$$\text{GNPA Ratio} = \frac{\text{Gross NPA}}{\text{Gross Advances}} \times 100$$

	Weak Bank	Strong Bank	Merged
GNPA (Given)	0.40	0.05	
	$0.40 = \frac{\text{GNPA}_R}{\text{₹ 3500 lac}}$	$0.05 = \frac{\text{GNPA}_S}{\text{₹ 27000 lac}}$	
Gross NPA	Rs. 1400 lac	Rs. 1350 lac	Rs. 2750 lac

PAPER 2 – STRATEGIC FINANCIAL MANAGEMENT

29. The following information relating to the acquiring Company Abhiman Ltd. and the target Company Abhishek Ltd. are available. Both the Companies are promoted by Multinational Company, Trident Ltd. The promoter's holding is 50% and 60% respectively in Abhiman Ltd. and Abhishek Ltd.:

	Abhiman Ltd.	Abhishek Ltd.
Share Capital (₹)	200 lakh	100 lakh
Free Reserve and Surplus (₹)	800 lakh	500 lakh
Paid up Value per share (₹)	100	10
Free float Market Capitalisation (₹)	400 lakh	128 lakh
P/E Ratio (times)	10	4

Trident Ltd. is interested to do justice to the shareholders of both the Companies. For the swap ratio weights are assigned to different parameters by the Board of Directors as follows:

Book Value	25%
EPS (Earning per share)	50%
Market Price	25%

- (a) What is the swap ratio based on above weights?
- (b) What is the Book Value, EPS and expected Market price of Abhiman Ltd. after acquisition of Abhishek Ltd. (assuming P.E. ratio of Abhiman Ltd. remains unchanged and all assets and liabilities of Abhishek Ltd. are taken over at book value).
- (c) Calculate:
- Promoter's revised holding in the Abhiman Ltd.
 - Free float market capitalization.
 - Also calculate No. of Shares, Earning per Share (EPS) and Book Value (B.V.), if after acquisition of Abhishek Ltd., Abhiman Ltd. decided to :
 - Issue Bonus shares in the ratio of 1 : 2; and
 - Split the stock (share) as Rs. 5 each fully paid.

[RTP → MAY 2020]

Answer:

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(a)

Swap Ratio

	Abhiman Ltd.	Abhishek Ltd.
Share Capital	200 Lakh	100 Lakh
Free Reserves	<u>800 Lakh</u>	<u>500 Lakh</u>
Total	<u>1000 Lakh</u>	<u>600 Lakh</u>
No. of Shares	2 Lakh	10 Lakh
Book Value per share	₹ 500	₹ 60
Promoter's holding	50%	60%
Non promoter's holding	50%	40%
Free Float Market Cap. i.e. relating to Public's holding	400 Lakh	128 Lakh
Hence Total market Cap.	800 Lakh	320 Lakh
No. of Shares	2 Lakh	10 Lakh
Market Price	₹ 400	₹ 32
P/E Ratio	10	4
EPS	40	8
Profits (₹ 2 X 40 lakh) (₹ 8 X 10 lakh)	₹ 80 lakh -	- ₹ 80 lakh

Calculation of Swap Ratio

Book Value	1 : 0.12 i.e.	0.12 x 25%	0.03
EPS	1 : 0.2	0.20 x 50%	0.10
Market Price	1 : 0.08	0.08 x 25%	<u>0.02</u>
		Total	<u>0.15</u>

Swap ratio is for every one share of Abhishek Ltd., to issue 0.15 shares of Abhiman Ltd. Hence total no. of shares to be issued

= 10 Lakh x 0.15 = 1.50 lakh shares

(b) Book Value, EPS & Market Price

Total No of Shares	2 Lakh + 1.5 Lakh = 3.5 Lakh
Total Capital	₹ 200 Lakh + ₹ 150 Lakh = ₹ 350 Lakh
Reserves	₹ 800 Lakh + ₹ 450 Lakh = ₹ 1,250 Lakh
Book Value	$\frac{\text{₹ 350 Lakh} + \text{₹ 1,250 Lakh}}{3.5 \text{ Lakh}} = \text{₹ 457.14 per share}$

$$\text{EPS} = \frac{\text{Total Profit}}{\text{No. of Share}} = \frac{\text{₹ 80 Lakh} + \text{₹ 80 Lakh}}{3.5 \text{ Lakh}} = \frac{\text{₹ 160 Lakh}}{3.5} = \text{₹ 45.71}$$

$$\text{Expected Market Price} = \text{EPS (₹ 45.71)} \times \text{P/E Ratio (10)} = \text{₹ 457.10}$$

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(c) (1) Promoter's holding

Promoter's Revised	Abhiman 50% i.e.	1.00 Lakh shares
Holding	Abhishek 60% i.e.	<u>0.90 Lakh shares</u>
	Total	1.90 Lakh shares

Promoter's % = $1.90/3.50 \times 100 = 54.29\%$

(2) Free Float Market Capitalisation

Free Float Market	= (3.5 Lakh – 1.9 Lakh) x ₹ 457.10
Capitalisation	= ₹ 731.36 Lakh

(3) (i) & (ii)

Revised Capital	₹ 350 Lakh + ₹ 175 Lakh = ₹ 525 Lakh
No. of shares before Split (F.V ₹ 100)	5.25 Lakh
No. of Shares after Split (F.V. ₹ 5)	$5.25 \times 20 = 105 \text{ Lakh}$
EPS	$160 \text{ Lakh} / 105 \text{ Lakh} = 1.523$
Book Value	$\frac{\text{Cap. ₹ 525 Lakh} + ₹ 1075 \text{ Lakh}}{105 \text{ Lakh}}$ = ₹ 15.238 per share

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CHAPTER 14: STARTUP FINANCE

14.

STARTUP FINANCE

QUESTIONS FROM ICAI STUDY MATERIAL

1. Explain some of the sources for funding a start-up.

[ALSO ASKED IN MAY 2019 EXAMS → 4 MARKS | MTP → MARCH 2019 → 6 MARKS]

Answer:

Every startup needs access to capital, whether for funding product development, acquiring machinery and inventory, or paying salaries to its employee. Most entrepreneurs think first of bank loans as the primary source of money, only to find out that banks are really the least likely benefactors for startups. So, innovative measures include maximizing non-bank financing.

Here are some of the sources for funding a startup:

- (i) **Personal financing.** It may not seem to be innovative but you may be surprised to note that most budding entrepreneurs never thought of saving any money to start a business. This is important because most of the investors will not put money into a deal if they see that you have not contributed any money from your personal sources.
- (ii) **Personal credit lines.** One qualifies for personal credit line based on one's personal credit efforts. Credit cards are a good example of this. However, banks are very cautious while granting personal credit lines. They provide this facility only when the business has enough cash flow to repay the line of credit.
- (iii) **Family and friends.** These are the people who generally believe in you, without even thinking that your idea works or not. However, the loan obligations to friends and relatives should always be in writing as a promissory note or otherwise.
- (iv) **Peer-to-peer lending.** In this process group of people come together and lend money to each other. Peer to peer to lending has been there for many years. Many small and ethnic business groups having similar faith or interest generally support each other in their start up endeavors.
- (v) **Crowdfunding.** Crowdfunding is the use of small amounts of capital from a large number of individuals to finance a new business initiative. Crowdfunding makes use of the easy accessibility of vast networks of people through social media and crowdfunding websites to bring investors and entrepreneurs together.

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- (vi) **Microloans.** Microloans are small loans that are given by individuals at a lower interest to a new business ventures. These loans can be issued by a single individual or aggregated across a number of individuals who each contribute a portion of the total amount.
- (vii) **Vendor financing.** Vendor financing is the form of financing in which a company lends money to one of its customers so that he can buy products from the company itself. Vendor financing also takes place when many manufacturers and distributors are convinced to defer payment until the goods are sold. This means extending the payment terms to a longer period for e.g. 30 days payment period can be extended to 45 days or 60 days. However, this depends on one's credit worthiness and payment of more money.
- (viii) **Purchase order financing.** The most common scaling problem faced by startups is the inability to find a large new order. The reason is that they don't have the necessary cash to produce and deliver the product. Purchase order financing companies often advance the required funds directly to the supplier. This allows the transaction to complete and profit to flow up to the new business.
- (ix) **Factoring accounts receivables.** In this method, a facility is given to the seller who has sold the good on credit to fund his receivables till the amount is fully received. So, when the goods are sold on credit, and the credit period (i.e. the date upto which payment shall be made) is for example 6 months, factor will pay most of the sold amount up front and rest of the amount later. Therefore, in this way, a startup can meet his day to day expenses.

PAST EXAMINATION & MTP QUESTIONS

2. Explain the advantages of bringing venture capital in the company.

[MAY 2018 → 4 MARKS]

Answer:**Advantages of bringing VC in the company:**

- It injects long- term equity finance which provides a solid capital base for future growth.
- The venture capitalist is a business partner, sharing both the risks and rewards. Venture capitalists are rewarded with business success and capital gain.
- The venture capitalist is able to provide practical advice and assistance to the company based on past experience with other companies which were in similar situations.
- The venture capitalist also has a network of contacts in many areas that can add value to the company.
- The venture capitalist may be capable of providing additional rounds of funding should it be required to finance growth.

CHAPTER 14: STARTUP FINANCE

- Venture capitalists are experienced in the process of preparing a company for an initial public offering (IPO) of its shares onto the stock exchanges or overseas stock exchange such as NASDAQ.
- They can also facilitate a trade sale.

3. Explain Angel Investors.

OR

Briefly explain how Angel Investors finance the Startups.

[NOV 2018 → 4 MARKS | MTP → OCTOBER 2019 → 4 MARKS]

Answer:

Angel investors invest in small startups or entrepreneurs. Often, angel investors are entrepreneur's family and friends. The capital angel investors provide may be a one-time investment to help the business propel or an ongoing injection of money to support and carry the company through its difficult early stages.

Angel investors provide more favorable terms compared to other lenders, since they usually invest in the entrepreneur starting the business rather than the viability of the business. Angel investors are focused on helping startups take their first steps, rather than the possible profit they may get from the business. Essentially, angel investors are the opposite of venture capitalists.

Angel investors are also called informal investors, angel funders, private investors, seed investors or business angels. These are affluent individuals who inject capital for startups in exchange for ownership equity or convertible debt. Some angel investors invest through crowdfunding platforms online or build angel investor networks to pool in capital.

Angel investors typically use their own money, unlike venture capitalists who take care of pooled money from many other investors and place them in a strategically managed fund.

Though angel investors usually represent individuals, the entity that actually provides the fund may be a limited liability company, a business, a trust or an investment fund, among many other kinds of vehicles.

Angel investors who seed startups that fail during their early stages lose their investments completely. This is why professional angel investors look for opportunities for a defined exit strategy, acquisitions or initial public offerings (IPOs).

4. Compare and contrast startups and entrepreneurship. Describe the priorities and challenges which startups in India are facing.

[MTP → MARCH 2018 & APRIL 2018 → 8 MARKS]

Answer:

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Differences between a startup and entrepreneurship

Startups are different from entrepreneurship. The major differences between them have been discussed in the following paragraphs:

- (i) Start up is a part of entrepreneurship. Entrepreneurship is a broader concept and it includes a startup firm.
- (ii) The main aim of startup is to build a concern, conceptualize the idea which it has developed into a reality and build a product or service. On the other hand, the major objective of an already established entrepreneurship concern is to attain opportunities with regard to the resources they currently control.
- (iii) A startup generally does not have a major financial motive whereas an established entrepreneurship concern mainly operates on financial motive.

Priorities and challenges which startups in India are facing

The priority is on bringing more and more smaller firms into existence. So, the focus is on need based, instead of opportunity based entrepreneurship. Moreover, the trend is to encourage self - employment rather than large, scalable concerns.

The main challenge with the startup firms is getting the right talent. And, paucity of skilled workforce can hinder the chances of a startup organization's growth and development. Further, startups had to comply with numerous regulations which escalates its cost. It leads to further delaying the chances of a breakeven or even earning some amount of profit.

5. Explain various stages of Venture Capital Funding.

[MTP → AUGUST 2018 → 4 MARKS]

Answer:

Stages of Venture Capital Funding

1. Seed Money: Low level financing needed to prove a new idea.
2. Start-up: Early stage firms that need funding for expenses associated with marketing and product development.
3. First-Round: Early sales and manufacturing funds.
4. Second-Round: Working capital for early stage companies that are selling product, but not yet turning in a profit.
5. Third Round: Also called Mezzanine financing, this is expansion money for a newly profitable company.
6. Fourth-Round: Also called bridge financing, it is intended to finance the "going public" process

6. DESCRIBE the term Pitch Presentation in context of Start-up Business?

[MTP → OCTOBER 2018 → 6 MARKS]

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Answer:

Pitch deck presentation is a short and brief presentation (not more than 20 minutes) to investors explaining about the prospects of the company and why they should invest into the startup business. So, pitch deck presentation is a brief presentation basically using PowerPoint to provide a quick overview of business plan and convincing the investors to put some money into the business. Pitch presentation can be made either during face to face meetings or online meetings with potential investors, customers, partners, and co-founders. Here, some of the methods have been highlighted below as how to approach a pitch presentation:

(i) Introduction

To start with, first step is to give a brief account of yourself i.e. who are you? What are you doing? But care should be taken to make it short and sweet.

(ii) Team

The next step is to introduce the audience the people behind the scenes. The reason is that the investors will want to know the people who are going to make the product or service successful.

(iii) Problem

Further, the promoter should be able to explain the problem he is going to solve and solutions emerging from it. Further the investors should be convinced that the newly introduced product or service will solve the problem convincingly.

(iv) Solution

It is very important to describe in the pitch presentation as to how the company is planning to solve the problem.

(v) Marketing/Sales

This is a very important part where investors will be deeply interested. The market size of the product must be communicated to the investors. This can include profiles of target customers, but one should be prepared to answer questions about how the promoter is planning to attract the customers.

(vi) Projections or Milestones

It is true that it is difficult to make financial projections for a startup concern. If an organization doesn't have a long financial history, an educated guess can be made. Projected financial statements can be prepared which gives an organization a brief idea about where is the business heading? It tells us that whether the business will be making profit or loss?

(vii) Competition

Every business organization has competition even if the product or service offered is new and unique. It is necessary to highlight in the pitch presentation as to how the products or services are different from their competitors.

(viii) Business Model

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The term business model is a wide term denoting core aspects of a business including purpose, business process, target customers, offerings, strategies, infrastructure, organizational structures, sourcing, trading practices, and operational processes and policies including culture. Every investor wants to get his money back, so it's important to tell them in a pitch presentation as to how they should plan on generating revenue. It is better to show the investors a list of the various revenue streams for a business model and the timeline for each of them.

(ix) Financing

If a startup business firm has raised money, it is preferable to talk about how much money has already been raised, who invested money into the business and what they did about it.

7. Discuss Bootstrapping as a mode of financing for startups.

[MTP → APRIL 2019 → 5 MARKS]

Answer:

Bootstrapping as a mode of financing for start ups

An individual is said to be boot strapping when he or she attempts to found and build a company from personal finances or from the operating revenues of the new company.

A common mistake made by most founders is that they make unnecessary expenses towards marketing, offices and equipment they cannot really afford. So, it is true that more money at the inception of a business leads to complacency and wasteful expenditure. On the other hand, investment by startups from their own savings leads to cautious approach. It curbs wasteful expenditures and enable the promoter to be on their toes all the time.

Here are some of the methods in which a startup firm can bootstrap:

- (a) Trade Credit:** When a person is starting his business, suppliers are reluctant to give trade credit. They will insist on payment of their goods supplied either by cash or by credit card. However, a way out in this situation is to prepare a well-crafted financial plan. The next step is to pay a visit to the supplier's office. If the business organization is small, the owner can be directly contacted. On the other hand, if it is a big firm, the Chief Financial Officer can be contacted and convinced about the financial plan.

Communication skills are important here. The financial plan has to be shown. The owner or the financial officer has to be explained about the business and the need to get the first order on credit in order to launch the venture. The owner or financial officer may give half the order on credit and balance on delivery. The trick here is to get the goods shipped and sell them before paying to them. One can also borrow to pay for the good sold. But there is interest cost also. So trade credit is one of the most important ways to reduce the amount of working capital one needs. This is especially true in retail operations.

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When you visit your supplier to set up your order during your startup period, ask to speak directly to the owner of the business if it's a small company. If it's a larger business, ask to speak to the chief financial officer or any other person who approves credit. Introduce yourself. Show the officer the financial plan that you have prepared. Tell the owner or financial officer about your business, and explain that you need to get your first orders on credit in order to launch your venture.

The owner or financial officer may give half the order on credit, with the balance due upon delivery. Of course, the trick here is to get the goods shipped, and sell them before one has to pay for them. One could borrow money to pay for the inventory, but you have to pay interest on that money. So trade credit is one of the most important ways to reduce the amount of working capital one needs. This is especially true in retail operations.

- (b) Factoring:** This is a financing method where accounts receivable of a business organization is sold to a commercial finance company to raise capital. The factor then got hold of the accounts receivable of a business organization and assumes the task of collecting the receivables as well as doing what would've been the paperwork. Factoring can be performed on a non-notification basis. It means customers may not be told that their accounts have been sold.

However, there are merits and demerits to factoring. The process of factoring may actually reduce costs for a business organization. It can actually reduce costs associated with maintaining accounts receivable such as bookkeeping, collections and credit verifications. If comparison can be made between these costs and fee payable to the factor, in many cases it has been observed that it even proved fruitful to utilize this financing method.

In addition to reducing internal costs of a business, factoring also frees up money that would otherwise be tied to receivables. This is especially true for businesses that sell to other businesses or to government; there are often long delays in payment that this would offset. This money can be used to generate profit through other avenues of the company. Factoring can be a very useful tool for raising money and keeping cash flowing.

- (c) Leasing:** Another popular method of bootstrapping is to take the equipment on lease rather than purchasing it. It will reduce the capital cost and also help lessee (person who take the asset on lease) to claim tax exemption. So, it is better to take a photocopy machine, an automobile or a van on lease to avoid paying out lump sum money which is not at all feasible for a startup organization.

Further, if you are able to shop around and get the best kind of leasing arrangement when you're starting up a new business, it's much better to lease. It's better, for example, to lease a photocopier, rather than pay \$3,000 for it; or lease your automobile or van to avoid paying out \$8,000 or more.

There are advantages for both the startup businessman using the property or equipment (i.e. the lessee) and the owner of that property or equipment (i.e. the lessor.) The lessor enjoys tax benefits in the form of depreciation on the fixed asset leased and may gain from capital appreciation on the property, as well as making a profit from the lease. The lessee benefits by making smaller payments retain the ability to walk away from the equipment at the end of the lease term. The lessee may also claim tax benefit in the form of lease rentals paid by him.

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8. Compare and contrast start-ups and entrepreneurship. Describe the priorities and challenges which start-ups in India are facing.

[MTP → OCTOBER 2019 → 6 MARKS]

Answer:

Differences between a start-up and entrepreneurship

Startups are different from entrepreneurship. The major differences between them have been discussed in the following paragraphs:

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- (iii) A startup generally does not have a major financial motive whereas an established entrepreneurship concern mainly operates on financial motive.

Priorities and challenges which start-ups in India are facing

The priority is on bringing more and more smaller firms into existence. So, the focus is on need based, instead of opportunity based entrepreneurship. Moreover, the trend is to encourage selfemployment rather than large, scalable concerns. The main challenge with the startup firms is getting the right talent. And, paucity of skilled workforce can hinder the chances of a startup organization's growth and development. Further, startups had to comply with numerous regulations which escalates it's cost. It leads to further delaying the chances of a breakeven or even earning some amount of profit.