STRATEGIC FINANCIAL MANAGEMENT REVISION BOOK

How to effectively use this book:

- ❖ Revision book covers past 11 RTP and exams
- ❖ Past experience indicates that minimum 60 percent of marks are asked from the past RTP and exam questions
- ❖ **Stage One:** Please read the theory for every chapter. Theory coverage would be sufficient to cover all practical theory questions and the same can help in answering problems
- ❖ **Stage two:** Start solving problems from individual chapters after completing theory. Try solving the question and in case you are stuck then please refer the summary of adjustments section. Summary of adjustments section has the guidance to solve a question
- ❖ **Stage three:** In case you are still not able to solve the question then please refer institute RTP and suggested answer to understand the question
- ❖ **Revision day before exam:** Please revise theory and summary of adjustments day before exam as the same can help in answering wide variety of questions. Also you can effectively work on various adjustments by quickly revising summary of adjustments section.

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Chapter One: Financial Policy and Corporate Strategy
1. **What is strategic financial decision making framework?**
   ❖ Strategic management is a systems approach, which is concerned with **where the organization wants to reach and how the organization proposes to reach that position**.
   ❖ It intends to run an organization in a **systematised fashion** by developing a series of plans and policies known as **strategic plans, functional plans, structural plans and operational plans**.

2. **What are the key decisions falling within scope of financial strategy?**
   ❖ **Financing decisions:** These decisions deal with the **mode of financing** or mix of equity capital and debt capital.
   ❖ **Investment decisions:** These decisions involve the **profitable utilization of firm's funds** especially in long-term projects (capital projects). Since the future benefits associated with such projects are not known with certainty, investment decisions necessarily involve risk. The projects are therefore evaluated in relation to their expected return and risk.
   ❖ **Dividend decisions:** These decisions determine the **division of earnings** between payments to shareholders and reinvestment in the company.
   ❖ **Portfolio decisions:** These decisions involve evaluation of investments based on their **contribution to the aggregate performance of the entire corporation** rather than on the isolated characteristics of the investments themselves.
3. **What are the strategy at different hierarchy levels?**
Strategies can be prepared at the following three levels:
   ❖ **Corporate Strategy:** Corporate level strategy focuses on the objectives of the firm along with their priorities. A corporate strategy provides with a framework for attaining the corporate objectives under values and resource constraints, and internal and external realities.
   ❖ **Business Strategy:** It is the managerial plan for achieving the goal of the business unit. However, **it should be consistent with the corporate strategy** of the firm and should be drawn within the framework provided by the corporate planners.
   ❖ **Functional Strategy:** It is the lowest level plan to carry out principal activities of a business. **Functional strategy must be consistent with the business strategy**, which in turn must be consistent with the corporate strategy.
4. **Explain how an organization balance financial goals vis-à-vis sustainable growth?**
   ❖ Sustainable growth forces managers to consider the financial consequences of sales increases and **set sales growth goals that are consistent** with the operating and financial policies of the firm. Sustainable growth is important for long-term development.
   ❖ Sustainable growth rate (SGR) of a firm is the **maximum rate of growth in sales that can be achieved, given the firm's profitability**, asset utilization and dividend payout ratio and leverage ratios.
   ❖ SGR is a **measure of how much a firm can grow without borrowing more money**. In case the firm grows at higher rate, then it would be required to borrow more money for funding the growth.
   ❖ The sustainable growth rate is consistent with the observed evidence that most

corporations are reluctant to issue new equity. Hence the only source of new equity is retained earnings.
❖ **SGR = ROE * (1 – Dividend Payout Ratio).** SGR assumes that the business wants to
   o Maintain a target capital structure without issuing new equity
   o Maintain a target dividend payment ratio and
   o Increase sales as rapidly as market conditions allow

Chapter 2 – Project Planning and Capital Budgeting

Meaning and importance of capital budgeting:

❖ Capital budgeting means budgeting for capital expenditure
❖ Capital expenditure involve huge outflow of cash today in anticipation of cash inflows over the life of the project
❖ Capital budgeting is important because
   o It involve substantial investment
   o Long term in nature
   o Complexity in estimation of cash flows
   o Capital expenditure is irreversible
   o It impact future cash flows

Time value of Money (TVM):
❖ Rs.100 received today is not equal to Rs.100 a year later
❖ TVM is the reward for postponement of consumption of money
❖ TVM is for different people and different investments
❖ TVM = Inflation rate + Real rate of return on risk free investments + Risk Premium

Terms associated with TVM:
❖ Present value is **today's value of tomorrow's money** discounted at TVM
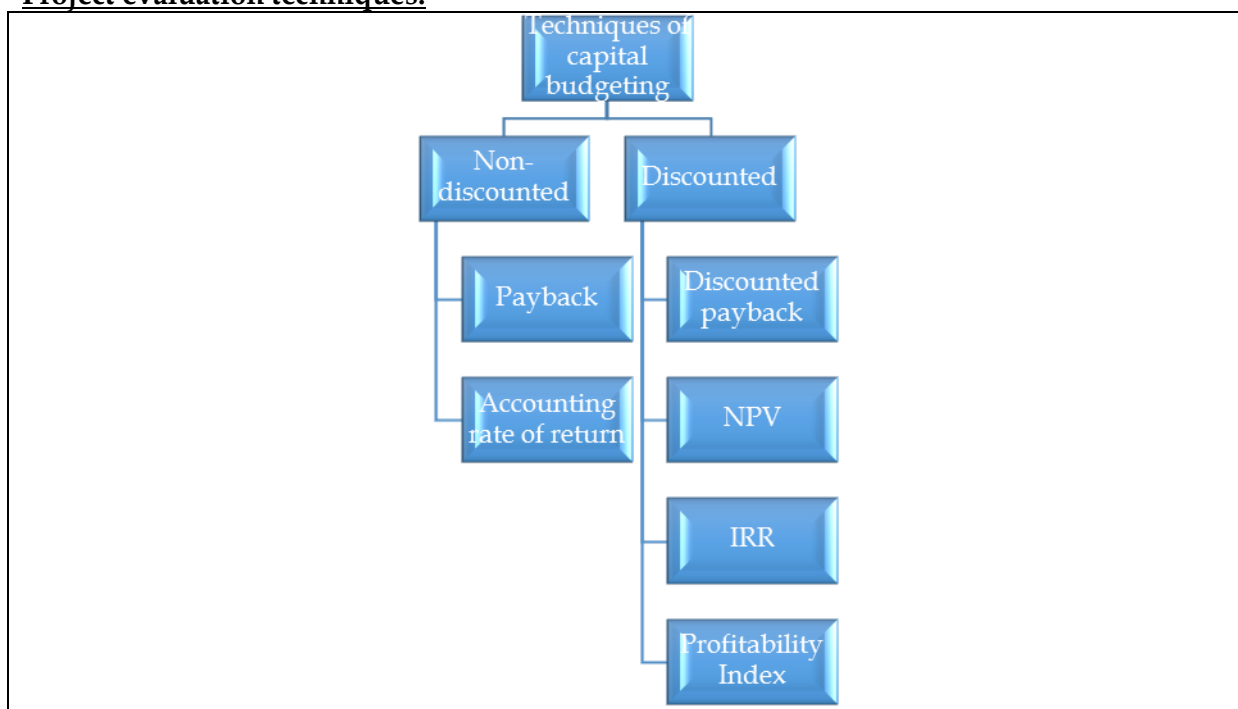❖ Future value is **tomorrow's value of today's money** compounded at TVM

Formulae:

Present value = Future value * Present value factor
Future value = Present value * Future value factor
Present value of annuity = Annuity amount * Present value annuity factor
Future value of annuity = Annuity amount * Future value annuity factor
Present value of Perpetuity = Perpetuity amount   TVM
Present value of Growing Perpetuity = Perpetuity amount   TVM – Growth rate

Example:

1) Future value of Rs.1000 invested in a bank for three years at 10%	
2) Present value of Rs.1000 receivable after 3 years if investor expectation is 12%	
3) Present value of 4 year annuity of Rs.1000 with interest rate of 15%	
4) Future value of 4 year annuity of	

Rs.8000 with interest rate of 10%	
5) Rework part 3 if the annuity is in advance	
6) Rework part 4 if the annuity is in advance	
7) Present value of perpetuity of Rs.10,000 with return expectation of 8%	
8) Present value of perpetuity of Rs.10,000 growing @ 4% with return expectation of 8%	

Project evaluation techniques:

Technique	Explanation	Formula
Payback	Payback refer to the time period in which initial investment in the project will be recovered	Base year + (Unrecovered cash flow of base year / Cash flow of nest year) **Note:** Base year refer to the last year in which cumulative cash flow is negative
ARR	ARR refer to the ratio of average PAT over the initial or average investment	ARR = Average PAT / (Initial or average investment) Initial investment = Initial outflow Average investment = Average of initial outflow and salvage value
Discounted payback	Discounted payback refer to the time period in which initial investment in the project will be recovered considering time value of money	Base year + (Unrecovered discounted cash flow of base year / Discounted cash flow of nest year)

		Note: Base year refer to the last year in which cumulative cash flow is negative
NPV	NPV refer to the difference between the PV of cash inflows and PV of cash outflows	PV of cash inflows – PV of cash outflows
IRR	IRR refer to the rate of return at which NPV of the project is zero	L1 + $\frac{\text{(NPV at L1)}}{\text{(NPV at L1 – NPV at L2)}}$ * (L2-L1) L1 = Lower rate with + NPV L2 = Higher rate with - NPV
Profitability index or Benefit cost ratio	This measure the ratio of benefits (PV of cash inflows) to costs (PV of cash outflows)	$\frac{\text{PV of cash inflows}}{\text{PV of cash outflows}}$

Consolidated format for calculation of all techniques:

Year	Cash Flow	Cumulative cash flow	PVF @ 10%	DCF	CDCF	Depreciation	PAT
0	(1,00,000)						
1	40,000						
2	60,000						
3	40,000						
4	50,000						
	Total						

Technique	Calculation	Answer
Payback		
ARR		
Discounted Payback		
NPV		
Profitability Index		
IRR		

Types of capital budgeting:
  ❖ Capital budgeting can either lead to cost reduction or revenue enhancement

❖ The principles of working are the same as both lead to same thing which is **increasing the cash flow**

Principles of capital budgeting:

Cash flow principle	Cash flow, not profits, that count because ❖ More objective ❖ You can spend cash ❖ No accounting treatment
After tax principle	Tax is an outflow and hence only CFAT matters
Incremental principle	The after tax cash which is relevant is the incremental CFAT and not the total CFAT

Rules of relevance	❖ Forget sunk cost
	❖ Consider side effect – Side effect is similar as opportunity cost but side effect can either be negative or positive whereas opportunity cost is only negative
	❖ Recall opportunity cost
	❖ Future cash flow – Only that future cash flow which is different among alternative is important
	❖ Beware of overheads
	    o Apportioned overheads is irrelevant
	    o Allocated overheads is relevant
	❖ Fixed cost can be misleading – Whenever fixed cost per unit is given it to be converted into total fixed cost (Only the differential fixed cost between current and proposed option is relevant)
	❖ Remember working capital
	❖ Committed cost are irrelevant

Long term fund principle	The shareholder and the term loan lender are partners in business and have equally strong desire that the business should do well. Hence we should preferably evaluate a project both the angle of shareholder and lender. ❖ Evaluate the project first, funding comes next ❖ Keep investment and financing decisions separate ❖ Mixing them could lead to faulty decisions
Reward exclusion principle	❖ Ignore the rewards payable to the investor for whom evaluation is done. ❖ Dividends, Interest and Principal repayment is not to be deducted as discounting will take care of reward

Particulars	Shareholders	Long term funds
EBIT	XXX	XXX
Less: Interest on long term loan	(XXX)	NA
Less: Interest on short term loan	(XXX)	(XXX)
EBT	**XXX**	**XXX**
Less: Tax	(XXX)	(XXX)
EAT	**XXX**	**XXX**
Add: Depreciation	XXX	XXX
CFAT	**XXX**	**XXX**
Less: Dividends	NA	NA
Less: Repayment of loans	(XXX)	NA
Adjusted CFAT	**XXX**	**XXX**

| Consistency | ❖ Inflation should either be included or excluded consistently from |

principle	• cash flows and discount rate
	• If cash flows are inclusive of inflation, discount rate should also be inclusive of inflation and vice versa
	• Tax should be adjusted both in cash flows and in discount rate
Discount rate	• Discount rate refers to the rate of return which providers of money expect. **The appropriate discount rate to be used is cost of capital (WACC post tax)**
	• The reward paid to providers of money is not considered while calculating the cash flows of the project as the discounting takes care of the reward
	• Discount rate can be an uniform one or there can be a **step up increase in discount rate (PVF for year 2 will be PVF of year 1 divide by new (1+r) and PVF for year 3 will be PVF of year 2 divide by new (1+r)**

Example for step-up discount rate

Year	1	2	3	4
Discount rate	10%	8%	11%	13%
PVF				

Evaluation:

From	CF owner	Rate	NPV	IRR
Shareholder angle	Shareholders	Ke	Equity NPV	Equity IRR
Long term fund angle	Shareholders & Term lenders	WACC	Project NPV	Project IRR

Steps in capital budgeting:
Step 1: Initial outflow

Particulars	Amount
Capital expenditure	(XXX)
Working capital	(XXX)
Total outflow	(XXX)

Step 2: In-between flows:

Particulars	Amount
Sales	XXX
Less: All costs other than depreciation	(XXX)
Profit before depreciation and tax (PBDT)	**XXX**
Less: Depreciation	(XXX)
Profit before tax (PBT)	**XXX**
Less: Tax	(XXX)
Profit after tax (PAT)	**XXX**
Add: Depreciation	XXX
Cash flow after tax (CFAT)	**XXX**
Less: Purchase of additional machine	(XXX)
Less: Payment for original machine	(XXX)
Add/Less: Increase/decrease in working capital (Note)	XXX
Revised CFAT	**XXX**

Note:
   • Increase in working capital will be treated as outflow of money as additional money is blocked in working capital

❖ Decrease in working capital will be treated as inflow of money as money has been released from working capital

Step3: Terminal flow:

Particulars	Amount
NSV of asset (Note 1)	XXX
Recapture of working capital	XXX
Total terminal flow	XXX

Step 4: Consolidation of cash flows and calculation of NPV:

Year	Cash flow	PVF	DCF
0	Step 1		
1	Step 2		
2	Step 2		
3	Step 2		
4	Step 2		
5	Step 2 + Step 3		
Total			

Note 1: Calculation of NSV

Particulars	Amount
Sale Value	XXX
Less: Book value	(XXX)
Gain / Loss on sale	**XXX**
Tax Paid / Tax Saved	XXX
Net salvage value (Sale value + Tax saved – Tax Paid)	**XXX**

Different types of capital budgeting decisions:

Abandonment	Giving up an existing asset
Purchase	Buying a new asset
Replacement	Buying a new asset and giving up an existing asset (Abandonment + Purchase)

How to decide on abandonment of an asset?

Step 1: Initial outflow

Particulars	Amount
NSV of existing asset at year 0	(XXX)
Working capital	(XXX)
Total outflow	(XXX)

Step 2: In-between flows – No change

Step3: Terminal flow:

Particulars	Amount
NSV of existing asset at the end of life	XXX
Recapture of working capital	XXX
Total terminal flow	XXX

Step 4: Consolidation of cash flows and calculation of NPV – No change

Conclusion: If the NPV of the project is positive then we should continue with the asset. However if the same is negative then we have to abandon the asset

How to decide on replacement?

Method 1 : Total Approach:
 ❖ Step 1: Compute NPV of continuation option
 ❖ Step 2: Compute NPV of purchase option
 ❖ Step 3: Decide by comparing step 1 & step 2
   o If step 1 is greater than we should continue with existing asset
   o If step 2 is greater than we should replace the asset
 	
Method 2: Incremental approach:
 ❖ Step 1: Compute incremental initial outflow
 ❖ Step 2: Compute incremental in between cash flows
 ❖ Step 3: Compute incremental terminal flow
 ❖ Step 4: If the NPV is positive then we should go ahead with replacement.

Special issues in capital budgeting:
Issue No.1: NPV versus IRR conflict
 ❖ In case of a single project that involves accept/reject decision, NPV and IRR will give the same decision.
 ❖ However whenever a choice is to be made between two mutually exclusive projects, IRR and NPV may give opposite ranking
 ❖ NPV assumes that cash flows are reinvested at cost of capital whereas IRR assumes that cash flows are reinvested at IRR.
 ❖ NPV versus IRR conflict arise due to
   o Life disparity
   o Cash flow disparity

Life Disparity:
 ❖ If the life of the two alternatives being analysed is not same, then decision cannot be done on the basis of NPV / Present value of outflow
 ❖ We need to calculate EAB/EAC to make the decision on selection of project
   o EAB = NPV / PVAF (r, life)
   o EAC = Present value of outflow / PVAF (r, life)

Cash flow disparity:
 ❖ This means that the timing of the cash flows are different for the two projects
 ❖ We need to calculate modified NPV and modified IRR to arrive at the decision on selection of the project
 ❖ Modified NPV/IRR can be calculated using a realistic reinvestment rate
 ❖ Compute terminal value of cash flows by assuming reinvestment of the cash inflows at the specified reinvestment rate
 ❖ The revised cash flow structure will not be a single inflow and single outflow structure
 ❖ The NPV of the revised cash flow structure is called modified NPV and the IRR of the revised cash flow structure is called modified IRR.
 ❖ Modified NPV and modified IRR will give the same ranking.

Issue No.2: Capital rationing:
 ❖ The term capital rationing means money in short supply
 ❖ Shorty supply means the money is less than demand for money

Types of capital rationing:

Divisible projects:	Indivisible projects:

❖ **Step 1:** Identify acceptable projects – Only those projects which has positive NPV is to be accepted
 ❖ **Step 2:** Identify whether capital rationing exist – Capital rationing exists when the money available is not sufficient to take up all the acceptable projects
 ❖ **Step 3:** Rank the projects in the order of NPV/Initial outflow
 ❖ **Step 4:**
     o Allot money to projects in the order of rank
     o If money is not available to undertake a project, part of the project should be undertaken
 ❖ **Step 5:** Compute aggregate NPV of selected projects
	❖ **Step 1:** Identify acceptable projects – Only those projects which has positive NPV is to be accepted
	 ❖ **Step 2:** Identify whether capital rationing exist – Capital rationing exists when the money available is not sufficient to take up all the acceptable projects
	 ❖ **Step 3:** Rank the projects in the order of NPV/Initial outflow
	 ❖ **Step 4:** Identify the various feasible combinations and compute the aggregate NPV
	 ❖ **Step 5:** Select the combination which has the highest aggregate NPV

How to deal with surplus cash?
- ❖ Surplus cash is possible only if the projects are indivisible
- ❖ We need to calculate NPV of surplus cash by comparing interest rate and cost of capital

Relationship	NPV
Interest rate > Cost of capital	Positive NPV
Interest rate = Cost of capital	Zero NPV
Interest rate < Cost of capital	Negative NPV

Issue No.3: Inflation:
- ❖ Inflation means "rise in prices"
- ❖ If cash flow includes inflation they are said to be in money terms and if it excludes inflation they are said to be in real terms
- ❖ If discount rate include inflation it is said to be in money term and if it exclude inflation then it is said to be in real terms

Particulars	Cash flow	Discount rate
Money	Include inflation	Include inflation
Real	Exclude inflation	Exclude inflation

- ❖ Real terms does not mean that they are PV

- ❖ We can move from money cash flow to real cash flow by discounting it at inflation rate
- ❖ We can move from real cash flow to present value by discounting it at real discount rate
- ❖ We can move from money cash flow to present value by discounting it at money discount rate

❖ Real cash flow and present value are not same because RCF eliminates only inflation and not risk while present value exclude both inflation and risk

❖ (1 + MDR) = (1 + RDR) * (1 + Inflation rate)

❖ If the problem is silent with regard to nature of cash flow and discount rate then they are said to be in **money terms**

Risk Analysis in capital budgeting:
Risk and Uncertainty:

Risk: Risk is a situation where:	**Uncertainty:** Uncertainty is a situation where
❖ Several outcomes are possible ❖ Within this, any one outcome can occur ❖ Each outcome has a known probability ❖ Such probabilities are assessed with respect to past information	❖ The range of outcomes is unknown ❖ The probability of outcomes is not known

Note: RISK CAN BE MEASURED WHEREAS UNCERTAINTY CANNOT BE MEASURED

Concept 1: Expected value:
   ❖ Expected value is the weighted average value with probability of occurrence being the assigned weight
   ❖ Expected value is a measure of return

$$\text{Expected Value} = \sum P * R$$
$$P = \text{Probability of occurrence} ; R = \text{Return}$$

   ❖ Other things remaining same, the alternative with higher expected value is to be selected

Example:
A person gets an interview from two places. He has to select where to go for interview and the salaries expected are:

Place I			Place II		
Salary	Probability	Expected value	Salary	Probability	Expected value
10,00,000	0.4		20,00,000	0.6	
15,00,000	0.4		10,00,000	0.3	
20,00,000	0.2		0	0.1	
Total					

Decision:

Concept 2: Standard Deviation:
   ❖ Standard deviation is the deviation from the mean
   ❖ It is a measure of risk

$$SD = \sqrt{(p\ \underline{d}^2)}$$
$$d = X - \overline{X}$$

   ❖ Other things remaining same the alternative with lower standard deviation should be selected

Example: Same as above

Salary	Probability	D	Pd²	Salary	Probability	d	Pd²
10,00,000	0.4			20,00,000	0.6		
15,00,000	0.4			10,00,000	0.3		
20,00,000	0.2			0	0.1		
Total							
SD							

Concept 3: Co-efficient of variation:
❖ Co-efficient of variation measures risk per unit of return

> **CV = Standard Deviation / Expected value**

- ❖ The project with lower CV should be selected
- ❖ CV forces every decision maker. Aggressive investor would like to select a project with higher return and conservative investor will like to select a project with lower risk

Example – Calculate CV for the above example:

Particulars	Place I	Place II
Expected value		
Standard deviation		
Co-efficient of variation		

Concept 4: Risk Adjusted Discount Rate (RADR):
- ❖ The project with a higher risk will be discounted at a higher rate (RADR). Select the project with higher risk adjusted NPV
- ❖ RADR = Normal cost of capital + Risk Premium
- ❖ Even for a single project the company can discount the different types of cash flows at different rate. For instance certain cash flows like depreciation tax shield, guaranteed salvage value can be discounted at normal cost of capital and uncertain cash flows like sales, cost structure, salvage value can be discounted at RADR

Concept 5: Certainty equivalent factor (CEF):
- ❖ CEF is ratio of certain cash flows to uncertain cash flows
- ❖ Less the certainty, lower the value of CEF. Hence risk is considered to be more when CEF is less
- ❖ We should select a project with higher NPV

Steps:
- ❖ Convert uncertain cash flows into certain cash flows
  - o CCF = UCF * CEF
- ❖ The appropriate discount rate is risk free rate of return
- ❖ Compute NPV

RADR or CEF Principle:
- ❖ RADR adjusts the discount rate whereas CEF adjusts the cash flow
- ❖ It is easier to adjust the discount rate than cash flow and hence RADR is popular

Concept 6: Sensitivity Analysis:
- ❖ It measures the percentage change in input parameters that would lead to a reversal in investment decision

$$\text{Sensitivity \% = } \frac{\text{Change}}{\text{Base}} * 100$$

❖ The input parameters and the direction of change leading to sensitivity are as under

Parameter	Direction
Size	↑
Cash Flows	↓
Discount Rate	↑
Life	↓

❖ A project is more sensitive to that input parameter whose sensitivity percent is least. This is because a small change would lead to a reversal of investment decision

Sensitivity Analysis – Uneven cash flows:
❖ Compute PV of uneven cash flows
❖ The above value has to change by the amount of NPV for the project to become unviable

$$\text{Sensitivity \% = } \frac{\textbf{NPV}}{\text{PV of uneven cash flows}} * 100$$

Concept 7: Decision Tree
❖ A decision tree is a diagrammatic representation of the various alternative courses of action leading to an investment decision

Rules:
❖ **Rule 1:** A decision tree begins with a decision point. A decision point is represented by a rectangle
❖ **Rule 2:** An outcome point (also known as chance note) is denoted by a circle
❖ **Rule 3:** A decision tree is drawn from left to right whereas the evaluation is done from right to left
❖ **Rule 4:** The value of a change node is the sum of expected values of the various branches emanating from the chance note
❖ **Rule 5:** The value of a decision node is the highest amongst the values of the various branches which arise from the decision node

Concept 8: Value of an option
❖ The term option means choice
❖ The option can either be an option to
   o Expand or
   o Abandon
❖ The foundation of the option is created today and the option is exercisable in future
❖ If the NPV of the option is greater than the negative NPV of the foundation then we must undertake the foundation

Concept 9: Hillier's model:
❖ Hillier looked at alternative ways of computing return & risk
❖ **Return:** If the risky rate is used for discounting, then it automatically incorporates risk and gives the risk adjusted NPV. But since risk is computed separately, the NPV is arrived at by discounting the same at risk free rate.

Types of cash flow:
- ❖ **Dependent cash flow:** Cash flow of succeeding periods are perfectly correlated to earlier periods
- ❖ **Independent cash flow:** Cash flow of succeeding periods are not dependent on earlier years

Steps for computation of risk:

Independent cash flow	Dependent cash flow
1. Compute SF of each year	1. Compute SF of each year
2. Discount the SD and get the discounted SD	2. Discount the SD and get the discounted SD
3. Square and sum up the values of step 2	3. Sum the value of step 2
4. Extract the square root of step 3 value and arrive at standard deviation	4. The value in step 3 is the standard deviation

Concept 10: Z- Value:
- ❖ The decision maker might want to know as to what is the probability that NPV is
  - o Greater than Rs.X
  - o Less than Rs.Y
  - o Falls between Rs.x and Rs.Y
- ❖ It is possible to ascertain the probability if the cash flow follows a normal distribution pattern

Steps:
- ❖ **Step 1:** Compute Z-value = $\dfrac{\text{Target value – Expected value}}{\text{SD}}$
- ❖ **Step 2:** Identify the probability of occurrence from Z value table and then calculate the probability for the required condition

Concept 11: Joint probability
- ❖ When a transaction outcome relating to an event and another outcome relating to another event are both to happen, then the relevant probability is their joint probability or combined probability. This is computed by multiplying their respective probabilities.
- ❖ **Example:** The probability of rain is 0.3 and carrying an umbrella is 0.5 the following are the various possible combinations and their respective probabilities:

Rain	Umbrella	Joint Probability
Yes	Yes	
Yes	No	
No	Yes	
No	Yes	

Concept 12: Simulation:
- ❖ Simulation involve creating a model of project in respect of which various outcomes are possible
- ❖ In doing a simulation exercise we must identify the parameters and variables
- ❖ Parameters are those which do not change during a project period
- ❖ Variables are those which change during a project period
- ❖ Parameters do not have probability whereas variables have probablity

Steps:
- ❖ **Step 1:** Identify parameters and variables
- ❖ **Step 2a:** For each variable, arrange the values in ascending order and calculate cumulative probability at the end of each value
- ❖ **Step 2b:** Construct random number class interval for each variable
- ❖ **Step 3:** Based on random number and class interval, select the values of various variables
- ❖ **Step 4:** Compute NPV of each set
- ❖ **Step 5:** The simple average of the computed NPV is the final NPV

Concept 13 – Adjusted NPV
- ❖ In capital budgeting, the cash flows are discounted at WACC and which assumes that all projects are funded in the same debt-equity ratio. However certain projects may not be funded in the same debt-equity ratio and hence WACC cannot be used for discounting
- ❖ This gives rise to adjusted NPV. The company should first calculate the base case NPV at the normal cost of capital. This base case NPV will be adjusted due for benefits and extra costs of taking debt.
- ❖ Adjusted NPV = Base case NPV – issue cost + PV of tax shield on interest

Steps:
- ❖ **Step 1:** Compute base case NPV
- ❖ **Step 2:** Compute issue cost
- ❖ **Step 3:** Compute the tax shield on interest payable. These cash flow savings are brought to year 0 **by discounting them at pre-tax cost of debt**. The logic for pre-tax cost of debt lies in the assumption that the cash flows arising out of tax saving is as risky as the cash flow from debt.
- ❖ **Step 4:** Adjusted NPV = Step 1 – Step 2+ Step 3

Chapter 3 – Leasing Decision including cross border leasing
Introduction:
- ❖ Leasing is a **financial transaction** under which the owner of the asset **transfers the right to use the asset** for a defined period of time for a **periodic consideration**.

Features of leasing transaction:

Features	Lessor	Lessee
Asset	Owner	User
Lease rental	Taxable income	Tax deductible expense
Depreciation	Yes	No
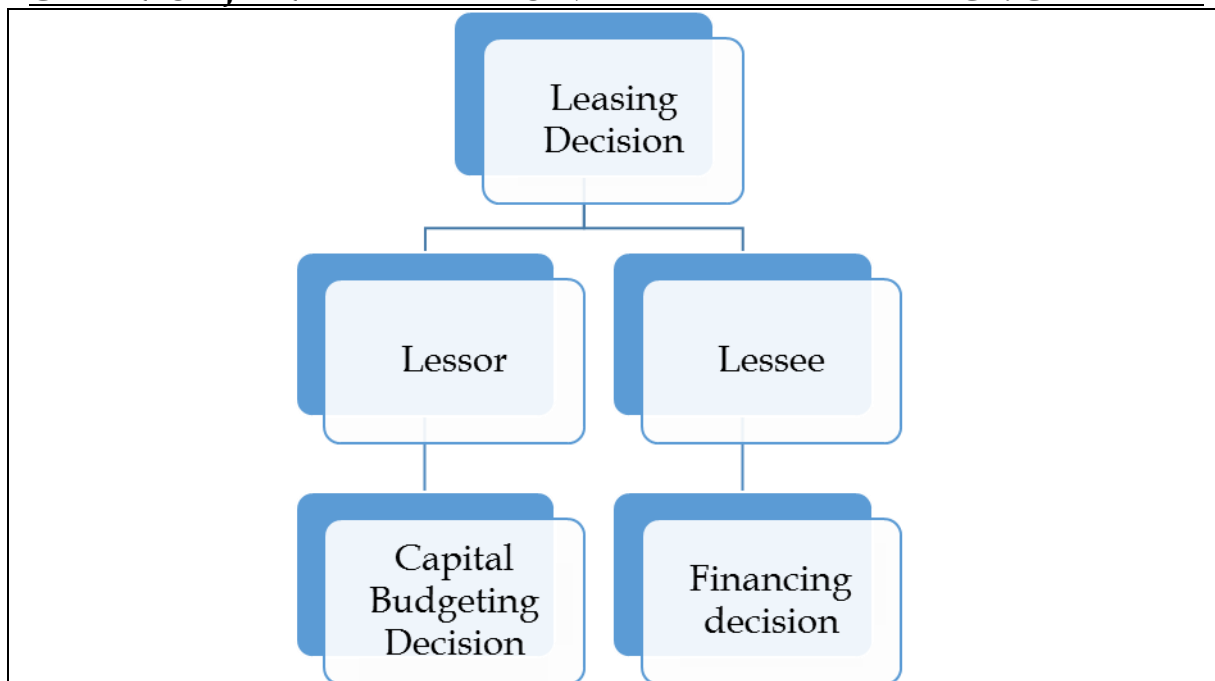
Evaluation from Lessor's angle:
- ❖ For the lessor this is an investment decision. All principles of capital budgeting will apply
- ❖ Lease if NPV is positive
- ❖ Lease if IRR > cost of capital

Evaluation from Lessee's angle:
- ❖ The lessee has the following two choices
  - o Take the asset on lease
  - o Buy the machine
- ❖ In the case of lessee the decision to have the asset is already made. The only remaining decision is how to finance the asset namely
  - o Buy the asset by taking a loan
  - o Take the asset on lease
- ❖ The lessee should choose the alternative which has lower PV of outflow

Steps:
- ❖ **Step 1:** Compute PV of Borrow & Buy Option

Purchase Price	XXX
Less: PV of tax saved on depreciation	(XXX)
Less: PV of net salvage value	(XXX)
PV of borrow and buy option	**XXX**

Note:
- ❖ The interest rate is irrelevant because the borrowing rate and the discount rate are same
- ❖ The appropriate discount rate to be used is **after tax cost of debt.** However if the problem specifies different discount rate then in-between outflows are to be calculated by considering the interest and instalment payment.

- ❖ **Step 2:** Compute PV of after tax lease rental
- ❖ **Step 3:** Compare step 1 and step 2 and select the option with lower present value

Chapter 4 – Dividend Decisions

Basic Theory:

Dividend Ratios:

Ratio	Meaning	Formula
Dividend Rate	DPS as a percentage of Face Value	$\dfrac{\text{DPS} * 100}{\text{FV}}$
Dividend Yield	DPS as a percentage of MPS	$\dfrac{\text{DPS} * 100}{\text{MPS}}$
Payout Ratio	DPS as a percentage of EPS	$\dfrac{\text{DPS} * 100}{\text{EPS}}$

Example:
A company has paid dividend of 20%. The current market price of the company is Rs.100. The face value of the share is Rs.2. The overall earnings were Rs.20,00,000 on equity base of 5,00,000 shares? Calculate dividend rate, dividend yield and payout ratio?

Particulars	Formula	Answer
Dividend rate		
Dividend yield		
Payout ratio		

Dividend dates:

Date	What happens
Declaration date	Dividend is announced
Last cum dividend date	Shares can be bought inclusive of dividends
First ex-dividend date	Shares can be bought without being eligible for dividends
Record date	Register of members is closed
Payment date	Dividend is credited to the members

Basic approach to dividend - Common Sense approach (ALL OR NOTHING APPROACH)

Nature of Firm	Equation	Payout
Growth	K<R	0%
Decline	K>R	100%
Normal	K = R	Indifferent

Note:
- ❖ K equal to cost of capital and refer to **rate of return which the investors want to earn**
- ❖ R equal to the rate of return **actually being earned by the company**

Dividend Relevance Theory:
- ❖ The market price of a share is the **present value of expected future dividends** discounted at the time value of money
- ❖ The answer to the question **"DOES DIVIDEND AFFECT MARKET PRICE"** determines the nature of the models:

- o If "YES" then dividend relevance model applies
- o If "NO" then dividend irrelevance model applies

1. WALTER'S MODEL:

- ❖ The market price of a share is the present value of infinite cash flows of
  - o Constant dividend
  - o Capital gain

$$P_0 = \frac{(D)}{K_e} + \frac{\dfrac{r * (E-D)}{K_e}}{K_e}.$$

Where:

P_0 = Current Market Price; D = Dividend per share

E = Earnings per share; r = Rate of return ; K_e = Cost of equity

THE COST OF EQUITY AT TIMES IS EXPRESSED AS THE INVERSE OF PE RATIO AND THIS WOULD MEAN THAT ALL EARNINGS ARE DISTRIBUTED AND THAT THERE IS NO GROWTH IN DIVIDEND

$$K_e = \frac{D_1}{P_0} + G \qquad ; \qquad K_e = \frac{EPS}{MPS}$$

2. GORDON'S MODEL

- ❖ The MP of a share is the Present Value of a stream of constantly growing dividend. This is similar to PV of growing perpetuity

$$P_0 = \frac{D_1}{K_e - G}.$$

Where

P_0 = Current Market Price; D_1 = Dividend of next year

K_e = Cost of equity; G = Growth rate in dividend

Growth rate = Retention ratio * Return on equity

Fair Market Price and Investment Decision:

Relationship	Valuation	Action
AMP < FMP	Undervalued	Buy
AMP > FMP	Overvalued	Sell
AMP = FMP	Correctly valued	Hold

Note:

- ❖ FMP under Walter's and Gordon's model is ex-dividend price. D_0 refers to nearby dividend and D_1 refers to distant dividend
- ❖ If shares are **trading cum-dividend** then we must add the **nearby dividend** to the ex-dividend FMP to get the fair market price.
- ❖ Example: Today is April 10, 2017 and the share is quoting at Rs.180. The next dividend is payable on 20th April, 2017 is Rs.8 and is factored in the CMP. The dividend for 20th April, 2018 is expected to be 10% higher. If the cost of equity is 15%, arrive at FMP and take an investment decision?

3. GRAHAM & DODD MODEL (TRADITIONAL POSITION):
- ❖ Dividends are the weighted average of past earnings
- ❖ Investors discount " DISTANT DIVIDENDS" (CG) at a higher rate than "NEARBY DIVIDEND"

$$P = M * (D + \frac{E}{3})$$

Where P = FMP ; D = DPS; E = EPS ; M = Multiplier

Note:
- ❖ The multiplier could be a historical multiplier and be based on the relationship between MPS, DPS and EPS

Example:
EPS = 12 per share and it is expected to grow by 20 percent in current year. If the company declares a 40% payout and if the multiplier is historically been 9. What is FMP under Graham & Dodd Model?

4. LINTNER'S MODEL
- ❖ Firms have a long term target dividend payout ratio (DPO)
- ❖ CFO's are more worried about changes in dividend rather than dividend per share
- ❖ CFO's are reluctant to change dividends which may have to be subsequently reversed
- ❖ Dividend changes follow LT sustained earnings

$$D_1 = D_0 + [(EPS * Target\ Payout) - D_0] * AF$$

Steps:
- ❖ Step 1: Find tentative DPS using CY EPS and target DPO
- ❖ Step 2: Find tentative increase in EPS
- ❖ Step 3: Actual increase = Step 2 * Adjustment Factor
- ❖ Step 4: Current year dividend = Last year dividend + Step 3

5. MODIGILANI MILLER MODEL:
Assumptions:

- ❖ **Perfect Markets:** There are large number of buyers & sellers so that the action of neither single buyer nor single seller can influence the market. The transaction costs are negligible. There is free flow of information and all investors are rational and equally knowledgeable
- ❖ **No taxes:** This would now mean that the tax on dividend and tax on capital gain are identical and that as such the investor is indifferent as to the form the rewards will flow in
- ❖ **Fixed investment policy:** Companies invest every year in capital expenditure plans and the same are assumed to take place at the end of the year
- ❖ **No risk of uncertainty:** Businesses have risks (quantifiable) but they do not have uncertainty
- ❖ No external funds

$$nP_0 = \frac{(n + m) * P_1 - I_1 + X_1}{1 + K_e}$$

Where:
P_0 = CMP; n = Present no. of shares; P_1 = Year end MP
m = Additional shares issues at year end market price to finance capex
I_1 = Investment made at year end; X_1 = Earnings of year 1
K_e = Cost of equity

Note: The market capitalization is not affected whereas market price does change

Steps:

Description	Formula
Step 1: Compute year-end MP	$P_1 = P_0 * (1 + K_e) - D_1$
Step 2: Compute money available as retained earnings	Retained earnings = PAT – Equity dividend
Step 3: Compute money to be raised at year end	Fresh equity = Investment in Y_1 – Step 2
Step 4: Compute shares to be raised at year end	Step 3 / Step 1
Step 5: Compare LHS and RHS of MM equation	

Valuation of firm in MM model:

Particulars	Amount
EBIT	XXX
Less: Interest	(XXX)
EBT/EAT/Dividend	
Cost of debt	
Cost of equity	
Cost of capital	
Value of debt	Interest/Cost of debt
Value of equity	Dividend/ Cost of equity
Value of firm	EBIT/ Cost of capital

```
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                          │  Financial   │
                          │   Markets    │
                          └──────┬───────┘
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   │   Market    │        │   Market    │        │   Market    │
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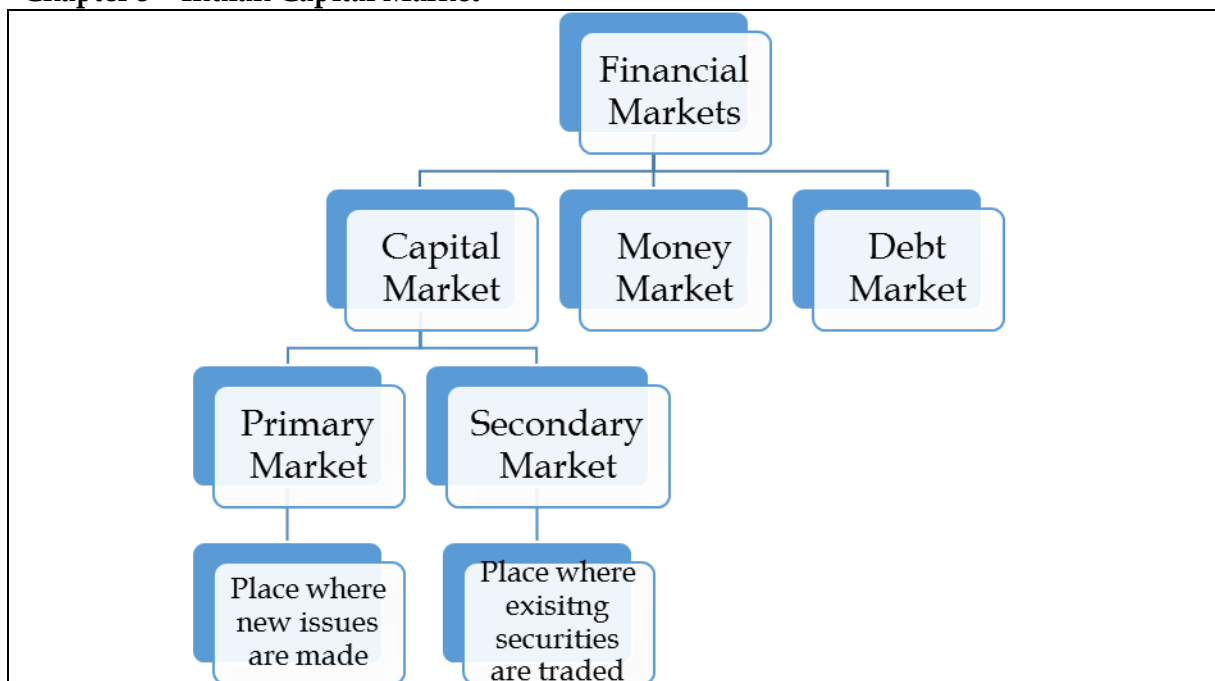
Basics of derivatives:
❖ A derivative contract is a financial instrument whose payoff structure is derived from the value of the underlying asset

Example: Ticket Price of IPL match is Rs.1,000 but the same is fully sold out. A reference letter is given to buy 3 tickets by paying the price of the ticket

Day	Grey Market Price	Value
T – 7	1,250	
T – 5	750	
T – 3	1,500	
T – 1	1,600	
T	1,800	
T + 1		

❖ The letter is a derivative instrument. It gives you the right to buy the tickets
❖ The underlying asset is the ticket
❖ The letter does not constitute ownership
❖ It is a promise to convey ownership
❖ The value of the letter changes with the value of the ticket

What can be an underlying asset?
❖ Stock (Equity)
❖ Commodity (Cotton)
❖ Precious metals (Gold)
❖ Foreign currency ($)
❖ Interest rate
❖ Market index (Sensex/Nifty)

Types of derivative contracts:

Forward contract:

Meaning:	Features:
A forward contract is an agreement entered today under which one party agrees to buy and the other party agrees to sell an asset on a specified future date at an agreed price	❖ Unique – No transfer can be made ❖ Performance obligation – Both parties obliged to perform ❖ Price risk is eliminated ❖ No margins ❖ Default risk ~ There is no guarantee of performance ❖ Illiquid – FC cannot be traded

Futures contract:

Meaning:	Features:
A futures contract is a standardized contract between two parties **where one of the parties commits to sell and the other permits to buy** a specified quantity of a specified asset at an agreed price on a given date in the future	❖ Standardized quantity ❖ Deal with clearing house ❖ Market to Market

Options Contract:

Meaning:	Features:
A contract between two parties under which the "buyer of the option" buys on payment of a price (premium) **the right and not the obligation to sell (put option)**, a standardized quantity (contract size) of a financial instrument (underlying asset) at or before a pre-determined date (expiry date) at a predetermined price (exercise price or strike price).	❖ Standardized quantity ❖ Deal with clearing house ❖ Market to market

Why derivative instruments:
- ❖ A derivative market is a market for derivative instruments. We need a derivative market because they perform three useful economic functions.

1. **Different Players and different objectives:**	2. **Price Discovery:**	3. **Risk transfer:**
Each player in the market has different objectives. Following are the objectives of the different players: ❖ Hedger – To protect	❖ Low transaction cost ❖ High return ❖ Price changes	❖ Like an insurance company ❖ Redistributes the risk to market players ❖ Premium is the protection against

against the adverse price changes ❖ Arbitrageur – Looks for prospects in 2 different markets for riskless gains ❖ Speculator – Take risk in order to make profit during adverse market movement	are first reflected in this market	adverse price movement

Futures:

Key concepts:

1. **Continuous compounding:**
   ❖ 12% rate of interest has a different effective annual rate if it is compounded at different frequencies as show below:

Compounding frequency	Effective rate
Annually	
Half-yearly	
Quarterly	
Monthly	
Continuous compounding	

   ❖ As the frequency of compounding increases the effective annual rate goes up
   ❖ The effective rate is maximum when compounding is continuous
   ❖ The future value of continuous compounding is got from e^X table and the present value of continuous discounting is got from e^{-X} table
   ❖ e^X values can be arrived using the following formula $1 + (X/1!) + (X^2/2!) + (X^3/3!) + (X^n/n!)$

2. **Arbitrage through futures:**
   ❖ Compute fair futures price
   ❖ Compare fair futures price with actual futures price to take decision

Relationship	Valuation	Futures	Spot	Action
AFP > FFP				
FFP < AFP				

Computation of fair futures price:
Situation 1: Non-dividend paying stock:
   ❖ The underlying asset (stock) does not generate any income for the investor.

> Fair futures price = Spot rate * e^X
> Where X = r * t; r = rate per annum; t = time in years

Situation 2: Dividend paying stock:
   ❖ This refer to assets (stock) which generate income or dividend during the period of the futures contract
   ❖ In this case the spot price should be adjusted with the present value of the income

> Fair futures price = Adjusted Spot rate * e^X
> Where Adjusted spot rate = Spot rate – PV of dividend income

Situation 3: Known yield
   ❖ At times the income is expressed as a % of spot price. This is called yield
   ❖ Since this is a %, it must be deducted from r

> Fair futures price = Adjusted Spot rate $* e^{(r-y)t}$
> Where r = risk free rate; y = known yield ; t = time in years

Situation 4: Storage costs:
   ❖ In respect of physical assets like Gold there is no intervening income. There are only intervening costs namely storage costs
   ❖ If the storage cost is expressed in rupees the adjusted spot price will be normal spot price + PV of storage cost
   ❖ If the storage cost is expressed as a percentage, then storage cost percentage is added to r
      o FFP = Spot price $* e^{(r+S)t}$

Convenience yield:
   ❖ It is an implied return on holding inventories. It is an adjustment to the cost of carry in the non-arbitrage pricing formula for forward prices.
   ❖ This is the amount of benefit that is associated with physically owning a particular good
   ❖ Fair Futures Price = Spot Price + Cost to Carry – Convenience yield

Hedging with futures:
   ❖ To hedge (protect against price risk) we must take a position in the futures market, which is opposite of the position taken in the spot market
      o If we are long in the spot market, we must go short in the futures market
      o If we are short in the spot market, we must go long in the futures market
   ❖ If we seek only partial protection, the value of the position to be taken in the futures market is as under:
      Value of futures position = Spot position * Protection needed (%)
   ❖ If the stock for which hedging is required is not traded in the futures market, we can create a cross hedge by taking a position in index futures. Position to be taken is as under:
      Value of futures position = Spot position * Protection needed (%) * Beta

Hedging through index futures:

No. of contracts = Beta * Value of units requiring hedging
                   Value of one futures contract

Example:
X Limited has a beta of 0.8. Mr. A holds 5000 shares of X Limited whose CMP is Rs.300 per share. Index future is 30000 points and has a multiplier of Rs.30. What action should be taken in order to hedge?

Impact of hedging:
- ❖ If we are long in one market and price goes up we gain
- ❖ If we are short in one market and price goes up we lose
- ❖ If we are long in one market and price falls we lose
- ❖ If we are short in one market and price falls we gain

Position	Price	Impact
Long	Up	Gain
Long	Down	Lose
Short	Up	Lose
Short	Down	Gain

How to compute Hedge ratio (Beta)
- ❖ Beta measures the sensitivity of a stock to a broad based index. Beta of 2 times would indicate that a 1 percent change in index will lead to a 2 percent change in stock price (concept of Beta is explained in detail in portfolio management)

Beta = Change in spot prices * Co-relation coefficient
          Change in future prices

How to alter risk in portfolio:

Situation 1: Reducing risk	Situation 2: Increasing risk
Method 1: Sell portfolio and buy risk free investment	**Method 1: Borrow money and buy securities**
❖ **Step 1:** Let weight of the stock in the new portfolio is W1. So weight of risk free investment is 1 – W1	❖ **Step 1:** Let weight of the stock in the new portfolio is W1. So weight of borrowings is 1 – W1
❖ **Step 2:** Compute weighted average of step 1 and equate the same to the new desired beta	❖ **Step 2:** Compute weighted average of step 1 and equate the same to the new desired beta
❖ **Step 3:** The proportion of (1-W1) of old portfolio will be sold and be replaced with risk free investment	❖ **Step 3:** The proportion of (1-W1) of old portfolio will be borrowed to buy additional stocks
❖ **Step 4:** All stocks in the portfolio will be sold for the value identified in step 3 in the proportion in which they were held in the original portfolio	❖ **Step 4:** The same old stocks will be bought in the proportion in which they were originally held
Method 2: Keep portfolio intact, sell stock index futures	**Method 2: Keep portfolio intact, buy stock index futures**
No. of contracts to be dealt = **Portfolio value * [Desired Beta – Existing Beta]** **Value of one futures contract**	No. of contracts to be dealt = **Portfolio value * [Desired Beta – Existing Beta]** **Value of one futures contract**
Note: If the result is (-) it means sell and if the result is (+) it means buy	Note: If the result is (-) it means sell and if the result is (+) it means buy

Concept of Mark to Market and margin account:

❖ The stock exchange wants the derivative players to maintain the margin accounts to safeguard against the risk of default

❖ **The initial margin to be maintained is equal to average daily absolute change + 3 (Standard deviation)**

❖ The margin balance will change with daily profits/losses being credited/recovered from the margin account. This concept is also known as mark to market wherein the company's derivatives are valued daily at the closing price

❖ The margin balance cannot fall below a specified limit which is also knows as maintenance margin. In case the margin account drops below the maintenance margin then the derivative player is required to replenish the account to the level of initial margin

❖ The derivative player can withdraw the balance from the margin account in case the balance is above initial margin. However the maximum withdrawal will be upto to the point of initial margin

Open Interest:

❖ Open interest is the total number of open or outstanding (not closed or delivered) options and/or futures contract that exist on a given day

❖ Open interest is commonly associated with futures and options markets, where the number of existing contracts changes from day to day unlike the stock market wherein the number of shares remain constant unless new issues are made

❖ Open interest is a measure of flow of money into a futures or options market. Increasing open interest represents new or additional money coming into the market, while decreasing open interest indicates money flowing out of the market

❖ An increase in open interest is typically interpreted as a bullish signal while decreasing open interest is interpreted as a bearish signal

Basics of option contract:

Term	Meaning
Holder	Buyer of the "Right to buy" or "Right to sell"
Writer	Person who sells the "Right to buy" or "Right to sell"
Exercise price / strike price	Price at which the underlying asset will be bought or sold
Expiry date	The date by which the option has to be exercised
Call option	This gives the buyer the right to buy
Put option	This gives the buyer the right to sell
Underlying asset	Asset against which the derivative instrument option is traded
American option	Right can be exercised at any time before the expiry date
European option	Right can be exercised only at the expiry date

When to exercise an option:

Relationship	Call option	Put option
Exercise price > Market price		
Exercise price = Market price		
Exercise price < Market price		

Note:

❖ Only buyer can exercise an option

❖ Option premium is irrelevant because the same is a sunk cost

In the money (ITM) / Out the money (OTM) and At the money (ATM):
  ❖ An option is in the money if exercising the option at that point would give a gain
  ❖ An option is out the money if exercising the option at that point would lead to a loss
  ❖ An option is at the money if exercising the option at that point would lead to neither profits nor losses
  ❖ In all the above cases, the option premium being a sunk cost is irrelevant

Relationship	Status for call	Status for Put
Exercise price > Market price		
Exercise price = Market price		
Exercise price < Market price		

  ❖ The phrase ITM, OTM and ATM are used in relation to the buyer. Therefore while in the money is good for the buyer, it is bad for the writer
  ❖ Similarly OTM is bad for the buyer it is good for the writer

Taking stance:
  ❖ Whether a derivative player want to be a buyer (holder) or a writer would depend on his ability to take risk
       o Maximum risk = Writer
       o Minimum risk = Holder
  ❖ A buyer would prefer that option which lead to him an exercise on the maturity date
  ❖ A writer would prefer that option which would lead to lapse on the maturity date
  ❖ In order to take a stance we need to compare the exercise price with expected market price

Bullish and Bearish Market:
  ❖ A bullish market is one where the expected MP is greater than the exercise price
  ❖ A bearish market is one where the expected MP is lesser than the exercise price

Party	EMP > EP	EMP < EP
Call Buyer		
Call Writer		
Put Buyer		
Put Writer		

Note:
  ❖ Favourable means making money and adverse means losing money. For a buyer the position is favourable if it is exercisable and for a writer the position is favourable if it lapses

Intrinsic value and time value:
  ❖ Intrinsic value is the extent to which the option is in the money if it ITM
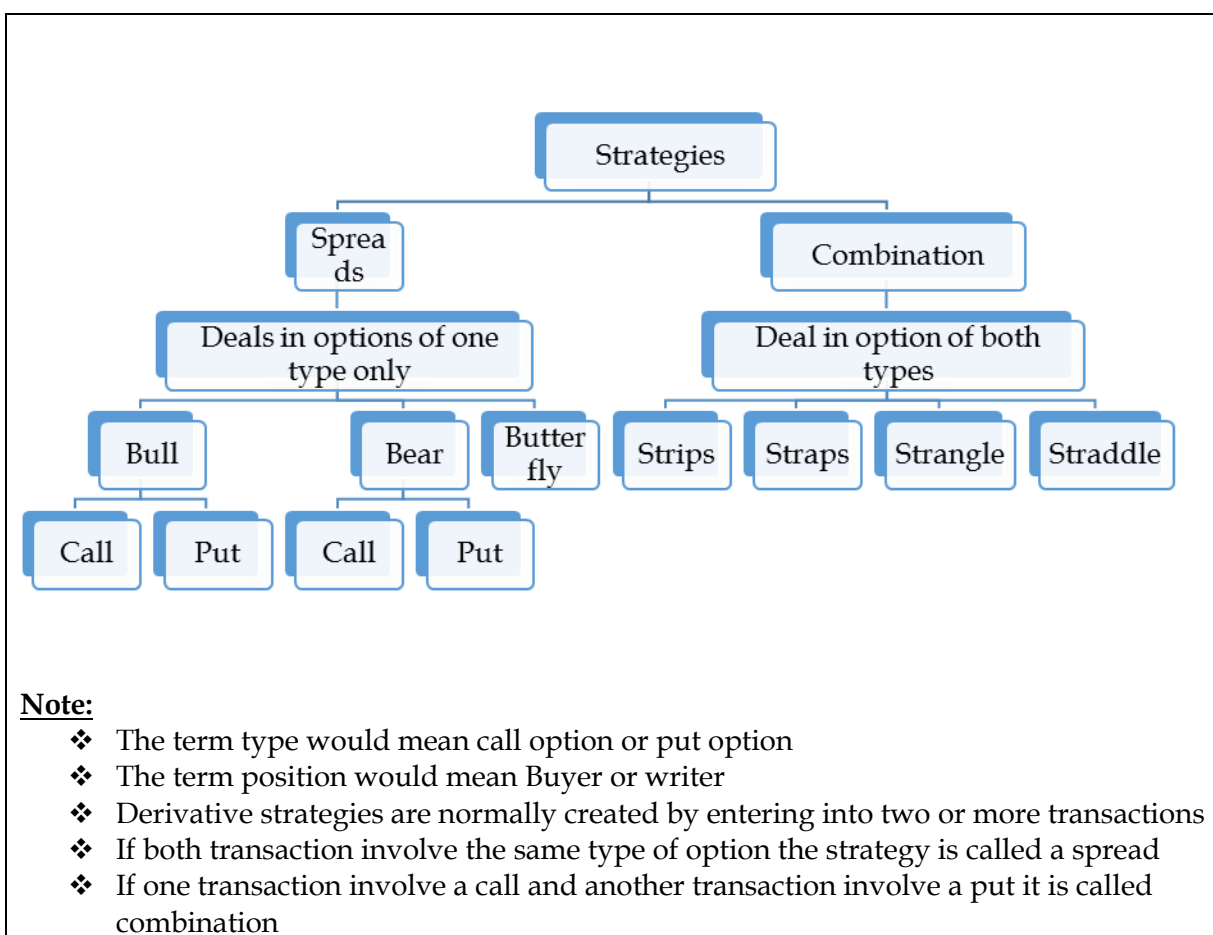 ❖ Time value is the difference between option premium and intrinsic value

Option Strategies:

Payoff table and Payoff graph:
  ❖ The payoff table captures the net profit at various expected MP on expiry date
  ❖ Such tables are drawn for call buyer, call writer, put buyer and put writer
  ❖ When an option is exercised, the buyer gains and the writer lose at gross payoff level

- ❖ Gain or loss at the net payoff level will depend on the extent of premium
- ❖ When an option in lapsed, neither the holder nor the writer gain or lose at the gross payoff level
- ❖ A payoff graph is a graphical representation of the payoff table with market price on X-axis and net payoff on Y-axis

Which option what premium?

- ❖ The option with the lowest exercise price is called E_1. The one with the higher EP is called E_2
- ❖ Example: EP of 90, 110 & 98. Then E1 = 90, E2 = 98 & E3 = 110
- ❖ The call with a lower EP has a greater probability of being exercised and therefore command a higher premium
- ❖ A put with a higher exercise price has a greater probability of being exercised and therefore command a higher premium

Note:

- ❖ The term type would mean call option or put option
- ❖ The term position would mean Buyer or writer
- ❖ Derivative strategies are normally created by entering into two or more transactions
- ❖ If both transaction involve the same type of option the strategy is called a spread
- ❖ If one transaction involve a call and another transaction involve a put it is called combination

Bull spread strategy:

There are two ways of creating a bull spread:

- ❖ Buying a call at E1 and writing a call at E2
- ❖ Buying a put at E1 and writing a put at E2

	E1	E2
Call	Buy	Write
Put	Buy	Write

Steps in derivative strategy:

Step 1: Prepare relationship table

- ❖ If there are "n" options then there will be "n+1" relationships
- ❖ The various columns in table and their computation is as follows

Column reference	Column Name	Explanation
1	Relationship	Refer point above
2	E1	Identify action on expiry date and calculation gross payoff
3	E2	Same as above
4	GPO	Column 2 + Column 3
5	Premium	Income (+) for writer and expense (-) for buyer
6	NPO	GPO ± Premium
7	BEP	Equate NPO to zero

Step 2: Breakeven table:

The breakeven table summarizes the outcome of the relationship table with reference to the net pay off column

- ❖ If a relationship has no BEP then it will have only one class interval
- ❖ If a relationship has BEP then it will have 3 columns. One before, one at and one after BEP

Step 3: Draw strategy graph:

- ❖ Strategy graph convert the BEP table into graph. Draw break even table on a graph with expected MP on x-axis and net payoff on y-axis

Bear Spread Strategy:

There are two ways of creating a bear spread:

- ❖ Writing a call at E1 and buying a call at E2
- ❖ Writing a put at E1 and buying a put at E2

	E1	E2
Call	Write	Buy
Put	Write	Buy

Butterfly spread strategy:

- ❖ A butterfly spread involves dealing in 4 transactions and 3 exercise prices
- ❖ You deal either with calls or puts

Way	Option	E1	E2	E3
1	Call	Buy	2 Write	Buy
2	Call	Write	2 Buy	Write
3	Put	Buy	2 Write	Buy
4	Put	Write	2 Buy	Write

Combination strategies:

Particulars	Strip	Strap	Strangle	Straddle
No of calls	1	2	1	1
No of puts	2	1	1	1
Exercise price	Same	Same	Different Call will have higher EP & Put will have lower EP	Same

Note:

- ❖ If the person buys calls and puts then it is called long strategy and in case he sells calls and puts then it is called short strategy
- ❖ For example a long straddle would involve buying one call and one put with same exercise price whereas a short straddle would involve selling one call and one put with same exercise price

Pricing options:
- ❖ Valuation of options means finding out the fair option price
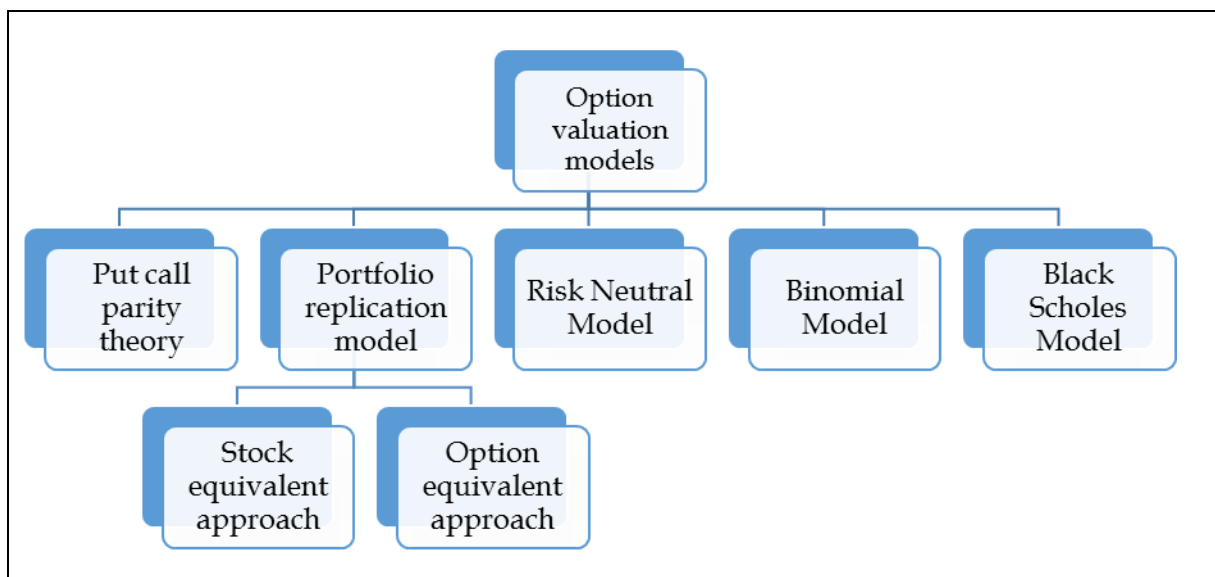
Model 1: Put call parity theory (PCPT)

Share + Put = Call + Present value of exercise price
The formula indicate that the payoff from the following two strategies will always be identical
❖ Buying a share and buying a put   ❖ Buying a call & making an investment equal to present value of exercise price

The above formula can be spun around as follows:
    ❖ Put = Call + Present value of exercise price – Share
    ❖ Call = Share + Put – Present value of exercise price
    ❖ Share = Call + Present value of exercise price – Put
Note: (+) would indicate buy/invest & (-) would indicate sell/borrow

Note:
- ❖   For all option valuation models the share price will get replaced with adjusted share price in case dividends are expected to be paid during tenor of option.
- ❖   Adjusted spot price = Spot Price – PV of dividend income

Model 2: Portfolio Replication Model
Assumptions:
- ❖ The investor can make only two judgements of market prices on expiry date
- ❖ He cannot make judgements of "MP before expiry date"
- ❖ That only 2 judgements of MP are made doesn't mean that their probabilities are 50/50

Stock equivalent approach:	Option equivalent approach:
❖ Compute intrinsic value at two judgement prices	❖ Compute intrinsic value at two judgement prices

❖ Compute no.of calls to be bought using
     o No of calls = Spread in stock price
                   Spread in IV
	❖ Compute the no. of shares to be bought using
	     o No of shares = Spread in IV
	                     Spread in Stock price

❖ Compute risk free investment = Present value of (Lower JP – IV at JP 1)	❖ Compute amount of borrowing using the following formula o Borrowing = PV of [(No. of shares * Lower JP) – IV at JP_1]

❖ Compute value of calls using
     o $S_0 = C_0$ * No of calls + Rf investment
	❖ Compute value of call using
	     o Call = share value bought – borrowing

❖ Compute value of put using PCPT	❖ Compute value of put using PCPT

Model 3: Risk Neutral Model:
Assumptions:
- ❖ Investors are indifferent to risk
- ❖ Investors can make only two judgement prices "MP of stock on expiry date"
- ❖ It is possible to make an estimate of probabilities of upside price & downside price

Steps:
- ❖ **Step 1:** Compute the intrinsic value at 2 judgement prices
- ❖ **Step 2:** Compute upside probability and downside probability by equating the weighted average return with the return from the risk free asset
- ❖ **Step 3:** Expected value of call on expiry date is the weighted average of the values in step 1 with probability computed in step 2 being the assigned weights
- ❖ **Step 4:** Compute the PV of expected value of step 3 by discounting at risk free rate. This gives the value of call
- ❖ **Step 5:** Use PCPT model to value the put

Formula to calculate Probability:

$$\text{Upside Probability} = \frac{e^{rt} - d}{u - d}$$

Where
r = rate of interest per annum; t = time period in years
d = JP 1 / Current Price ; u = JP 2 / Current Price

Model 4: Binomial model:
- ❖ **Step 1:** Draw decision diagram
- ❖ **Step 2:** Identify market price on expiry dates
- ❖ **Step 3:** Write intrinsic value at various judgement price on expiry date
- ❖ **Step 4:** Taking into account the previous probabilities roll back the IV to the base. This is the fair value of the option
- ❖ **Step 5:** Discount the value of step 4 to identify the fair value of option on day 0

Binomial model and American Option:
- ❖ **Step 1:** Draw decision diagram
- ❖ **Step 2:** Identify market price on expiry dates

❖ **Step 3:** Write intrinsic value at various judgement price on expiry date
❖ **Step 4:** The value of each previous node is higher of the following
  ○ Value of immediate exercise
  ○ Value of later exercise
❖ **Step 5:** Roll back to get the option value at base node
❖ **Step 6:** Discount the value of step 4 to identify the fair value of option on day 0

Model 5: Black – Scholes Model:
Assumptions:
  ❖ Applicable only for European options
  ❖ Risk free rate of return is known and is constant over the life of the option
  ❖ The volatility of the underlying asset is known and is constant over the life of the option
  ❖ The underlying asset's CCRFI is known and follows normal distribution pattern
  ❖ The prices of underlying assets cannot be negative
  ❖ No transaction charges & tax

$C_0 = [\{S_0 * N(d_1)\} - \{PV_{EP} * N(d_2)\}]$
Where $d_1 = \dfrac{[\text{Naturallog }[S_0/E)] + [\{r+0.5SD^2\}t]}{SD\sqrt{t}}$
Where $d_2 = \dfrac{[\text{Naturallog }[S_0/E)] + [\{r-0.5SD^2\}t]}{SD\sqrt{t}}$ Or $d_2 = d_1 - SD\sqrt{t}$
S_0=CMP; r =risk free rate per year; t =time in years and E =Exercise Price
Valuation of Put $P_0 = [\{PV_{EP} * N(-d_2)\}\{S_0 * N(-d_1)\}]$

Delta of an option:
  ❖ Delta is a ratio comparing the change in the price of an asset to the corresponding change in the price of the derivative instrument.
  ❖ It is similar to beta of a stock which measures the percentage change in share price for a corresponding change in market
  ❖ **Example:** A stock option having beta of 0.7 would mean that if price of share increased by 1 rupee then the price of the option will increase by Rs.0.7
  ❖ Delta values can be positive or negative depending on the type of option. Call option will have positive delta values as the increase in share price will lead to increase in call value. However put option will have negative delta values as the increase in share price will lead to decrease in put value
  ❖ Call option can have delta closer to 1 for deep in the money options whereas it will have delta value closer to 0 for deep out of the money options

Delta = $\dfrac{\text{Change in option Price}}{\text{Change in stock price}}$ **(or)**   **Delta of call option = $N(D_1)$ of Black Scholes Model**   **Delta of put option = Call delta -1**
Delta values with dividend: ❖ In case the dividend is given in rupees then the current market price of the share is

> to be replaced with CMP – PV of dividend income
> - ❖ In case the dividend is given as % then delta is as under
>   - o Call delta = N (d1) * e^-yt
>   - o Put delta = Call delta - 1
> Where y = Annualized dividend yield in %; Also additionally r is to be replaced with r-y while calculating d1

Delta Hedging:
- ❖ Creating a riskless hedge using options and underlying stock is called as Delta Hedging
- ❖ The investor should aim to make the delta adjusted value of the portfolio as zero to have a delta neutral portfolio

Chapter 6 – Security Analysis
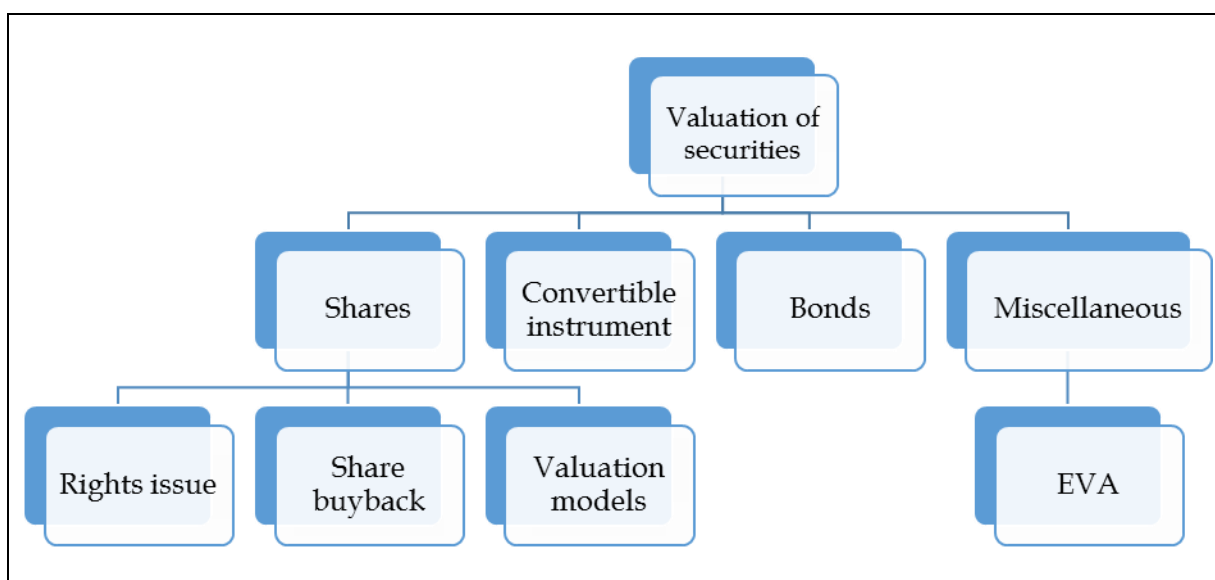
Rights Issue:
- ❖ A rights issue is an invitation to existing shareholders to purchase additional shares in the company
- ❖ The shares are normally issued at a discount to the fair market price
  - o Every shareholder will be given an option to subscribe to the rights shares. The shareholders are also allowed to sell their right. The buyer of the right will get the option to buy the shares at special price
- ❖ A rights issue will not alter the wealth of the shareholder in case he either subscribes to the issue or sells the right. However in case the shareholder takes no action then his wealth will come down

Theoretical ex-rights price = **(Existing shares * Existing Price) + (New shares * Rights Price)**

(Existing shares + New Shares)

Value of one right = Theoretical ex-rights price – Rights Issue price

Buyback of Shares:
- ❖ Buyback refer to repurchase of shares by companies for capital reduction
- ❖ Buyback can be done due to following reasons:
  - o Company has surplus cash

- o Large scale change in capital structure
- o To build confidence among investors
- o To defend against hostile takeover
- ❖ Buyback price means the price at which the shares will be bought back
- ❖ The term theoretical post buyback price means the price at which the share is expected to trade after buyback. The buyback price is fixed that it is equal to theoretical post buyback price

Valuation of shares:

Model	Explanation
Gordon's model or perpetual growth model	❖ The current market price of the share is calculated with the help of formula for present value of growing perpetuity $$P_0 = \frac{D_1}{K_e - G}$$
Walter's model	$$P_0 = \frac{(D)}{K_e} + \frac{\frac{r}{K_e} * (E-D)}{K_e}$$

Step-up growth model	❖ This refer to a scenario where growth happen in multiple stages
	    O Initial stage
	    O Intermediate stage
	    O Final stage
	 Step 1: Calculate dividends till the end of second stage
	 Step 2: Calculate market price at the end of second stage using Gordon's formula
	 Step 3: Discount the above cash flow at investor's required rate of return (K_e) to get the current market price

Price earning multiple method	MPS = EPS * PE Multiple
Free cash flow approach	$$P_0 = \frac{FCF_1}{K_e - G}$$ FCF = PAT – Equity funding for net capex Net capex = Capital expenditure - depreciation

Convertible instrument:

Term	Explanation
Meaning	Convertible instrument refer to those instruments which have an option of converting them into specified number of equity shares within specified period
Conversion value	Value of the instrument post conversion of them into equity shares. This will be valued based on the current market price of equity shares
Conversion premium	Difference between conversion value and the current market price of the convertible instrument. This can be expressed either as a **percentage of conversion value** or per equity share or per convertible instrument

Straight value	Straight value refer to the present value of future cash flows of convertible instrument discounted at investor's required rate of return
Downside risk	Possible fall in the value of the convertible instrument. A convertible bond trades at higher value than its intrinsic value due to option of conversion. However in case the conversion is not going to happen then the bond value will fall to its intrinsic value (straight value) Downside risk = Current Market Price – Intrinsic value
Conversion parity price or market conversion price	Price of an equity share at which the holder of the instrument will have no loss on conversion. **CPP = Current market price of convertible instrument / conversion ratio**
Favorable income differential	A convertible instrument before conversion would give interest income and post conversion would give dividend income. Favorable income differential refers to additional income generated out of convertible instrument
Premium payback period	Conversion premium can be recovered through favourable income differential. This refers to the number of years taken to recover the conversion premium **Premium payback period = Conversion Premium / Favorable income differential**

Economic Value Added (EVA):
- ❖ EVA is a measure of a company's financial performance based on the residual wealth calculated by deducting its cost of capital from its operating profit, adjusted for taxes. EVA can also be referred to as economic profit and it attempts to capture the true economic profit of a company
- ❖ The purpose of EVA is to assess company and management performance. EVA champions the idea a business is only profitable when it creates wealth and returns for shareholders, and requires performance above a company's cost of capital
- ❖ **EVA = {EBIT * (1-Tax rate)} – {Invested capital * WACC}**
- ❖ EBIT has to be adjusted for non-recurring items, extra-ordinary items such as one-time advertisement expenditure, write-off of bad debts, loss due to fire among others
- ❖ Capital employed has to be ascertained on replacement cost basis and not on book value
- ❖ **EVA versus market value added:** EVA is calculated from earnings point of view whereas market value added represents the difference between market value of equity and book value of equity.

Bond valuation:

Term	Meaning
Face value or coupon value	Value written across the face of the certificate
Coupon rate	Interest rate written on the face of the certificate
Maturity value	Value payable at the end of the life of a bond
Yield to maturity	The rate of return earned by an investor who buys the bond today and hold it until maturity
Current yield	Current yield refers to the ratio of interest to current market price

Bond's yield:

❖ A bond will trade above face value if it gives investors a return which is higher than the yield on comparable investments. Such a bond is called premium bond

❖ A bond will trade at a discount if the rate of return is lower than the expected return on comparable instruments. Such a bond is called as discount bonds

❖ The price changes will occur unless the yield is equal to the yield on comparable instruments and then the price will stabilize

Calculation of YTM:

Method 1	Calculate IRR of the bond considering the future cash flows
Method 2 (Short-cut method)	**Post tax interest income + Average other income** **Average funds employed** Post tax interest income = Interest income * (1 – Tax rate) **Average other income = (Redemption value – Net investment)** **Life of instrument** **Average funds employed = (Redemption value + Net investment)** **2**

Realized yield:

❖ Realized yield assumes that interim cash flows from a bond will be reinvested at a realistic reinvestment rate

❖ Terminal value of cash flows is calculated with the reinvestment rate and the same is compared with initial outflow

❖ The IRR of the revised cash flows is the realized yield

Duration:

❖ Duration refers to the number of years at which the bond will have no impact due to interest rate movement

❖ The time period of a bond at which there is no interest rate risk (Immunization)

Steps in computing duration:

❖ Step 1: Compute cash flows of bond till maturity

❖ Step 2: Determine PVF using YTM

❖ Step 3: Market price is sum of present value of cash flow discounted at PVF of step 2

❖ Step 4: Divide each year's cash flow by market to get weights

❖ Step 5: Sum of (time * weights) is duration

Duration of a normal bond = $\dfrac{1 + y}{y} - \dfrac{(1+y) + t(c-y)}{c[(1+y)^t - 1] + y}$ Where y = Required yield (YTM); c = Coupon Rate for the period   t = time to maturity
Duration of perpetual bond = $(1 + y) / y$
Duration of zero-coupon bond = Life of bond

Format for calculation of duration:

Year	Cash flow	PVF @ YTM	DCF	Weight	Year * Weight
1	Interest				

2	Interest				
3	Interest				
4	Interest				
5	Interest + Principal				
Total					

Volatility:
- ❖ Interest rates and bond prices are inversely related
  - o If interest rates go up, then bond prices will come down
  - o If interest rates comes down, then bond prices will go up
- ❖ The % change in bond prices can be computed with the help of the following formula

$$\textbf{Volatility} = \frac{\textbf{Duration * Change in interest rates}}{\textbf{1+YTM}}$$

Bond refunding:
- ❖ Refunding of a bond is an exercise in capital budgeting, since the cash flow structure represents investment decision as shown below

Repayment made today (Y0) = -1000
Interest saved (Y1 to Y5)   = 150
Repayment saved (Y5)   = 1000

- ❖ If the NPV of the above cash flow structure is positive then we should refund the bond
- ❖ If a bond is being refunded and a fresh bond is being raised then this would be similar to replacement decision
- ❖ All rules that apply to replacement decision will equally apply here

Chapter 7 – Portfolio Theory

Notion of Return:
Example:

Company	Year 1	Year 2	Year 3	Year 4	Year 5
X Limited	20%	18%	22%	19%	21%
Y Limited	10%	-10%	40%	25%	35%

- ❖ Return is computed using simple mean and is 20% in each of the above cases.
- ❖ However the Arithmetic mean could be incorrect because if we assume that the stock opens at Rs.100 then one will close at _____ and another will close at __ _____
- ❖ Hence IRR of compounded annual rate of growth is most appropriate indicator of return
- ❖ Despite its limitations, simple mean is used as indicator of return because of following:
  - o It is assumed that each year has equal probability of occurrence
  - o Arithmetic mean is used to compute standard deviation which is a measure of risk

How to compute return?

❖ Return is a function of dividend and capital appreciation. The one year holding period return is calculated as under:

$$\frac{D_1 + (P_1 - P_0)}{P_0} * 100$$

❖ If each year's return has a certain probability of occurrence, the expected return will be the weighted average of return with probability of occurrence being the assigned weight
❖ Other things (risk) remaining the same, the investment with higher return will be selected

Notion of Risk:
❖ Risk refers to volatility of returns and is measured with the help of standard deviation
❖ Standard deviation is a measure of risk and is compute with the help of following formula:

$$\text{Standard deviation} = \sqrt{P d^2}$$

❖ Standard deviation can be measured in rupees or in percentages
❖ Other things (return) remaining the same, the stock with lower SD will be selected
Note: If probabilities are not given in the question then equal probability is to be assumed for every year.

Notion of diversification:
❖ Diversification means investing in more than one stock. Investing in more than one stock is called building a portfolio
❖ Diversification reduces risk if an "economic factor" affects the company in one way and another company in opposite way
❖ **Example:** Summer is good for ice-cream and bad for coffee and investing in both ice-cream and coffee business lead to risk reduction.
❖ **Example:** Investing in ice-cream and soft drink business may not lead to risk reduction because summer is good for both businesses and winter is bad for both businesses
Portfolio:
❖ The return of a portfolio is the weighted average return of securities which constitute the portfolio
❖ The risk of a portfolio is **NOT** the weighted average risk of securities which constitute the portfolio. This is because the risk of a portfolio does not depend only on the securities but also on how the securities **correlate** to each other.

$$SD = \sqrt{(W_1SD_1)^2 + (W_2SD_2)^2 + (2W_1W_2SD_1SD_2COR_{12})}$$
$$COR_{12} = CO\text{-}VARIANCE_{12} / SD_1 SD_2$$

❖ Risk-reduction is set to take place if the risk of a portfolio is less than the weighted average risk of securities which constitute the portfolio
❖ The extent of risk reduction can be as under:

Correlation co-efficient	Extent of risk reduction
-1	↓ even to zero
-1 to +1	↓but not up-to zero
+1	Cannot be reduced

Example:

Stock	Return	Risk
X	10%	6%
Y	8%	3%

❖ Compute return of the portfolio which has 60% of X and 40% of Y
❖ Risk of the portfolio and extent of risk reduction if correlation co-efficient is
  o   -1
  o   +1
  o   + 0.4

Portfolio with minimum risk:
  - ❖ Portfolio risk does not depend only on the standard deviation of individual securities but also on how securities are correlated to each other

Optimum weights with 2 securities:

Weight of security 1 = **Variance of security 2 – Co-variance of 1 & 2**

Variance of security 1 + variance of Security 2 – (2*co-variance of 1 &2)

Weight of security 2 = 1 – weight of security 1

Optimum weight with more than 2 securities (Sharpe's optimal portfolio):
  - ❖ **Step 1:** Calculate excess return (expected return – risk free return) to Beta for all securities
  - ❖ **Step 2:** Arrange the securities in the descending order of the variable computed in step 1
  - ❖ **Step 3:** Calculate [(Excess return * Beta) / $\sigma^2 ci$] for all securities
  - ❖ **Step 4:** Calculate cumulative values for the variable identified in step 3
  - ❖ **Step 5:** Calculate [$Beta^2$ / $\sigma^2 ci$] for all securities
  - ❖ **Step 6:** Calculate cumulative values for the variable identified in step 5
  - ❖ **Step 7:** Calculate cut-off point for all securities.

Cut-off point = [Market variance * Step 4 Value]/[1 + (Market variance * Step 6 value)]
  - ❖ **Step 8:** Identify the maximum cut-off point. Securities till the maximum cut-off point will form part of optimum portfolio
  - ❖ **Step 9:** Calculate Z-value for securities which have been selected to form part of optimum portfolio

Z-Value = [Beta/ $\sigma^2 ci$ * (Excess return to Beta – Maximum cut-off point)]
  - ❖ **Step 10:** Identify the proportion of securities in the final portfolio. The weights of the securities would be in the same proportion as their z-value

How to calculate correlation co-efficient:
  - ❖ **Step 1:** Compute the deviation of each security for each observation from their respective mean
  - ❖ **Step 2:** Multiply the product of these deviations with the probability of occurrence
  - ❖ **Step 3:** The sum of the values of step 2 is the co-variance$_{AB.}$ Co-variance between two securities can also be calculated as Beta of Security 1 * Beta of Security 2 * Variance of market.

  - ❖ **Step 4:** **Correlation co-efficient = Co-variance$_{AB}$ / $SD_A SD_B$**

Return and risk of three securities (Markowitz Model):
  - ❖ **Return:** Weighted average of the securities which constitute the portfolio
  - ❖ **Risk:**
    - o For 3 securities the formula of $(a+b+c)^2$ should be used
    - o To 2ab attach correlation of a and b and 2ac attach correlation of a and c is to be used
    - o a represents W_a * SD_a, b represents W_b and SD_b and c represents W_c and SD_c

Notion of Dominance:

- ❖ Security A dominates Security B if
  - o Security A has higher return for same risk
  - o Security A has same return for a lower risk
- ❖ In that case Security A is said to be a dominating (or efficient) stock. Security B is said to be a dominated (or inefficient) stock
- ❖ Only efficient stocks should form part of a portfolio

Efficiency frontier:
- ❖ Efficiency frontier is a curve which connects all the efficient securities/portfolio
- ❖ The curve should start with minimum SD security/portfolio and all other efficient securities/portfolio are to be plotted on the graph
- ❖ Risk is to be considered on x-axis and return is to be plotted on y-axis

Utility Curve:
- ❖ Efficiency frontier gives a list of various efficient securities/portfolio. However the portfolio to be selected within the list of efficient portfolios would depend upon the risk appetite of the investor
- ❖ Utility of a portfolio is measured with the help of standard deviation and expected return

Utility = Expected return of portfolio – (0.5*aversion factor*variance of portfolio)

- ❖ Utility curve provides the different combination of risk and return which will give same utility. There can be multiple utility curves which gives enhanced levels of utility to and investor. We can call it as Utility curve 1 (u1) giving the highest levels of utility and then U2 giving a moderate level of utility and U3 giving a lower level of utility and so on.
- ❖ The point of intersection of higher utility curve and efficiency frontier will give the portfolio to be selected by the investor

Portfolio of risk free-asset and efficient portfolio:
- ❖ Risk free-asset provides guaranteed return with zero risk. Addition of risk free asset can help in increasing the return while reducing the standard deviation of the portfolio
- ❖ Efficient frontier gives multiple efficient portfolios. However one of the portfolios will be the best and the same can be identified by following a combination of efficient portfolio and risk free asset

Steps
- ❖ **Step 1:** Identify the target standard deviation
- ❖ **Step 2:** Get the weight of the efficient portfolio and risk free asset
  - o Weight of efficient portfolio = Target SD/SD of efficient portfolio
  - o Weight of risk free asset = 1 – weight of efficient portfolio
- ❖ **Step 3:** Calculate the weighted average expected return and select the combination of risk free asset and efficient portfolio which gives the highest return

Notion of non-diversifiable risk:
- ❖ Adding more securities to a portfolio reduce risk but the rate of reduction slows down and after a point tapers off.
- ❖ The number of securities at which risk reduction stops is not known
- ❖ Since risk reduction is not possible beyond a point of time, total risk is broken into
  - o Diversifiable risk [Non-systematic risk]

- o Non-diversifiable risk [Systematic risk]
- ❖ The portfolio manager should eliminate diversifiable risks through diversification and hold only non-diversifiable risk
- ❖ The stock market rewards only non-diversifiable risk
- ❖ Non-diversifiable risk exists because there are certain events (inflation, recession, outbreak of war) which affects all stocks alike

Systematic risk and non-systematic risk:

Particulars	Components	Standard deviation approach	Variance approach
Systematic risk	Interest rate risk, Purchasing Power risk and Market risk	SD of security * Co-relation co-efficient Or (Beta of security * SD of market)	(SD of security * Co-relation co-efficient)^2 Or (Beta of security * SD of market)^2
Non-systematic risk ($\sigma^2 \epsilon i$)	Business risk and financial risk	Total risk – Systematic risk	Total risk – Systematic risk

Note:
- ❖ Co-efficient of determination gives the percentage of the variation in the security's return that is explained by the variation of the market return. Variation on account of index is called systematic risk and balance is called unsystematic risk.

> ## Co-efficient of determination = Systematic risk / Total Risk

- ❖ Total risk of portfolio as per Sharpe Index Model = Systematic risk of portfolio + Unsystematic risk of portfolio
  - o Systematic risk of portfolio = (Beta of portfolio * SD of market)^2
  - o Unsystematic risk = (W_1^2 * Unsystematic risk) + (W_2^2 * Unsystematic risk) + (W_n^2 * Unsystematic risk)

Notion of Beta:
- ❖ Beta is a measure of non-diversifiable risk. Beta measures the sensitivity of a stock to a broad based market index.
- ❖ If the beta of a stock with respect to sensex is 1.5, it means that if sensex changes by 10% then the stock will change by 15%

Nature of Beta	Size	Nature of Investor
Low	<1	Conservative
Unity	=1	Neutral
High	>1	Aggressive

- ❖ Beta is the ratio of **systematic risk** to standard deviation of the market

Formula 1: Beta = $\frac{\sum XY - [n* \text{Mean of } (X) * \text{Mean of } (Y)]}{\sum Y^2 - [n(\text{Mean of } (Y)^2]}$ N = No. of observations ; X = Rate of return of stock; Y = Rate of return of market
Formula 2: Beta = $\frac{\text{Standard deviation of Security * Co-relation co-efficient}}{\text{Standard deviation of market}}$
Formula 3: Beta = $\frac{\text{Co-variance of security and market}}{\text{Variance of market}}$

Beta of portfolio:

- ❖ Beta of the portfolio is the weighted average of beta of individual securities with the amount invested in each security being the assigned weights
- ❖ An individual stock is not diversified and therefore the risk applicable is total risk or standard deviation
- ❖ A portfolio is normally fully diversified and hence the risk applicable is non-diversifiable risk computed with the help of Beta
- ❖ If a portfolio is not fully diversified then the applicable risk is total risk computed with the help of standard deviation
- ❖ **Format for calculation of Beta**

Security	Beta	Weight (Amount invested)	Product

❖ Beta of portfolio = Sum of products/sum of weights

CAPM and Gearing:
- ❖ Based on the liabilities side, a firm can be classified either as unlevered firm or levered firm
- ❖ Based on the asset side, a firm may have single project or multiple projects
- ❖ Based on the above mentioned 2 points the following situations arise:
    - o Unlevered firm & single project
    - o Unlevered firm & multiple projects
    - o Levered firm & single project
    - o Levered firm & multiple projects

Key Principles:
- ❖ Overall beta of assets side = Overall beta of liabilities side
- ❖ If there are several assets, then Beta of assets will be weighted average of beta of various assets
- ❖ If there are several liabilities, then Beta of liabilities will be weighted average of beta of various liabilities
- ❖ The overall beta of a firm is constant irrespective of capital structure. As we introduce more debt in the capital structure the beta of equity will change in such a way that overall beta remains same
- ❖ Two firms operating under same business risk class will have same overall beta irrespective of capital structure. Example: WIPRO and INFOSYS will have same overall Beta
- ❖ The starting beta for overall beta will therefore be beta of the unlevered firm

Proxy Beta:
- ❖ Following organisation will not be able to compute equity beta:
    - o Unlisted companies
    - o Private companies
    - o Partnership firms
- ❖ Such companies can take the overall beta of a similar company as their own beta (proxy)

Overall Beta = Debt Beta (**Value of Debt**) + Equity Beta * (**Value of Equity**)

Value of Firm	Value of Firm

**Note:**
1. In cases taxes are involved then value of debt is replaced with debt * (1- tax rate) and
2. Value of Firm = Value of Debt + Value of equity

Security Market Line:

❖ Security Market Line (SML) is the representation of capital asset pricing model.

❖ It displays the expected rate of return of an individual security as a function of systematic, non-diversifiable risk (Beta).

❖ It is visual of the capital asset pricing model (CAPM) where the x-axis of the chart represent risk in terms of beta, and the y-axis of the chart represents expected return.

❖ Return as per Security market line = $R_f + \beta * (R_m - R_f)$
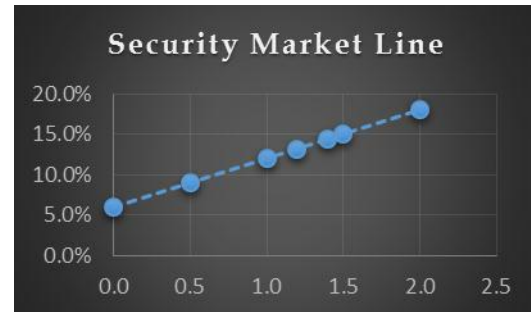
Characteristic line:

❖ Security characteristic line plots performance of a particular security or portfolio against that of the market portfolio at every point of time

❖ It represents the amount by which an individual share price gives a greater or lower return mandated by CAPM. The excess or lower return is denoted as Alpha.

❖ Positive Alpha indicates that the share has outperformed the market and vice versa

Characteristic line = $\alpha + \beta * (R_m)$
Where α = Alpha = Security return – (Beta * Market Return)
β = Beta and R_m = Market Return

Capital Market Line:

❖ Capital market line is used to show the rates of return, which depends on risk-free rates of return and levels of risk for a specific portfolio

❖ **CML Versus SML:** This risk in case of CML is measured through standard deviation while the same for SML is measured through Beta

❖ It depicts the expected return of a security on Y-axis and the standard deviation is depicted on the X-axis

❖ Return as per Capital market line = R_f + (SD of security/SD of Market) * $(R_m - R_f)$

Critical Line:

❖ Critical line is calculated to get the weights of the individual securities in the minimum variance portfolio

❖ We would need combination of two minimum variance portfolio in order to arrive at the critical line

Weight of security 1 = a + b (weight of security 2)
Form two equations and get values of a and b
The critical line will then be written as Weight of security 1 = a + b (weight of security 2)

Example:
Portfolio 1 = Security A = 50%, Security B = 25% and Security C = 25%
Portfolio 2 = Security A = 70%, Security B = 20% and Security C = 10%

Critical line between A and B:

Weight of Security A = a + b(weight of Security B)

0.50 = a + 0.25b ………….. (Equation 1)

0.70 = a + 0.20b…………. (Equation 2)

Solving equations, we get b = -4 and a = 1.5

Critical line: Weight of Security A = 1.50 – 4(Weight of Security B)

Creation of portfolio with Security A, B and C:
- ❖ Weight of security A = 0.70
- ❖ Desired weight of security B = 0.2
- ❖ Balance weight of Security C = 0.1

Critical line between B and C:

Weight of Security B = a + b(weight of Security C)

0.25 = a + 0.25b ………….. (Equation 1)

0.20 = a + 0.10b…………. (Equation 2)

Solving equations, we get b = 0.3333 and a = 0.1667

Critical line: Weight of Security B = 0.1667 – 0.3333(Weight of Security C)

Creation of portfolio with Security A, B and C:
- ❖ Weight of security B = 0.20
- ❖ Desired weight of security C = 0.1
- ❖ Balance weight of Security A = 0.7

Critical line between A and C:

Weight of Security A = a + b(weight of Security C)

0.50 = a + 0.25b ………….. (Equation 1)

0.70 = a + 0.10b…………. (Equation 2)

Solving equations, we get b = -1.3333 and a = 0.8333

Critical line: Weight of Security A = 0.8333 – 1.3333(Weight of Security C)

Creation of portfolio with Security A, B and C:
- ❖ Weight of security A = 0.70
- ❖ Desired weight of security C = 0.1
- ❖ Balance weight of Security B = 0.2

Arbitrage Pricing Theory Model (APT Model)

- ❖ APT is an asset pricing model based on the idea that an asset's returns can be predicted using the relationship between that asset and many common risk factors.
- ❖ CAPM is a single factor model wherein expected return of a security is dependent on a single factor named Beta
- ❖ However share price can be impacted by multiple factors such as inflation, money supply, interest rate, industrial production among others
- ❖ Expected return under APT model is calculated as under:

  Expected return = Risk free return + (Factor 1 * Risk premium of factor 1) + (Factor 2 * Risk premium of factor 2) + (Factor 3 * Risk premium of factor 3) + (Factor 4 * Risk premium of factor 4)

Chapter 8 – Financial Services in India

Factoring:
- Factoring is a financial transaction and a type of debtor finance in which a business sells its accounts receivable to a third party (factor) at a discount

- It is a form of financing used by companies to maintain cash flow. It is more common in certain industries where immediate cash is necessary to operate the business like staffing, textile and printing firms
- **Factoring advantages:**
  - Time Savings
  - Good use for growth
  - Doesn't require collateral
  - Qualify for more funding
- **Factoring disadvantages:**
  - Less control on receivables
  - Cost associated with factoring like commission

Computation of cost of factoring:
Step 1: Compute the amount lent by factor:

Particulars	Calculation	Amount
Credit Sales		XXX
Credit Period		XXX
Average receivables	**Credit sales * credit period / 365**	**XXX**
Less: Reserve	XX % of receivables	(XXX)
Less: Commission	XX % of receivables	(XXX)
Amount eligible to be lent		**XXX**
Less: Interest	Eligible amount * Interest rate (%) * Credit period/365	(XXX)
Amount actually lent		**XXX**

Step 2: Calculation of effective cost of factoring:

Particulars	Calculation	Amount
Costs of factoring:		
Commission	Commission expense as per WN 1 * 365/Credit period	XXX
Interest	Interest expense as per WN 1 * 365/Credit period	XXX
Total costs (A)		**XXX**
Benefits of factoring:		
Savings in administration charges		XXX
Savings in bad debt		XXX
Total Savings (B)		**XXX**
Net Cost of factoring (A-B)		**XXX**
Amount lent by factor	WN 1	XXX
Effective cost of factoring	**Net cost / Amount actually lent**	**XXX**

Chapter 9 – Mutual Funds

Introduction:

- A mutual fund is an **investment vehicle** made up of a pool of funds collected from many investors for the purpose of **investing in securities such as stocks, bonds, money market instruments and similar assets**
- Mutual funds are operated by **fund managers**, who invest the fund's capital and attempt to produce capital gains and income for the fund's investors
- **One of the main advantages of mutual funds is they give small investors access to professionally managed, diversified portfolios of equities, bonds and other securities.** Each shareholder, therefore, participates proportionally in the gain or loss of the fund. Mutual funds invest in a wide amount of securities, and performance is usually tracked as the change in the total market cap of the fund, derived by aggregating performance of the underlying investments.

Classification of mutual funds:
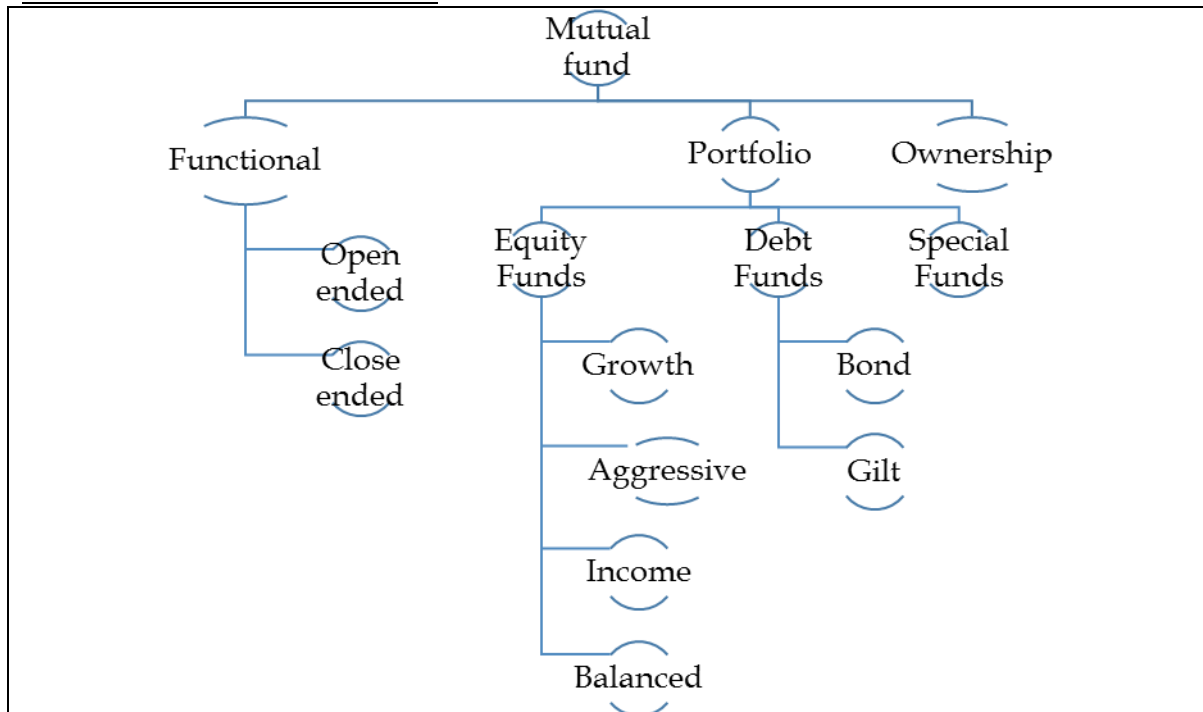
Key players in mutual funds:

Sponsor	Asset Management Company	Trustee	Unit Holder	Mutual Fund
• Company established under companies act to form a mutual fund	• Entity registered under companies act which manages the money invested in mutual fund and to operate the schemes of the mutual fund as per regulations	• Trustee holds the property of the mutual fund in trust for the benefit of the unit holders and looks into legal requirements of operating a mutal fund	• Person holding an undivided share in mutual fund	• Mutual Fund established under the Indian Trust Act to raise money through the sale of units to the public

Advantages and disadvantages of mutual fund

Advantages of Mutual Fund:	Disadvantages of Mutual Fund:
• Professional management • Diversification • Convenient administration • Higher returns • Low cost of management • Liquidity • Transparency • Highly regulated • Economies of scale • Flexibility	• No guarantee of return • Diversification minimizes risk but it does not ensure maximum returns • Selection of proper fund • Cost factor • Unethical practices • Taxes • Transfer difficulties

Net Asset Value:
- ❖ Net asset value (NAV) is value per unit of a mutual fund on a specific date. It is the amount which a unit holder would receive if the mutual fund were wound up
- ❖ NAV per unit is computed once per day based on the closing market prices of the securities in the fund's portfolio
- ❖ NAV per unit = (Value of assets – value of liabilities) / Number of units

Holding Period Return:
- ❖ The total return received from holding an asset or portfolio of assets over a period of time, generally expressed as a percentage.
- ❖ Holding period return/yield is calculated on the basis of total returns from the asset or portfolio – i.e. income plus changes in value. It is particularly useful for comparing returns between investments held for different periods of time.
- ❖ Holding Period Return = Income + (End of Period Value – Initial Value)
                                    Initial Value

Expense ratio:
- ❖ Expense ratio is a measure of what it costs an investment company to operate a mutual fund

- ❖ An expense ratio is determined through an annual calculation, where a fund's operating expenses are divided by the average assets under management (AUM)
- ❖ Operating expenses are paid out of fund's earnings and hence high expense ratio will lead to lower return for unitholders
- ❖ Expense ratio = Operating expenses per unit / Average of opening and closing NAV

Evaluation of MF Performance:

Measure	Description
Sharpe Index [Reward to Variability]	❖ Measures the risk premium per unit of total risk ❖ Sharpe Index = [Return from MF – Risk free return]/SD of MF ❖ Suitable for undiversified portfolio
Treynor Index [Reward to Volatility]	❖ Measures the risk premium per unit of non-diversifiable risk ❖ Treynor Index = [Return from MF – Risk free return]/Beta of MF ❖ Suitable for diversified portfolio
Jensen's Alpha	❖ Return in excess of what has been mandated by CAPM ❖ Jensen's Alpha = Return from MF – Required return as per CAPM

Chapter 10 – Money Market Operations

Money Market:
- ❖ Money Market is market for short-term financial assets which can be turned over quickly at low cost
- ❖ It provides an avenue for investing funds for shorter duration and also for meeting short-term financing needs
- ❖ Some of the instruments dealt in money market are:
  - o **Call/Notice Money:** It is a segment of money market where scheduled commercial banks lend or borrow on call (overnight) or for a short notice (for periods upto 14 days)
  - o **Inter Bank Term Money:** Domestic financial institutions can borrow from other banks for a maturity period of 3 to 6 months
  - o **Inter-Bank Participation Certificate (IBPC):** IBPC are short-term instruments issued by scheduled commercial bank and can be subscribed by any commercial bank
  - o **Inter Corporate Deposit:** This is issued outside the purview of regulatory framework. It provides an opportunity for the corporates to park their short term surplus funds at market determined rates
  - o **Treasury Bills:** Treasury Bills are short term bills issued by Government of India for a discount for 14 to 364 days
  - o **Certificate of Deposits:** The CDs are negotiable term-deposits accepted by commercial bank from bulk depositors at market determined rates
  - o **Commercial Paper:** CPs are unsecured and negotiable promissory notes issued by high rated corporate entities to raise short-term funds for meeting working capital requirements directly from market instead of borrowing from banks.

Chapter 11 – International Finance

Why exchange rate is required?

1. Export	Receive dollars, convert to INR	Hence exchange rate is important
2. Import	Buy dollars and pay dollars	Hence exchange rate is important
3. Global finance	Raise money globally, receive dollars and convert to INR	Hence exchange rate is important
4. Global investment	Buy dollars and pay investment	Hence exchange rate is important

Nature of quotation:
- ❖ Exchange rate is that rate at which one currency is exchanged (bought & sold) for another.
- ❖ **Example:** Rs.12 per apple is the exchange rate between apple and rupees. Rs. is the price and Apple is the product.
- ❖ Rs.65 per dollar is the exchange rate between dollar and rupees. Here Rs. is the price and dollar is the product

Direct quote Vs indirect quote:
- ❖ Direct quote expresses the exchange rate as home currency per unit of foreign currency. Rs.65 per dollar is the direct quote in India.
- ❖ Indirect quote expresses the exchange rate as foreign currency per unit of home currency. Rs.65/dollar is the indirect quote in USA.
- ❖ In short an exchange rate which is a direct quote in one country is an indirect quote in another country.

Conversion of direct quote into indirect quote:
- ❖ A direct quote and an indirect quote are an inverse of each other.
- ❖ Indirect quote = 1/direct quote

Price and Product:
- ❖ In a direct quote home currency is the price and foreign currency is the product
- ❖ In an indirect quote foreign currency is the price and home currency is the product
- ❖ In either case the first currency is the price and the second currency is the product
- ❖ To decide price & product it would be good to view every quote as a direct quote. This is because what is indirect for someone is direct for someone else.

American Term Versus European Terms:
- ❖ An exchange rate which is in the direct mode in USA is said to be in American terms. Example: USD/GBP , USD/INR
- ❖ An exchange rate which is in the indirect mode in USA is said to be in European terms. Example: GBP/USD, INR/USD
- ❖ Internationally all exchange rates are expressed with reference to USD
- ❖ All international quotes except Pound are expressed in European terms [Indirect mode in USA]

Concept: Bid, Ask, Spread and middle rates

Term	Meaning
1. Bid rate	The rate at which the bank buys the product
2. Ask rate	The rate at which the bank sells the product
3. Spread rate	The difference between bid and ask rate
4. Middle rate	Simple average of bid and ask rate. This is used primarily for statistical purpose
5. Spread %	Spread is calculated as a percentage of offer rate when the same is expressed in percentage

Two way quote:
- In a two way quote Bid precedes Ask. Rs.62.50-62.80 per Dollar means that bank is buying dollar at 62.50 and the bank is selling dollar at 62.80.

Quote in decimals:
- The numbers after the decimal are referred to as PIPS.
- If the numbers before the decimal in bid and ask is identical then while quoting the ASK portion of the two way quote only the PIP is quoted. Example: Rs.67.80 – 67.90 per USD is quoted as Rs.67.80-90.
- If the numbers in the PIP are same those numbers are not quoted in the two way quote in case of ASK. Example Rs.12.315-70 / rand mean 12.315-12.370.

Cross rates:
- ❖ Cross rate is the rate which does not contact USD in it. Example: Rs./YEN, Rs/GBP etc/
- ❖ Straight rate is the rate at which has USD in it. Example: Rs/USD, USD/GBP.

Cross multiplication:
- ❖ Cross multiplication is the procedure by which when two exchange rates are given a third exchange rate is ascertained.

Three rules of cross multiplication

Bid ($\underline{A}$) = Bid ($\underline{A}$) * Bid ($\underline{B}$)   C   B   C
Ask ($\underline{A}$) = Ask ($\underline{A}$) * Ask ($\underline{B}$)   C   B   C
Bid (A/B) = 1 / Ask (B/A) ; Ask (A/B) = 1 / Bid (B/A)

Forward rate:
- ❖ Forward rate is the rate that is contracted today for the exchange of currencies at a specified future date
- ❖ In contrast spot rate is the rate at which the currencies are exchanged today
- ❖ The forward rate can be either expressed either as
  - o Outright forward rate
  - o Swap rate
- ❖ The forward differential is called as the swap rate. Example: Spot rate: Rs.62/USD; Forward Rs.64/USD; Swap = Rs2/USD

Spot rate:

❖ Like spot rate which has both bid & ask rate, Forward too has a bid and ask rate, consequently there will be a swap bid and swap ask.

	Spot	Forward	Swap
BID	P	R	R-P
ASK	Q	S	S-Q
Spread	Q-P	S-R	

Rules:
   ❖ In a direct quote if forward rate is greater than the spot rate then the foreign currency is appreciating (at a premium). For example if spot rate is 104 YEN/USD and forward is 106 YEN/USD then USD is appreciating.
   ❖ In a direct quote if forward rate is less than spot rate then the foreign currency is depreciating (at a discount). If spot is 110 YEN/USD and forward is 105 YEN/USD then USD is depreciating.
   ❖ If one currency is appreciating with reference to the other than the other is depreciating with reference to the first currency.
   ❖ If forward bid in points is less than forward ask in points, then forward rate of foreign currency is at a premium.
   ❖ If forward bid in points is more than forward ask in points, then forward rate of foreign currency is at a discount
   ❖ Swap points can be converted into an outright rate by
        o If **ascending order**, Add the swap points to the spot rate
        o If **descending order,** deduct the swap points from the spot rate
   ❖ If the swap points for the desired forward period are not given then the same is to be computed using interpolation method. For example if the swap points for 1, 2 and 3 months are given, then the swap points for 2.5 months can be computed by using interpolation technique on 2 and 3 months swap points

Calculation of % of appreciation/depreciation:
The price of a bottle of coke is Rs.10 today and is expected to be Rs.11, 6 months from now. Compute appreciation/depreciation %?
In the case of a direct quote

   ❖ For the product the formula is $\dfrac{(\text{Forward – spot rate}) * 12 * 100}{\text{Spot rate} \quad m}$

   ❖ For the price the formula is $\dfrac{(\text{Spot – forward rate}) * 12 * 100}{\text{Forward rate} \quad m}$

Interest rate parity theory:
   ❖ High interest rates in a country will be offset by depreciation in a currency of that country.
        o Example: If interest rate in India is 5 percent and that in USA is 2 percent then the rupee is expected to depreciate against the dollar.
        o Example: If interest rate in India is 6 percent and that in England is 9 percent then the dollar will depreciate against the rupee
   ❖ Formula: $\dfrac{1+ R_h}{1+ R_f} = \dfrac{F_1}{e_0}$
        o Where R_h = Risk free rate in home country
        o R_f = Risk free rate in foreign country

- o F_1 = Forward rate of foreign currency
- o e_0 = Spot rate of foreign currency
- ❖ If the above equilibrium does not hold good, arbitrage opportunities will open up as a result of which over a period of time the above equilibrium will start holding hold.
- ❖ The interest rates must be expressed for the same period as the forward period.
- ❖ **To arrive at the forward rate:**
    - o Add the appreciation percent of the product to the spot rate
    - o Deduct the depreciation percent of the produce from the spot rate

Arbitrage:
- ❖ Arbitrage involves play in exchange rate differentials. This happens when a product is quoted at two different prices in two different markets.
    - o Space arbitrage means buying and selling at the same time in two different markets (bank A and bank B)
    - o Time arbitrage means entering into contract today to buy & sell in two different period either in the same bank or different bank

Steps in case of space arbitrage:
- ❖ Step 1: Express the exchange rate in different banks in same mode (currency A/currency B)
- ❖ Step 2:
    - o Buy from the bank which has the lower ask rate
    - o Sell to bank which has the higher bid rate
- ❖ Step 3: If the result of step 2 is gain, arbitrage exist.

Steps in case of time arbitrage:
- ❖ Time arbitrage means buying in one market (spot or forward) and selling in another market (spot or forward)
- ❖ Step 1: Compute fair home interest rate using IRPT formula. Home in this would be the first currency in the pair of currencies.
- ❖ Step 2: Identify whether arbitrage exists and record the flow of money as per the following details:

❖ Actual R_h < Fair R_h	❖ From home to foreign
❖ Actual R_h = Fair R_h	❖ No arbitrage
❖ Actual R_h > Fair R_h	❖ From Foreign to Home

- ❖ Show how arbitrage gain works
    - o Borrow in the currency of the country from which money flow in
    - o Convert @ spot rate into the other currency
    - o Invest the converted amount
    - o Take forward cover
    - o Realize the investment along with the interest thereon
    - o Reconvert @ the forward rate
    - o Repay the principal along with the interest thereon
    - o Compute arbitrage gain

Time arbitrage (Bid rate not equal to ask rate)

- ❖ In this case instead of using a detailed formula, we will first check whether there is arbitrage in borrowing from one country and then check whether there is arbitrage in borrowing from another country.
- ❖ While converting we must be clear about selecting the bid or ask rate as the case may be
- ❖ While reconverting we must appropriately select the bid or ask rate as the case may be and this should be kept in mind while taking the forward cover also.

Purchasing power parity theory:
- ❖ High inflation rate in a country is offset by depreciation in a currency of that country.
  - o Example: If the price of bike in India is Rs.50,000 and the same in USA is USD 1000. Then the exchange rate should be Rs.50/USD. If the exchange rate is not Rs.50, then arbitrage opportunities will open up.
  - o If the inflation for the bike is 5 percent in India and 2 percent in USA, the price one year later in India will be Rs.52500 and USD 1020 respectively. The exchange rate will therefore be Rs.51.47 USD.
  - o The rupee has depreciated against the dollar because the inflation rate in India is higher than the rate in USA.
- ❖ Formula: The purchasing power parity formula is as below:

$$\frac{1+ I_h}{1+ I_f} = \frac{F_1}{e_0}$$

  - o Where I_h = Inflation rate in home country
  - o I_f = Inflation rate in foreign country
  - o F_1 = Forward rate of foreign currency
  - o e_0 = Spot rate of foreign currency

Risk Management:

Technique No.1 – Currency Invoicing:
- ❖ The exchange rate risk is eliminated if:
  - o In case of exports the invoicing is in home currency
  - o In case of imports invoicing in home currency
- ❖ Currency invoicing does not eliminate the exchange rate risk in a transaction. It only transfers the risk to the counterparty
- ❖ If the counterparty is unwilling to accept the invoicing strategy an insistence on home currency invoicing can lead to loss of business

Principle: Which invoicing to do
- ❖ The decision on whether to do home currency invoicing or foreign currency invoicing depends on whether the foreign currency is expected to appreciate or depreciate
- ❖ The decision on invoicing will depend on which alternative will lead to higher inflow of INR in case of exports and will lead to lower INR outflow in case of imports
- ❖ The above points are relevant only if the company wants to take advantage of exchange rate risk

❖ If the company wants to avoid exchange rate risk then it should invoice in home currency

Technique No.2 – Leading & Lagging

❖ The term lead means "NOW" and the term lag means "LATER"
❖ Leading a receipt means receiving payment now and lagging a receipt means receiving payment later
❖ Leading a payment means making payment now and lagging a payment means making payment later

S.No	Explanation	Action
1	Dollar depreciating – Exporter $ Asset – Value of asset is falling – Collect money now	Lead
2	Dollar depreciating – Importer $ Liability – Value of liability is falling – Pay later	Lag
3	Dollar appreciating – Exporter $ Asset – Asset is increasing at appreciation rate. If alternative investment rate > appreciation rate. Collect money now and invest in alternative investment	Lead
4	If alternative investment rate < appreciation rate, then collect money later	Lag
5	If there is a cash surplus and dollar appreciating then Alternative investment rate > Appreciation rate %	Lag
6	If alternative investment rate < appreciation rate	Lead
7	If there is a cash deficit and dollar appreciating then Alternative borrowing rate > Appreciation rate %	Lag
8	If alternative borrowing rate > appreciation rate %	Lead

Technique No.3 – Netting:

- ❖ Netting refers to the process by which dues receivable and dues payable between two parties are set off against each other
- ❖ This would require
    - o The receivable and payable are converted to the same currency if they are not in same currency
    - o They mature on the same date

Types of Netting:
- ❖ Bilateral netting – Involves two parties only
- ❖ Multilateral netting – Involves more than 2 parties

Note: Multilateral netting is likely to be feasible only amongst group companies because a company might not like the other company to know at to which company it deals with

Technique 4 - Forward contract:
When to take forward contract:
- • The decision is dependent on
    - o Whether you are an importer or an exporter
    - o Whether the forward rate will be greater than the expected spot rate on the date of maturity of the forward cover
- • Forward cover will be taken if
    - o In the case of importer it results in payment of Lower INR
    - o In the case of exporter it results in receipt of higher INR

Situation	Exporter	Importer
Forward rate > expected spot rate	Take FC	Exposed
Forward rate < expected spot rate	Exposed	Take FC

Cancellation of forward contract:
- • A forward contract can be cancelled if a customer so desires
- • This would be taking a position opposite to that of the original position
- • The cancellation can be done either on due date of before the due date

Step 1: Identify original position
- • Exporter – Sell forward
- • Importer – Buy forward

Step 2: Take opposite position
- • Applicable rate: Spot if you come on due date and forward if you come early
- • No of months forward: No of months by which we are early

Step 3: Amount of settlement – Compare the new rate and the old rate and arrive at the amount of settlement.

Honour of forward contract:
- ❖ A forward contract can be honoured either on due date or early
- ❖ If honour takes place on due date, no further transaction is required except the exchange of currencies at agreed rates
- ❖ If honour happens early following steps are involved
    - A. Identify original position – Forward
    - B. Identify opposite position – Forward

    C. Take new position – Spot
    D. Compute effective rate (A+B+C)
    E. Loss/gain = Original rate – effective rate

Roll over of a forward contract:
- Roll over of a forward contract can take place either
  - Early or
  - On due date
- Roll over involves
  - Identifying the original position
  - Entering into opposite position
  - Entering into new position

Extension of contract when customer doesn't appear on due date:

Cancellation Rate	Spot rate + margin on the date on which customer appears for cancellation
Amount payable by the customer	Difference between customer's original customer rate and cancellation rate as calculated above
Swap loss	It is an amount paid by bank due to cancellation by customer to another bank in the interbank channel. Bank generally does a swap by taking 1 transaction in spot and taking cover by a reverse position in the immediate forward rate. All this is done on due date
Interest on outlay of funds	Bank will charge interest to the customer on the cancellation charges paid by bank by cancelling contract on due date. It is calculated on banks original covered rate and the reverse rate on the maturity date. Interest is calculated for the period of disappearance of the customer from the due date
Total cost to customer	Cancellation charges + Swap loss + Interest on outlay of funds

Money market hedge:
- Money market hedge involves creating a matching dollar liability for a dollar asset for an exporter and vice versa for an importer.

Steps in the case of exporter:
- Step 1: Identify that a foreign currency receivable exists
- Step 2: Borrow foreign currency such that the amount borrowed along with interest thereon mature in value to the foreign currency asset of Step 1
- Step 3: Convert the foreign currency borrowed in step 2 into home currency
- Step 4: Invest the home currency for a period maturing on the date when the foreign currency receivable of step 1 matures
- Step 5: Realize on the maturity value of the home currency investment of step 4 along with investment thereon.
- Step 6: Collect the foreign currency receivable of step 1 and repay the foreign currency liability and interest thereon

Steps in the case of importer:
- Step 1: Identify that a foreign currency liability exists
- Step 2: Identify the amount to be invested to create a foreign currency asset

- Step 3: Borrow money in Home currency (Step 2 * conversion rate)
- Step 4: Convert the value of step 3 to foreign currency
- Step 5: Invest the foreign currency of step 4
- Step 6: Realize the investment along with interest thereon
- Step 7: Settle foreign currency liability of step 2 with realization of step 6
- Step 8: Repay the home currency borrowing along with interest thereon

Miscellaneous areas:

Nostro, Vostro and Loro account:

Type of account	Meaning	Example
Nostro account	A bank's foreign currency account maintained by the bank in a foreign country and in the home currency of that country	ICICI Bank having a $ account with CITI Bank USA
Vostro account	Local currency account maintained by a foreign bank/branch	CITI Bank USA having an INR account with ICICI Bank, India
Loro account	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	

Exchange position versus cash position:
- ❖ Exchange position refers to the extent of overbought/oversold position of a foreign currency by a bank
- ❖ Cash position refers to the actual foreign currency balance maintained in a Nostro account by a bank

Transaction affecting Exchange position and cash position:

Transaction	Exchange position	Cash position
Immediate cash flow (Telegraphic transfer)	Yes	Yes
Demand draft	Yes – Sale Transaction	No. Will be impacted only when the draft is realized
Bills purchase	Yes – Buy Transaction	No. Will be impacted only when the bill is realized
Forward purchase/sale	Yes	No. Will be impacted only on delivery

Note:
- ❖ Exchange position records all purchase and sale of foreign currency irrespective of cash flow.
- ❖ Cash position is impacted only when the cash flow happens for a transaction

International capital budgeting
- ❖ Host country is the country in which investment is made. Home country is the country which is making the investment
- ❖ Example: If China invests in Japan, then Japan is the host country and China is the home country
- ❖ Home currency refers to the currency of the home country and host currency is the currency of the host country

❖ Home currency approach means computing NPV in home currency
❖ Host currency approach means computing NPV in host currency
❖ All cash flows in steps 1,2 and 3 should consistently be either in home currency or the host currency
❖ The appropriate discount rate is the home currency discount rate if the home currency approach is used
❖ The appropriate discount rate is the host currency discount rate if the host currency approach is used

(1+ Risky rate) = (1 + Risk free rate) * (1 + Risk Premium)

❖ The link between the host currency NPV and home currency NPV is the spot rate

Home currency NPV = Host currency NPV * Spot rate

Currency futures:
❖ A futures contract gives the right as well as an obligation to buy/sell a currency at a specified rate on the future date

Futures mechanism:
❖ **Day 1:** Enter into a futures contract to buy/sell a currency at a specified rate. The exchange rate will be different in the spot market and futures market
❖ **Maturity date:**
  ○ Realize/pay the foreign currency amount using the spot rate in the cash market
  ○ Calculate gain/loss on futures position = (Realization using originally contracted rate – Payment using today's futures rate)

Note: The above gain/loss has been calculated on the assumption that company sells the foreign currency initially.

Interest rate options:

Interest rate caps	❖ Buyer of an interest rate cap pays the seller a premium for the right to receive the difference in the interest cost on some notional principal amount if the market interest rate goes above a stipulated "cap" rate ❖ Cap resembles an option that it represents a right rather than an obligation to the buyer
Interest rate floors	❖ A derivative instrument which protects the buyer of the floor from losses arising from decrease in interest rates ❖ The seller of the floor compensates the buyer with a payoff when the interest rate falls below the strike rate of the floor
Interest rate collars	❖ Buyer of an interest rate collar purchases an interest rate cap while selling a floor indexed to the same interest rate ❖ Collar = Cap + Floor. This enables the borrower to restrict the maximum interest outflow. However the buyer cannot benefit from significant fall in interest rates as the minimum floor rate is to be paid ❖ **Collar versus Cap:** Cap and collar both restrict the maximum interest outflow. However the minimum interest outflow is restricted in case of collar. However investor may prefer buying a collar due to lower premium outflow as compared to a cap

Note: Option Premium for every reset period is calculated using the below formula:
(Rate of Premium / PVAF (Fixed rate of interest, Number of periods)) * Notional amount

Forward Rate Agreement (FRA):

- ❖ A forward rate agreement involves entering into an agreement with the bank under which the bank will give loan at a specified interest rate on a specified future date
- ❖ When a bank quotes a FRA it will give the rate at which it will borrow money and the rate at which it will lend money
- ❖ **Example:** Bank quotes FRA at 4%-5%. This would mean that the bank will pay 4 percent interest in future and will receive 5 percent interest in case it lends money
- ❖ 3 X 9 FRA means a customer has entered into an agreement that he would borrow/lend money after 3 months for month 4 to month 9 (6 months)
- ❖ FRA is settled on net-basis. A bank which 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 stipulated forward rate on the settlement date. Conversely the buyer agrees to pay the seller any decrease in interest cost if market interest rates fall below the forward rate
- ❖ The net settlement of FRA is calculated using the below formula:

Notional Principal * (Actual rate – FRA rate) * (Days/360 or 365) * 100
(1 + Actual rate)

- ❖ The differential interest amount in the FRA is discounted at actual interest rate as the FRA is settled in the beginning of the period and not at the end.

FRA versus Interest rate Futures:

- ❖ FRA is an OTC derivative instrument whereas the interest rate futures is traded in the exchange. Bothe instruments helps in fixing the interest rate for a future period
- ❖ Interest rate futures are quoted as 100 – Interest rate. Hence interest rate futures quote of 94 would mean that the future interest rate is 6%
- ❖ No. of contracts = <u>Amount of borrowing</u> * <u>Duration of loan</u>
                        Contract Size   Duration of futures

Interest rate / currency swaps:

- An interest rate swap is an agreement between two parties who exchange interest payments based on a notional principal amount, over an agreed period of time.

Pre-requisites for a swap transaction:

- One party should be stronger than the other. This would mean that it enjoys lower borrowing rates than the other.
- The two parties should have opposite views about the direction of the movement of the interest rates.

Steps in effective swap:

- Step 1: Identify the rates – This involves tabulating the rates applicable to the two companies.
- Step 2: Compute the net differential
  - Difference in fixed rates
  - Difference in floating rates
  - Net differential
- Step 3: Split the net differential between two companies
- Step 4: Identify the sequence of operations.

S.No	STRONGER Company wants floating rate	STRONGER Company wants a fixed rate

	Operations from view point of strong company	
1.	Pays bank at fixed rate	Pays bank at floating rate
2.	Receives from counter party fixed rate as per sequence 1 plus strong company's share of gain	Receives from counter party floating rate as per sequence A plus strong company's share of gain
3	Pays counter party the floating rate which strong company is entitled to from the market	Pays counterparty the fixed rate which strong is entitled to from the market
4	Aggregate after correctly considering the signs. This will be STRONG Company's revised floating rate.	Aggregate after correctly considering the signs. This will be STRONG company's revised fixed rate
	Operations from view point of weaker company	
5	Pays bank at floating rate	Pays bank at fixed rate
6	Pays the fixed rate identified in sequence 2 above to the counter party	Pays the floating rate identified in sequence 2 above to the counter party
7	Receives the floating rate identified in sequence 3 above from the counter party	Receives the fixed rate identified in sequence 3 above from the counter party
8	Aggregate after correctly considering the signs. This will be WEAK's revised fixed rate	Aggregate after correctly considering the signs. This will be WEAK's revised floating rate

Calculation of fixed rate under swap

Step 1	❖ Calculate forward rates under the floating rate mechanism. The forward rates can either be calculated using expectation theory or on the basis of non-compounded rates
	❖ Example: Interest rate for 3 months = 8%; Interest rate for 6 months = 9%
	❖ **Expectation theory:**
	     ○ FVF for 3 months = 1.02
	     ○ FVF for 6 months = 1.045
	     ○ FVF for 3 to 6 months = 1.045/1.02 = 1.02451
	     ○ Interest rate for 3 to 6 months = 2.45% or 10.17% per annum
	❖ **Non-compounded rates:**
	     ○ Interest rate for 3 months = 2%
	     ○ Interest rate for 6 months = 4.5%
	     ○ Interest rate for 3 to 6 months = 2.5% or 10% per annum

Step 2	**Calculate the PVF for every reset period** ❖ PVF for reset period 1 = 1/(1+Forward rate for period 1) ❖ PVF for reset period 2 = PVF for period 1 / (1+ Forward rate for period 2) ❖ PVF for reset period 3 = PVF for period 2 / (1+ Forward rate for period 3
Step 3	**Calculate the fixed rate:** ❖ Get the year and cash flow structure of the bond. The interest will be assumed as X ❖ Discounting has to be done with the PVF as calculated above ❖ Equate the cumulative DCF with the today's value of bond and get the value of X ❖ Get the effective fixed interest rate with the help of X

Valuation of Swap:

Step 1	❖ Calculate the future interest payable for every reset period. Interest is to be calculated both for fixed leg and floating leg
Step 2	❖ Calculate the net interest amount and discount the same using PVF calculated while getting the value of fixed rate

> ❖ The total of the discounted net interest amount is the value of swap

Conventions for calculation of interest:

Interest on a money market instrument is paid on March 31 and September 30. Interest for the period April 1 to June 20 is to be calculated under the following conventions.

Conventions	Numerator days	Denominator days
30/360 basis	April and May will be taken as 30 days irrespective of the number of days. Hence the numerator will be taken as 79 days (19 clean days in June)	Denominator will be taken as 180 (360/2)
Actual days/ 360	April = 30 days ; May = 31 days; June = 19 days Denominator = 80 days	Denominator will be taken as 180 (360/2)
Actual days/ reference period	April = 30 days; May = 31 days; June = 19 days. Denominator = 80 days	April = 30 days; May = 31 days; June = 30 days; July = 31 days; August = 31 days; September = 30 days Denominator = 183 days

Chapter 12 – Mergers, Acquisitions & Restructuring

Why Merge?

- ❖ **Create operating synergies** – Operating synergies can affect margins and growth [Positive impact]
  - o Economies of scale
  - o Greater pricing power from less competition
  - o Combination of different functional strengths
  - o Higher growth in markets
- ❖ **Create financial synergies** – With financial synergies the payoff can be either higher cash flow or lower cost of capital
  - o Merger of a company with slack cash with a company with high-return projects
  - o Increase in debt capacity
  - o Tax benefits
- ❖ **Acquire under-valued firms:** Firms whose actual value is less than fair value
- ❖ **Diversification:** Leads to reduction in total risk. However an already diversified investor may not be excited
- ❖ Managerial self interest
  - o Empire Building
  - o Managerial ego
  - o Board composition and side effects

Synergy gain:

- ❖ Synergy gain is possible when the combined value of two firms is greater than the sum of the value of two firms
- ❖ Synergy gain means the sum of the parts is less than the whole

Methods for distributing gain:

❖ The target company's share of synergy gain will normally be made over to them by the acquiring company at the onset of the merger itself. Should the planned synergy gain not come through, the acquirer loses
❖ The target's share of synergy gain is paid out
  o Either in the form of cash
  o Or in the form of shares in the merged entity

Steps in case of Cash deal:

Step	Description
Step 1	Compute synergy gain
Step 2	Compute value of consideration
Step 3	Target company's share of gain = Consideration less market value of target company
Step 4	Net gain to acquiring company = Step 1 – Step 3

Steps in case of stock deal:

Step	Description
Step 1	Compute synergy gain
Step 2	Compute theoretical post-merger price = [MV of acquiring company + MV of target company + synergy gain] / [Existing shares + shares to be issued]
Step 3	Consideration to target company = Shares issues * Step 2 price
Step 4	Target company's share of gain = Consideration less market value of target company
Step 5	Net gain to acquiring company = Step 1 – Step 4

How to compute swap ratio?
❖ Write the base values (based on which exchange ratio is computed)
❖ Switch it around. Example: EPS of A and T are 10 & 5. The exchange ratio is 5:10

Extent of gain:
❖ When stock deal takes place the percentage gain to the acquiring company is the change in market price (pre-merger & post-merger)
❖ To compute the percentage gain of the target company we must compare the pre-merger price of the target company with the adjusted MP of the merged company
❖ Adjusted MP = New MP * Exchange ratio

Synergy gain and no increase in earnings:
❖ If there is no increase in earnings it can be assumed that there is no synergy gain. Even when there is no increase in earnings synergy gain can be computed if we assume a certain P/E ratio of the merged entity
❖ In this case the MP of the merged entity can be obtained by multiplying the EPS with PE ratio of the merged entity

Exchange ratio and EPS:
❖ If there is no increase in earnings and if the EPS of the acquiring company is to be maintained then the ratio should be in the EPS

Weighted average swap ratio:
❖ The swap ratio is normally based on any of the following variables:
  o Book value per share

- o Fair value per share
- o Market value per share
- o EPS
- ❖ It is also possible to base the swap on more than one parameter by assigning to them appropriate weights and thus arrive at a weighted average swap ratio

Steps in computation:
- ❖ **Step 1:** Based on each agreed parameter compute no. of shares to be issued
- ❖ **Step 2:** Use the given weight and arrive at the weighted average no of shares to be issued
- ❖ **Step 3:** With the weighted average number of shares the exchange ratio can be calculated

How is the final exchange ratio determined?
- ❖ The exchange ratio is likely to be favorable to the company
  - o Which is financially stronger and
  - o Which is less desperate to merge
- ❖ It would also depend on the negotiating skills of two companies

SUMMARY OF ADJUSTMENTS

Qn	Summary
	Chapter 2 – Project Planning and Capital Budgeting
1	❖ Cash flows given for the project has to be mapped to a utility value. Weighted average of the utility value with probability being the assigned weight gives the expected utility value ❖ Select the project which has higher utility value
2	❖ Replacement can happen either today or at the end of year 1, 2, 3 or 4 ❖ Five options will have different life of 8 years, 9 years, 10 years, 11 years and 12 years ❖ Calculate EAC/EAB for various options and select the option which has lowest EAC/highest EAB
3	❖ Calculate the expected cash flow of each year and based on that calculate the NPV of the project ❖ Calculate the standard deviation of every year cash flow ❖ Cash flows are independent in nature. Discount the standard deviation and then again square it. Use the below format: <table><tr><td>Year</td><td>SD</td><td>PVF</td><td>Disc SD</td><td>Disc SD ^2</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table> ❖ Take a square root of the last column to get the SD of cash flow
4	❖ Decision tree will reflect the various possible options ❖ If the project is successful then the company can invest additional amount as the present value of cash flow (4 lacs/10%) is more than the investment amount ❖ If the project is failure then the company need not invest additional amount as the present value of cash flow (1 lac/10%) is lower than the investment amount ❖ **Present value of perpetuity = Perpetuity amount / Rate of return**
5	❖ We need to calculate the upside and downside probability using risk neutral model. The same is summarized in the below table: <table><tr><td>Scenario</td><td>Return</td><td>Prob</td><td>Product</td></tr><tr><td>Upside</td><td>+30%</td><td>P</td><td>30P</td></tr><tr><td>Downside</td><td>-40%</td><td>1-P</td><td>40P-40</td></tr><tr><td></td><td></td><td></td><td>8</td></tr></table> ❖ Sum of the product column is to be equated to 8% and we can get upside and downside probability ❖ Expected value of the project without abandonment option is (130 * upside + 60 * Downside) ❖ Expected value of the project with abandonment option is (130 * upside + 80 * Downside) ❖ Difference between both values will give the value of abandonment option
6	❖ Nominal revenues and costs are to be calculated for every year. Revenues of year 1 = Real revenues * (1+ inflation rate of year 1) ❖ Nominal revenues of year 2 = Real revenue of year 2 * (1+ inflation rate of Y1) * (1+ inflation rate of Y2) ❖ Discount the above cash flows and calculate NPV
7	❖ We should calculate 3 NPV for three different cash flows ❖ Highest NPV will be best case and lowest will be worst case ❖ Probable NPV is weighted average of NPV with probability being the assigned weights ❖ NPV of the worst case with perfect co-relation = Probability of the worst cash flow
8	❖ Soft capital rationing as the fund constraint is due to a decision made by the company

Qn	Summary
	❖ If projects are to be repeated in future then the decision is to be done on the basis of EAB. EAB = NPV/PVAF ❖ **PVAF for a perpetuity is 1/Cost of capital** ❖ If projects are not to be repeated then decision is to be done on the basis of NPV and different combination is to be analyzed. Project Y NPV will increase due to subsidy and the present value benefit due to tax savings in interest and lower interest outflow
9	❖ Probability of project success = Probability of success in year 1 * year 2 * year 3* year 4* year 5* year 6 ❖ Expected Cash flow of last year = Normal cash flow * above probability ❖ Discount the cash flows and calculate NPV
10	❖ Life of the motor bike is 3 years and it can be replaced at end of year 1, 2 or 3 ❖ Calculate EAB for all three options and then decide which option to implement
11	❖ Sensitivity analysis measures the percentage change in input parameter that would lead to reversal in investment decision ❖ Sensitivity (%) = (Change/Base) *100 ❖ Part II – Calculate expected sales volume and get NPV based on expected volume
12	❖ Replacement of the bike can happen at the end of year 1, 2 or 3 ❖ Calculate EAC for different options and find optimum replacement time
13	❖ Cost of capital given in the question has to be assumed as real or nominal ❖ In case the discount rate is real then the same is to be converted into money discount rate ❖ (1+ MDR) = (1+ RDR) * (1+ Inflation rate)
14	❖ Nominal revenues and costs are to be calculated for every year. Revenues of year 1 = Real revenues * (1+ inflation rate of year 1) ❖ Nominal revenues of year 2 = Real revenue of year 2 * (1+ inflation rate of Y1) * (1+ inflation rate of Y2) ❖ Discount the above cash flows and calculate NPV
15	❖ Net benefits to users = Saving in time + Saving in cost of start and stop + Saving in accidents – Incremental expenditure due to added distance ❖ Annual cost to state = Investment cost (EAC) + Maintenance cost – Savings in cost of operating traffic lights ❖ Cost benefit ratio = PV of benefits/PV of costs
16	❖ Discount rate = Rf + Risk Index * (Rm-Rf) ❖ Use the appropriate discount rate and calculate NPV and decide on project
17	❖ Capital recovery factor can be used to calculate PVAF. Capital recovery factor = 1/PVAF ❖ Calculate EAC for the two plants and then calculate the cost per unit and decide on plant to be used
18	❖ Interest becomes a relevant item in this case as the amount of interest varies as per the area ❖ Calculate relevant cash flow and calculate NPV for both options ❖ Tax is not to be considered till there are past losses and post that the appropriate tax is to be calculated. Give effect to tax exemption while calculating taxes
19	❖ EAC is to be computed to decide on the machine as life of two machines are different ❖ EAC = PV of outflow / PVAF (r,life)
20	❖ IRR of the project is 16% and hence the PV of inflow will be same as PV of outflow and with this we can calculate the initial investment ❖ IRR is 16% and discount rate sensitivity is 16%. This will help us in getting the cost

Qn	Summary
	of capital. Based on the cost of capital we need to calculate NPV ❖ Use the fixed cost sensitivity and then get the fixed cost amount ❖ Get the annual units sold with the help of fixed cost amount ❖ Break even units can be calculated as fixed cost/contribution per unit. It can also be interpreted as the level of units at which NPV is zero
21	❖ We need to calculate the upside and downside probability using risk neutral model. The same is summarized in the below table:

Scenario	Return	Prob	Product
Upside	98 (91 + 7)	P	98P
Downside	82 (75 + 7)	1-P	82-82P
			88 (80 +10%)

❖ Sum of the product column is to be equated to 88 and we can get upside and downside probability
❖ The company can go for construction today or wait a year later.
❖ The company will opt for 10 apartments if it construct today as the same give higher profits
❖ Decision at the end of year 1: It can go either for 10 or 15 flats depending on which option give better cash flow. The decision can be different for buoyant market and sluggish market. Expected cash flow at end of year 1 = Buoyant cash flow * upside probability + Sluggish cash flow * Downside probability. Discount this cash flow to year 1 and then decide on when to construct
❖ Value of vacant plot of land = Highest of construction at year 0 or year 1

Qn	Summary
22	❖ Calculate the expected cash flow of each year and based on that calculate the NPV of the project ❖ Calculate the standard deviation of every year cash flow ❖ Cash flows are independent in nature. Discount the standard deviation and then again square it. Use the below format:

Year	SD	PVF	Disc SD	Disc SD ^2

❖ Take a square root of the last column to get the SD of cash flow

Qn	Summary
23	❖ Replacement can happen at end of year 1, 2, 3 or 4 ❖ Calculate EAC for all options and decide what should be the replacement time
24	❖ The company plans to reduce dividend and invest in a project ❖ Get the cash flow of the project and then calculate the NPV ❖ Cash inflow will be written in year 2 = Perpetual inflow from year 3 / Cost of capital ❖ Market price will go up by the amount of NPV per share
25	❖ We need to calculate the upside and downside probability using risk neutral model. The same is summarized in the below table:

Scenario	Return	Prob	Product
Upside	+30%	P	30P
Downside	-40%	1-P	40P-40
			8

❖ Sum of the product column is to be equated to 8% and we can get upside and downside probability
❖ Expected value of the project without abandonment option is (130 * upside + 60 * Downside)
❖ Expected value of the project with abandonment option is (130 * upside + 80 * Downside)
❖ Difference between both values will give the value of abandonment option

Qn	Summary
	Chapter 3 – Leasing Decisions
1	❖ Initial lease rent will be paid in year 0 but the tax benefit for the same will be considered at the end of year 1 ❖ EAC is to be calculated as the life of the lease terms are different
2	❖ The company has to take a loan for both lease option as well as buying the asset ❖ In the lease option loan is to be taken for initial security deposit ❖ Calculate the total cash flow for lease option = Lease rent – Tax benefit on Lease rent + Interest payment for loan – Tax benefit on interest + Principal payment ❖ Select the option which has lower present value of outflow
3	❖ Company follows WDV method and hence the cash flow will vary every year ❖ We need to assume lease rent as X and calculate cash flow of every year ❖ Cash flow = Post tax Lease rental + Tax benefit on depreciation ❖ Discount the cash flow and equate the NPV to zero. This would provide the amount of lease rent to be charged
4	❖ Discount rate is missing and hence the same is to be taken as after tax cost of debt ❖ PV of loan option: Asset cost – Tax saving on depreciation ❖ PV of lease option: Post tax lease rental * PVAF ❖ Select the option which has lower PV of outflow ❖ Sensitivity is to be done by equating the PV of loan option with PV of lease option and accordingly the sensitivity percentages are to be calculated
5	❖ Discount rate is same as after tax-borrowing rate in this case. However the taxes are paid one year in arrears and hence we cannot assume PV of principal and interest to be equal to the amount of loan take ❖ Compute the relevant cash flows and select the option having lower PV of outflow ❖ Annual percentage rate = Effective interest cost = $(1+r)^n$ ❖ Instalment amount = Loan amount/PVAF
6	❖ Cost of capital is different from after tax cost of debt and hence detailed cash flow is to be calculated for loan option ❖ Equate PV of loan option with PV of lease option and get the lease rental to be charged
7	❖ Discount rate is different from after tax cost of debt and hence detailed calculation of cash flows is to be done ❖ Calculate the cash flows of both options and select the option with lower PV of outflow
8	❖ Beta of levered company will also be equal to 3. Earlier the Beta of equity was 3 but the same will now undergo a change as the company has taken debt. Debt will have beta of 0 and equity beta will be a balancing figure to have overall beta of 3 <table><tr><td>Source</td><td>Beta</td><td>Weight</td><td>Product</td></tr><tr><td>Equity</td><td>X</td><td>1</td><td>X</td></tr><tr><td>Debt</td><td>0</td><td>0.18</td><td>0</td></tr><tr><td></td><td></td><td>1.18</td><td>3.54</td></tr></table>❖ Use the equity beta and get the cost of equity and use the same for discounting the cash flows ❖ Stage 1: Decide whether plant is to be acquired. The cash flows will be discounted at post tax-cost of capital of 12% ❖ Stage 2: Lease option will be discounted at 12% as the company will be ungeared ❖ Stage 3: Loan option will be discounted at 13% as the company will become geared and hence the relevant cost of equity is taken for discounting purpose
9	❖ Lease payment will be done at the beginning of the year but the tax benefit for the same is to be taken by end of the year

Qn	Summary
10	❖ Sale and leaseback decision – The tax liability for sale will be considered immediately as the capital gain tax is to be paid once the sale is finalized ❖ Calculate the relevant cash flow of lease option as well as new purchase option and decide the alternative having lower present value of outflow ❖ Interest income is to be considered in sale and leaseback option as fixed deposit is created in that option
11	❖ Simple problem on loan versus lease option
12	❖ The company has to take a loan for both lease option as well as buying the asset ❖ In the lease option loan is to be taken for initial security deposit ❖ Calculate the total cash flow for lease option = Lease rent – Tax benefit on Lease rent + Interest payment for loan – Tax benefit on interest + Principal payment ❖ Select the option which has lower present value of outflow
13	❖ Loan versus lease option with discount rate not same as after tax cost of debt ❖ Loan instalment amount = Loan amount / (1+ PVAF (r,(n-1))
14	❖ The discount rate is different from past tax cost of debt and hence we need to calculate the detailed cash flows showing interest, principal and depreciation benefit is to be done for loan option ❖ PV of lease rentals can be calculated by multiplying the post tax lease rental with PVAF ❖ Select the option which has lower PVAF
	Chapter 4 – Dividend Decisions
1	❖ Price at end of year = Price at beginning * (1 + Ke) – Amount of dividend ❖ Number of shares to be issued = (Investment budget – Retained earnings) / P1
2	❖ Walter's model = [(D/ke) + (r/ke* [E-D])/Ke] ❖ Optimum payout ratio under walter model will be 0% as IRR is higher than cost of equity
3	❖ Project is to be discounted at cost of equity. Ke = (D1/P0) + G ❖ P0 in the above formula is to be taken as ex-dividend price and accordingly cost of equity is to be calculated ❖ Current market cap is Rs.1060 Crores (21.2 * 50 Crores). The new market cap will increase by the amount of NPV and additional investment. The total market cap is divided by 60 crores shares to get the ex-rights price ❖ Post fresh issue price is to be calculated by assuming no of shares as X and accordingly the issue price is to be calculated ❖ Gain under both options will remain same as the benefit of NPV will go only to existing shareholders
4	❖ Price = Dividend/(Ke-G) ❖ Ke will be 10 percent before budget announcement and Ke post budget announcement will be 7% as the investor was only earning 7% post tax return. Divided is tax-exempt in second scenario and hence the we should calculate the price based on discount rate of 7 percent
5	❖ Ke will be taken as inverse of PE multiple ❖ Compare Ke and r and decide on the optimal dividend payout
6	❖ Receipt of Rs.2,000 per annum can be ensured through sale of shares in every year ❖ Price can be calculated by discounting the future cash flows ❖ P3 = D4/(Ke-G). This price is discounted to get P2 and P1
7	❖ Gordon model = D1/(Ke-G) ❖ Growth rate = IRR * Retention ratio
8	❖ Walter's model = [(D/ke) + (r/ke* [E-D])/Ke] ❖ Ke is 8% whereas R is 10% and hence optimum payout ratio is 0%

Qn	Summary
9	❖ Price at end of year = Price at beginning * (1 + Ke) – Amount of dividend
	❖ Number of shares to be issued = (Investment budget – Retained earnings) / P1
10	❖ Price at end of year = Price at beginning * (1 + Ke) – Amount of dividend
	❖ Number of shares to be issued = (Investment budget – Retained earnings) / P1
11	❖ Walter's model = [(D/ke) + (r/ke* [E-D])/Ke]
12	❖ Present price = D1/(Ke-G)
	❖ Second part: Price = EPS * PE Multiple. PE Multiple is inverse of ROE
	❖ Second part: Earning growth model = E1/(Ke-G)
13	❖ Rate of return = Cost of equity = (D1/P0) + G
	❖ Growth changes to 6% and hence Ke will change
14	❖ EPS is Rs.5 per share based on payout ratio of 36% and dividend payment of Rs.1.8 per share
	❖ Price earning multiple is 7.25 and based on that share price is calculated
	❖ Use walter's formula and calculate ke by assuming the same as X
	❖ Limiting value will be the one where the company pays the payout ratio which is opposite of the optimum payout ratio
15	❖ Calculate the EPS for the share
	❖ Assume dividend as x and use walter's model formula to arrive at the dividend payout ratio
16	❖ We will have to assume buyback price as X and post buyback price as 1.1X
	❖ Post buyback market capitalization will be 210 lacs and hence the number of shares will be (210/1.1X)
	❖ Number of shares bought back will be 10 lacs – post buyback shares
	❖ The above amount is to be equated with available surplus cash balance and hence we can calculate the buyback price
	❖ Based on shares bought back we can find the impact on EPS and other requirements of the question
Chapter 5: Indian Capital Market	
1	❖ Interest is to be paid every day and the same will get added to the principal amount in case of floating rate mechanism
	❖ Interest at 7.98% has to be calculated for 2 days as Sunday is holiday
	❖ Total interest under floating rate mechanism is calculated as per the above table
	❖ Derivative bank receives Rs.317 as net settlement and hence interest under fixed rate mechanism will be Rs.317 lower than floating rate mechanism
	❖ Calculate interest rate under fixed rate leg using the above calculated amount
2	❖ Interest rate for USD is 4.50% for 3 months and 5% for 6 months. Amount of 100 will become 101.125 after 3 months and it will become 102.5 after 6 months
	❖ Find the rate which will make 101.125 as 102.5 in 3 months and the same will be taken as 3 month FRA
	❖ 6 month interest rate is 5% and 12 month interest rate is 6.5%. 100 will become 102.5 in 6 months and it will become 106.5 in 12 months.
	❖ Fair FRA rate is one which will make 102.5 as 106.5 in 6 months and compare it with actual FRA to decide on arbitrage mechanism
3	❖ Net assets method = Realizable value of assets – Settlement amount of liabilities
	❖ Profit capitalization method = Current PBT is to be adjusted for non-recurring and new expenses. Calculate future maintainable profits and then capitalize the same at capitalization factor
	❖ Fair Price = Average of net assets price & profit capitalization price
4	❖ Hedge ratio (Beta) = (SD of spot price/SD of future) * Co-relation co-efficient
	❖ Amount to be hedged = Beta * Value of spot position

Qn	Summary
5	❖ Number of futures contract = Beta adjusted value of spot position/Value of one futures contract ❖ The company will make profits on spot position if price increase and will make loss on futures position. The reverse will happen if price reduces
6	❖ Cap option will restrict the maximum interest outflow and will lead to interest savings in case the actual interest rate is higher than cap rate ❖ Amount of premium = [(Rate of premium/PVAF (fixed rate, no. of periods)] * Amount of contract
7	❖ Semi-annual fixed payment = Notional Principal * 8% * (1/2) ❖ Floating rate payment = Notional Principal * 6% * (181/360) ❖ Net settlement = Amount under fixed – Amount under floating
8	❖ Current portfolio beta is the weighted average of beta of various assets forming the portfolio ❖ Revised Beta = Change in portfolio/Change in market
9	❖ Price of futures position = Spot position + Cost to carry ❖ No of contracts = Beta adjusted value of spot position/Value of one futures contract ❖ Gain on short futures position = (Original sell price – adjusted futures price at the end of three months) * No of shares * No of contracts
10	❖ Fixed amount of interest payment for every instalment will be at 10.20% including commission ❖ Floating rate payment will be at PLR + 0.80%. Net amount is to be calculated for every year and the cash flows will be discounted at 10% ❖ NPV of each scenario cash flow is to be calculated and the decision on swap arrangement is to be made
11	❖ **One-year bond:** Rs.91,500 become Rs.1,00,000 in one year. This will give the interest rate for year 1 ❖ **Two year bond:** Inflow is Rs.10,000 in year 1 and Rs.1,10,000 in year 2. The discounted value of these cash flows should give Rs.98,500. This should bring the forward rates of year 2 ❖ Forward rate of year 3 is to be calculated as per the above rule
12	❖ Overall loss for three positions are given. The loss of X Inc and A plc can be computed with the amount of exposure. The loss of index futures position will be the balancing figure ❖ We have to reverse the amount of position in index futures on the basis of loss and the percentage fall in index futures ❖ Index futures position would give us the net beta adjusted value of the portfolio and the same can be used to compute the Beta of X inc
13	❖ Fair futures price = Spot Price * $e^{(rt)}$ ❖ t = no. of days/365; r = rate of interest – Dividend yield ❖ Profit/loss after 28 days = Actual index position was 2450 and we had short the index at 2303.65 for a period after 90 days. The price of it at the end of 28 days would be 2294.24 and based on that profit/loss is calculated ❖ Third part: Profit = Sell rate – Buy rate
14	❖ Initial margin = Absolute change + 3 times of standard deviation of change ❖ Maintenance margin = 75% of initial margin ❖ The margin account would increase/decrease based on daily profits. In case the margin balance falls below 12000 the same needs to be replenished back to 16000 through a margin call
15	❖ The bank has to quote FRA for a period after 2 years and the FRA period is one year

Qn	Summary
	❖ Future value of XYZ after 3 years = 100*1.0448^3
	❖ Future value of XYZ after 2 years = 100*1.0420^2
	❖ Above two amounts are to be compared and based on that FRA is to be calculated. Same treatment is to be done for ABC Limited
	❖ Interest rate guarantee is an option contract with a strike price of 5.04%. The option can be exercised in case the actual interest rate is higher than 5.04% and we can save on interest outflow
16	❖ Post rights price = [(Existing shares * Existing Price) + (New shares * New Price)]/ (Existing shares + New shares)
	❖ Value of right = Ex-rights price – rights issue price
	❖ No impact on wealth if rights is sold/exercised
	❖ Wealth will reduce in case the same is allowed to lapse
17	❖ Beta of the portfolio can be interpreted either as beta of overall portfolio or beta of equity portfolio
	❖ No of index futures = (Beta * value of spot position) / value of one futures contract
18	❖ Fair futures Price = Spot Price * e^(r-y)t
	❖ Y is the yield and the same should be taken as average yield for the period of the futures contract
19	❖ Effective interest rate will be between 4 and 7 percent for the various reset period
	❖ If the interest is lower than 4 percent (Libor + 50 bps) then the company will have to mandatorily pay 4 percent. If interest rate is higher than 7 percent then the interest outflow will be restricted to 7 percent
20	❖ FRA freezes the future interest outflow for an investor. The company wants to borrow after 3 months and for a period of 6 months. Hence it should enter into 3 to 9 FRA.
	❖ The ask rate for 3 to 9 FRA is 5.94 percent and hence the borrowing rate can be freezed at that level
	❖ **Mechanism of FRA:** The company will be paying interest at the actual rate from the borrowing bank. The FRA intermediary will compensate/collect the difference between actual interest rate and FRA rate from the customer. This will ensure that the overall interest rate is freezed at 5.94 percent.
	❖ **Futures contract:** Futures contract is available for the period when the loan is required to be taken. However the loan is required for 6 months whereas the futures contract is for 3 months. Hence we should take
	❖ We will have to sell interest rate futures as we have to be compensated by the other party in case the interest rate goes above 5.85%. The IRF will ensure that interest outflow is at 5.85% irrespective of the actual interest rate
21	❖ Calculate fair futures price. Fair futures price = Spot price * (1 + (r-y)t)
	❖ Compare the same with actual futures price and derive the arbitrage strategy to earn risk less profits
22	❖ The overall buyback size is 30% of surplus cash and the same will be Rs.27 lacs
	❖ Let us assume the buyback price as x and hence the no of shares bought back will be 27 lacs/x
	❖ Post buyback price will be 1.1x and hence the market capitalization of post buyback period is 1.1x (10,00,000 – no of shares bought back) = 200 lacs
	❖ Solve the above equation and get buyback price, no of shares bought back and EPS post buyback
23	❖ A Inc wants to borrow in dollars and in this case they will borrow in Yen and enter into currency swap with B Inc. They will pay 5% to Bank, will receive 6% from B Inc and will pay B Inc at 9%. This will make their effective cost as 8%
	❖ B Inc wants to borrow in yen and in this case they will borrow in Dollar and enter

Qn	Summary
	into a currency swap with B Inc
24	❖ We can enter into futures contract to reduce the loss as the same is available at Rs.18.50 per kg ❖ The company should enter into a sell position in futures market as it has a buy position in spot market ❖ It will be able to sell wheat at Rs.17.50 and it will be earning a profit of 0.95 on futures position. This would take its overall realizations to Rs.18.45
25	❖ The company should enter into a currency swap wherein an USD loan can be swapped with INR on day 0. This will give the required INR for investment ❖ The company can repay the INR loan with profits from the project on Day 365. They will receive USD back and the same can be used for repaying USD loan. In this approach only the profits are exposed to currency risk ❖ Part 2: Swap option will be beneficial as higher inflow can be received from it. If the company does a swap then it need not convert back 500 crores and hence can save itself from rupee deprecation for this quantum
26	❖ Cap settlement will happen when the interest rates are higher than 8%. This is similar to call option which gets exercised when the actual goes above exercise price ❖ Cap settlement will happen when the interest rates are lower than 4%. This is similar to put option which gets exercised when the actual goes below exercise price
27	❖ The current price of share is Rs.420 and the same is expected to reach Rs.428.484 at the risk free rate ❖ Equate the expected values and get the probability. Consider the probability and complete the valuation of the call
28	❖ Fair futures price = Adjusted spot price $* e^{rt}$ ❖ Adjusted spot price = Spot price – PV of dividend income ❖ Cost to carry = Fair futures price – spot price
29	❖ Expiration date cash flow refer to the cash flow which will occur in case you choose to exercise the option ❖ Investment value is the gross payoff and net profit is the net payoff
30	❖ Portfolio beta = Sum of products/Sum of weights ❖ Equate the portfolio to the desired beta and find the desired proportion of risk free asset. Dispose all shares and replace the same with risk free asset ❖ Number of nifty contracts = Amount of portfolio * (Target beta – Current beta) / Value of one futures contract ❖ Beta of the portfolio will remain same even after 2 percent increase in Nifty as other shares would have also moved up and hence the weighted average of portfolio and futures will be 0.91
31	❖ Call option is exercised if the price is above 52 and put option is exercise if the price is below 46
32	❖ Delta hedging is to be done in this question to arrive at an optimum hedge ❖ Delta = Variation in share price / Variation in option price. This will give the combination of number of options and shares to be taken to have an optimum hedge ❖ Option is to be valued based on portfolio replication model ❖ Expected value of option is to be calculated as per binomial model and based on that we need to arrive at expected return
33	❖ Beta of the portfolio is the weighted average of portfolio with Beta being the assigned weight

Qn	Summary
	❖ Fair futures price = Spot Price * e^(rt) ❖ No of contracts = (Amount of portfolio * Protection needed) / value of one futures contract
34	❖ Calculate dividends for first two years. ❖ Calculate market price at the end of year 2. P2 = D3 / (Ke-G) ❖ Discount the above cash flows at 15% and get fair market price. Use this and get PE multiple
35	❖ Amount to be raised = USD 15 million / (100%-2%) ❖ GDR issue price = (Share price * 3 – 10% discount)/Discount rate ❖ Cost of GDR = (D1/(P0-F)) + G
36	❖ Calculate dividends for first two years. ❖ Calculate market price at the end of year 2. P2 = D3 / (Ke-G) ❖ Discount the above cash flows at 15% and get fair market price
37	❖ Portfolio Beta is the weighted average of the beta of the various assets ❖ The company has entered into a long position in Nifty futures and hence it will have loss both in futures and spot position. ❖ Revised Beta = (%loss in portfolio) / (% fall in Nifty)
38	❖ Similar to Question No.12
39	❖ The investor expected rate of return is to be taken as return on equity and based on that growth rate is calculated. Growth rate = Retention ratio * ROE ❖ Ke = (D1/P0) + G ❖ Part two: Growth rate of 13 percent is higher than cost of equity and hence the same is not possible as the price will become negative ❖ Part three: P0 = D1/(Ke-G_
40	❖ Beta of the portfolio is the weighted average of Beta of various securities forming part of portfolio ❖ Fair Futures Price = Spot price * e^(rt). The normal cost of capital can be converted into CCRFI using Natural log values and thereafter e^rt can be computed ❖ Number of contracts = (Spot position * Protection needed * Beta) / (Value of one futures contract) ❖ Number of contracts = [Value of portfolio * (desired beta – Existing beta)]/ Value of one futures contract
41	❖ Expected share price = Weighted average of various prices with probability being the assigned weight ❖ Part two: Option price will be zero in case the exercise price prevails on the maturity date ❖ Part three: Expected option price = Weighted average of various IV with probability being the assigned weight
42	❖ Compute the maximum possible fall in Nifty. The same in this case is 10% ❖ Floor value = Amount of investment – maximum fall ❖ Investment in equity = 2* (Value of portfolio – Floor value) ❖ The investor should initially deposit Rs.2,40,000 in bonds and Rs.60,000 in equity ❖ The allocation will change at every reset period depending on the revised portfolio value
43	❖ Expected share price at the end of month = 421 * e^0.036 ❖ Equate the expected share price to the above value and get the probability of upside and downside movement
44	❖ Current Beta can be computed as the weighted average of the cash portfolio and share portfolio ❖ Revised Beta = (% change in portfolio / % change in market index). The company

Qn	Summary
	would incur loss on both share portfolio and index futures
45	❖ Conversion value = No of shares * CMP ❖ Conversion premium = Can be expressed as per share/equity share or as a percentage of conversion value ❖ Effect on EPS: Before conversion the EAES will reduce and accordingly EPS will be impacted and post conversion no of shares undergo change and hence EPS will be impacted
46	❖ Fair futures price is to be computed by doing monthly interest compounding and then arbitrage opportunity is to be found out ❖ If fair futures price is lower than actual futures price then we should sell the futures and vice versa
	Chapter 6: Security Analysis
1	❖ Fair value of bond is the present value of future cash flows discounted at the yield given in the question ❖ Fair value of preference share =Amount of preference dividend / annual yield
2	❖ The yield of comparable share is 9.6% provided the two conditions on capital gearing ratio and PAT coverage is met. In case of adverse variation then we have to increase the yield on subjective basis ❖ PAT coverage = (PAT + Interest) / (Interest + Preference Dividend) ❖ Capital gearing ratio = (Debt + Preference)/ Equity
3	❖ Straight value = Fair price of the bond arrived by discounting the cash flows at comparable yield of 9.5% ❖ Conversion value = CMP of share * Conversion ratio ❖ Conversion premium = Difference between current market price and conversion value ❖ Percentage of downside risk = The bond price can at max fall to its straight value and hence percentage of downside risk is calculated by comparing the CMP with straight value ❖ Conversion parity price = CMP/Conversion ratio
4	❖ EMA for any day = Previous EMA $\pm$ Adjustment factor ❖ Adjustment factor = EMA exponent * (Difference between day end price & previous EMA) ❖ The market is said to be bullish if the EMA has been on an increasing trend
5	❖ Refer Question No.3 for the formulae ❖ Income differential per share = (Interest income per bond – Dividend income from proportionate shares) / Conversion ratio ❖ Premium payback period = Premium / Income differential per share
6	❖ Interest rate for 1 year, 2 years and 3 years are available ❖ Calculate the expected future value at end of year 1, 2 and 3 for Rs.100. Compare the two prices and get the forward rates ❖ **Part two:** Interest rate for a 5 year bond is 12% as the same is par bond and hence interest rate will be equal to yield. The interest rate increases in the economy leading to increase in yield and hence the bond price will drop. Calculate bond price by discounting the future cash flows at 12.5% and get the revised price. Compare the original and revised price and get the percentage fall in bond price
7	❖ **Initial outflow** = Outflow of old bond – net proceeds of new bond. The call premium on old bond will be immediately available for tax benefit and unamortized discount and floatation cost will be immediately written off. Overlapping interest is to be calculated on the old bond as the same is now an extra interest paid by the company

Qn	Summary
	❖ In-between flows: Compare the cash flow of old bond with new bond and then decide the savings
	❖ Discount the above cash flows at after tax cost of debt and decide on the feasibility of bond refunding
8	❖ Sales will be calculated based on assets turnover ratio. Operating margins will help us in getting EBIT. Interest expense will be calculated as total debt multiplied with effective interest cost.
	❖ Sustainable growth rate = ROE * Retention ratio. ROE = PAT / Amount of equity
	❖ Required rate of return on equity is the cost of equity and based on that fair price of the share is to be calculated
	❖ Compare the current market price with fair market price and decide on investment decision
9	❖ Duration = Sum of year * weights. Weight = DCF of each year / CMP of bond
	❖ Volatility = Duration / (1+YTM)
10	❖ Calculate Ke = Rf + Beta * (Rm-Rf)
	❖ Use Gordon model and calculate the current market price. Price of two shares are different due to difference in Beta
	❖ Compare current market price with Fair market price and decide on investment
11	❖ Refer question No.2
12	❖ Net income is to be interpreted as PAT and we need to reverse work and calculate EBIT.
	❖ EVA = EBIT * (1-Tax) – (Invested capital * WACC)
	❖ The company can declare EVA dividend as the same is the excess earnings. If the dividend is not declared then price of the share will go up
13	❖ The bond can either be converted into shares or be retained as bond. We need to calculate the cash flows of the bond option as that is certain to happen and that would represent the minimum price the investor can pay
14	❖ EVA = EBIT * (1-Tax) – (Invested capital * WACC)
	❖ Invested capital is to be calculated based on replacement cost and EBIT is to be adjusted for non-recurring items
15	❖ Beta of assets = Beta of liabilities side = Weighted average of Beta of liabilities
	❖ Cost of capital is to be calculated as per CAPM formula
16	❖ EPS = Profit / No of shares
	❖ Free cash flow = EPS – (Equity funding for next capex & Working capital)
	❖ Net capex = Capital expenditure – Depreciation
	❖ Equity funding for capex & WC = (Net capex + WC) * (1 – Debt ratio)
	❖ MPS = FCF1 / (Ke-G)
17	❖ YTM of bond X is to be calculated as IRR of the bond. The same YTM is to be used for Bond Y
	❖ Duration = Sum of Year * Weight. Weight = DCF/CMP
18	❖ Post rights price = [(Existing shares * Existing Price) + (New shares * New Price)]/ (Existing shares + New shares)
	❖ Value of right = Ex-rights price – rights issue price
	❖ No impact on wealth if rights is sold/exercised
	❖ Wealth will reduce in case the same is allowed to lapse
19	❖ Similar to question No.7
20	❖ WACC = Cost of debt * Weight of debt + Cost of equity * Weight of equity
	❖ EVA = EBIT * (1-Tax) – (Invested capital * WACC)
	❖ Company with highest EVA is best for investment
	❖ Price = EPS * PE Multiple

Qn	Summary
	❖ PE multiple has to be changed for the debt/equity ratio as higher debt/equity ratio leads to increased risk and vice versa
21	❖ CMP is the PV of future cash flows discounted at 17% ❖ Duration = Sum of year * weight ❖ Volatility = Duration / (1+YTM) ❖ Percentage change in market price = Volatility * 0.75
22	❖ Fundamental value is the straight value of bond without the conversion option ❖ Minimum conversion price = Straight value/conversion ratio ❖ Duration is computed using the normal formula
23	❖ Calculate the future cash flows of the bond and discount it at 16% to get the issue price
24	❖ Similar to question No.16
25	❖ Similar to question no.21
26	❖ The investor needs money after 2 years and hence he should create a portfolio having weighted duration of 2 years. This will ensure that he is not impacted by the interest rate movement ❖ Compute the duration of both bonds and then get the desired weights of both bonds
27	❖ ZCB is to be discounted at 7.5% to get the CMP ❖ 98500 will become 100000 in 81 days and based on that annual yield is to be calculated ❖ Half-yearly discounting is to be done for 10% GOI bond as the interest is paid every 6 months
28	❖ Cost of equity is computed using CAPM and cost of debt is given in the question ❖ WACC = Cost of debt * Weight of debt + Cost of equity * Weight of equity ❖ Use formula of EVA and get the answer
29	❖ Similar to question No.3
30	❖ Intrinsic value of bond is computed as the PV of future cash flows discounted at investor required rate of return ❖ Expected value = Intrinsic value * Beta
31	❖ Price is computed as PV of future cash flows discounted at investor required rate of return ❖ P0 = D1 / (Ke-G) ❖ P3 = D4/ (Ke-G)
32	❖ Similar to question no.7
33	❖ Financial leverage = EBIT / [EBT –(PD/(1-Tax))] ❖ Assume EBIT as X and then compute it ❖ Use the normal formula of EVA to calculate the same
34	❖ Similar to question no.8
35	❖ Interest coverage = EBIT/Interest
	Chapter 7: Portfolio Management
1	❖ Cost of equity is to be computed as per CAPM. The fair price of the share is calculated as D1/(Ke-G) ❖ Beta changes and the same will lead to different Ke and hence the price will undergo a change
2	❖ Beta of portfolio = Weighted average of Beta of various assets ❖ Expected return has to be calculated as per CAPM. We will have to take risk free return as zero
3	❖ Beta of portfolio = Weighted average of Beta of various assets ❖ Consider there are two assets – one is risk free asset and the other one is the risky

Qn	Summary
	portfolio
	❖ Equate the beta to the desired Beta and get the required composition of risk free asset
4	❖ Portfolio Risk = Systematic Risk + Unsystematic Risk
	❖ Systematic Risk = (Beta * SD of Market)^2
	❖ Unsystematic Risk = Sum of [(Weight * Random error (unsystematic risk) ^2]
5	❖ Market risk premium = Market return – Risk free rate
	❖ Beta = weighted average of beta of various combination of assets
6	❖ Compute return of each year. Return = (DPS + Capital appreciation) / MPS
	❖ Beta value = [Summation of XY – n*(Mean of X)*(Mean of Y)] / [Summation of Y^2 – n * (Mean of Y)*(Mean of Y)]
7	❖ Co-efficient of determination = Systematic risk / Total risk
	❖ Systematic risk for Y stock = (Beta^2 * Variance of market)
	❖ Unsystematic risk = Total risk – Systematic risk
	❖ Portfolio risk = Systematic risk of portfolio + Unsystematic risk of portfolio
	❖ Systematic risk of portfolio = Beta of portfolio^2 * Variance of market
	❖ Unsystematic risk = Weighted average of various securities
8	❖ Sensitivity of each stock = Beta = (SD of security/SD of market * Correlation co-efficient)
	❖ Covariance among the stock = Beta of security 1* Beta of security 2 * Variance of market
	❖ Portfolio risk = (a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc +2ac
	❖ Beta of portfolio = Average of three Betas
	❖ Systematic risk of portfolio = Beta of portfolio^2 * Variance of market
	❖ Unsystematic risk = Total risk – systematic risk
9	❖ We need to calculate the Beta of the securities
	❖ We need to then calculate required return using CAPM and then compare with actual return
10	❖ Return of security = (Capital appreciation + Dividend)/ Base price
	❖ Return of market = (Dividend yield + capital gain %)
	❖ Beta of the security can be computed by comparing the security and market returns
11	❖ Beta = [Sigma (XY) – (n)(average of x)(average of y)]/ [Sigma (YY) – (n)(average of y)(average of y)]
	❖ Characteristic line = Alpha + Beta (Rm)
	❖ Alpha = Actual return – Return as per CAPM
12	❖ Beta can be changed through risk free security by equating the weighted beta with the desired beta. The risk free security will be the balancing figure
	❖ Index futures = (Desired Beta – Existing Beta) * Portfolio value / (value of one futures contract)
13	❖ Beta = Variation in security return/variation in market return
	❖ Expected return = Weighted average of two returns with probability of 50% and 50%
	❖ SML = Rf + Beta * (Rm-Rf). Risk free rate will be 7.5% and Rm-Rf will be taken as 8.5%
	❖ Alpha = Actual return – required return as per CAPM
14	❖ Relative risk measurement can be computed by finding the Beta of the portfolio and comparing the same with fair Beta as per CAPM equation
	❖ Composition change can be identified by comparing the expected return as per CAPM and actual return. If the return is lower than expected return then we should sell the stock

Qn	Summary
15	❖ 7% treasury bond is trading at a premium and hence the risk free rate will be only 5% (interest/CMP) ❖ Security beta will be 1 as the return is same as market return ❖ We can use the beta formula and get SD of market and SD of security
16	❖ Return under APT = Risk free rate + (Risk premium of factor 1 * Variation of factor 1) + (Risk premium of factor 2 * Variation of factor 2) + …..
17	❖ Current return is 10% and we will need a return of 10.5%. Assume the composition as W1 and (1-W1) and calculate the weighted average return. Equate the weighted average return to 10.5% and get the composition ❖ Portfolio SD = SQRT [[W1*SD1]^2+ [W2*SD2]^2+ 2W1W2SD1SD2COR12] ❖ Sharp ratio indicates the excess return we generate for the risk(SD) undertaken. We can compute sharpe ratio before and after change in composition. If the sharpe ratio improves then the company has been benefitted owing to the change in portfolio
18	❖ SD to be compute to measure the risk of the individual companies. SD = SQRT (p(d^2) ❖ Portfolio return = Weighted average of individual returns ❖ Portfolio risk = We also need to consider correlation co-efficient while calculating portfolio risk ❖ Optimum weight for minimum risk of security 1= [Variance of security 2 – Co-Variance of Security 1&2] / [Variance of Security 1 + Variance of Security 2 – (2*co-variance of 1&2]
19	❖ Similar to question no.15
20	❖ We need to compute the Beta of the share and the expected return of security and market ❖ Characteristic line = Alpha + (Beta * Rm) ❖ Alpha = Actual return – Required return ❖ Systematic risk = [Beta^2 * Variance of Market] ❖ Unsystematic risk = Total risk (Variance of security) – Systematic risk
21	❖ Correlation co-efficient = Co-variance of security 1&2 / SD of 1 * SD of 2 ❖ Covariance of MFX with MFX is given in the table. The co-relation co-efficient has to be 1 between MFX and MFX. With the help of this we can get the variance of MFX, MFY and market ❖ Beta of MFX = Co-variance of MFX with market / Variance of market ❖ Portfolio return and Beta will be the weighted average return of the securities ❖ Portfolio variance has to be computed considering the co-relation coefficient and the individual variances ❖ Portfolio SD would be the square root of portfolio variance ❖ Expected return is to be calculated based on CAPM equation ❖ Systematic risk = (Beta^2* Variance of market) ❖ Unsystematic risk = Total risk – Systematic risk ❖ Shape ratio = Excess return/SD ❖ Treynor ratio = Excess return/Beta ❖ Alpha = Actual return – required return as per CAPM
22	❖ Beta of the security = Covariance of security and market / Variance of market ❖ Cost of equity = Rf + Beta* (Rm-Rf) ❖ Compute dividends till the end of five years and market price at the end of fifth year as (D6/(Ke-G) ❖ Discount the above cash flows at cost of equity and arrive at intrinsic value
23	❖ Compute cost of equity using CAPM equation and arrive at the fair value of the share for the existing and proposed situation
24	❖ It is assumed that the market consist of one share of Gold Limited, Silver Limited,

Qn	Summary
	Bronze Limited and GOI Bonds
	❖ The market return is the total of overall dividend and capital appreciation
	❖ Return on market portfolio = (Dividend + Capital appreciation) / Value of market portfolio
	❖ Calculate the average Beta of the portfolio by taking a simple average of beta of four assets
	❖ Average portfolio return is 15.7% and average Beta is 0.75. We also have the market return as 16.7%. We can use the CAPM equation and get the risk free return
	❖ We have the risk free rate of return and market return. Beta of four securities are available and hence we can calculate expected return using CAPM
25	❖ Portfolio Beta = Weighted average of Beta of various securities of the portfolio
	❖ Residual variance = Total variance – (Beta^2 * Variance of market)
	❖ Portfolio variance using sharpe index model = Systematic risk + Unsystematic risk
	❖ Systematic risk = (Beta ^2 * Variance of Market)
	❖ Unsystematic risk = (W1^2 * Residual variance of S1) + (W2^2 * Residual variance of S2) + (W3^2 * Residual variance of S3)
	❖ Portfolio variance as per Markowitz model is found out with the help of formula for (a+b+c)^2
26	❖ We need to compute cost of equity as per CAPM equation
	❖ Equilibrium price = D1/(ke-G)
27	❖ Compute cost of equity using CAPM equation and arrive at the fair value of the share for the existing and proposed situation
28	❖ It is assumed that the market consist of one share of Gold Limited, Silver Limited, Bronze Limited and GOI Bonds
	❖ The market return is the total of overall dividend and capital appreciation
	❖ Return on market portfolio = (Dividend + Capital appreciation) / Value of market portfolio
	❖ Expected return of each security is computed with the help of CAPM
	❖ Average return of portfolio is computed with the help of average Beta. Beta will be taken as simple average of four securities and then the CAPM equation is used to compute the average portfolio return
29	❖ Portfolio Beta is to be taken as the weighted average of the Beta of various securities
	❖ Expected return of the portfolio is computed using CAPM
	❖ Security Better can be replaced with Nifty as both have Beta of 1
30	❖ Return of security = (P1-P0)/P0. Get the various returns and the weighted average of the returns will be the expected return
	❖ SD = SQRT (P(d^2))
31	❖ We can compute the market returns and security returns for 2013, 2014 and 2015
	❖ Beta = [Sigma (XY) – (n)(average of x)(average of y)]/ [Sigma (YY) – (n)(average of y)(average of y)]
	❖ We can get the expected return of the security using CAPM formula. Our observation would be on whether the security has achieved the expected return
32	❖ Beta = (SD of security/SD of market) * Co-relation coefficient
	❖ Alpha = Actual return – expected return
	❖ Expected return is to be computed with CAPM formula
33	❖ Beta of portfolio is the weighted average of Beta of individual securities
	❖ Beta = (SD of security/SD of market) * Co-relation coefficient. This formula can be used to compute Beta of Car AC and Window AC
	❖ Beta of split AC can be computed by equating the Beta of split AC with a comparable company Beta. The comparable company Beta is again computed with

Qn	Summary
	the help of the above formula
	❖ Beta of portfolio is the weighted average of the Beta of the above 3 securities
	❖ Cost of equity is to be computed with the help of CAPM formula
	❖ Debt has a return of 5% whereas risk free security has a return of 4% and hence Debt will have a beta and the same can be computed with the help of CAPM equation
	❖ The overall beta does not undergo a change due to change in capital structure and hence we can equate the weighted average of equity and debt beta with the old beta. In this process we would be able to get the equity beta of the company
34	❖ A security dominates another security if it generate higher return for same or lower risk. It can also said to dominate another security if generates same return for lower risk
	❖ Portfolio risk can be calculated as simple weighted average if there is a perfect correlation. We need to compare the risk and return of E with the portfolio return and decide if any portfolio dominates the other one
	Chapter 8: Financial Services
1	❖ Benefits of factoring arrangement: Interest saving on reduced debtors, bad debt saving, administration cost saving
	❖ Cost of factoring arrangement: Factoring fee and higher interest on amount advanced by the factor
	❖ In a non-recourse arrangement the entire bad debt will be borne by the factor and hence the bad debt saving will be entire reduction
2	❖ Step 1: Compute the loan outstanding balance at the end of year using the loan amortization table using the current interest rate
	❖ Step 2: Revised installment amount = Outstanding balance at beginning of third year / [PVAF (r,n)]
3	❖ We can compare the effective interest cost of the new loan wherein the loan structure as – Intial inflow (1,89,540 – swap charges) and we need to pay 36,408 for seven year
	❖ Calculate the IRR and compare it with the current cost of the loan
4	❖ Benefits of factoring arrangement: Interest saving on reduced debtors, bad debt saving, administration cost saving
	❖ Cost of factoring arrangement: Factoring fee and higher interest on amount advanced by the factor
	❖ Debtors has been valued on the basis of cost of sales
5	❖ Step 1: Compute the amount lent by factor – Receivables less commission less withholding portion – this would give the amount eligible for funding and we need to deduct the interest from this to get the amount actually lent
	❖ Step 2: Cost of factoring = Costs– Net benefits; Costs are commission and interest costs; benefits are lower bad debt, saving in administration.
	❖ Effective cost of factoring = Step 2/Step 1
	❖ 20% recourse would indicate that factor can come back to company for 20 percent of bad debt and only 80 percent of the bad debt would be borne by the factor
6	❖ The company can maintain the existing position or it can go with factoring/insurance
	❖ Factoring: Benefits – Saving in bad debt, administration cost and interest cost on 80% of debtors; Cost – Factoring commission
	❖ Insurance: Benefits – Saving in bad debt and interest cost on 70% of debtors; Cost – Insurance premium
	❖ Calculate the net benefit and select the scheme which is more beneficial
7	❖ Similar to question no.5

Qn	Summary
8	❖ Flat rate of interest =(Amount of interest/Amount of lent) * (12/ Loan tenor) *100 ❖ Effective rate of interest is to be computed by calculating IRR
9	❖ Step 1: Calculate the cost of in-house processing – This would include Bad debt, Interest cost, Cash discount and admin cost. Interest cost would be calculated at 10.8 percent as the same would be the WACC ❖ Step 2: Compute the amount lent by the factor and also the total cost of factoring. Amount lent by factor will be required to calculate the amount of own funding and on that we need to compute the interest cost using WACC. Also we should consider the extra contribution on incremental sales and then get the net cost of factoring ❖ Compare factoring cost with in-house cost and then we have to decide on whether to go for factoring
10	❖ Similar to question no.5
11	❖ Similar to question no.9
12	❖ Benefits of factoring: Interest saving on lower debtors, administration cost and bad debt ❖ Cost of factoring: Commission and extra interest on amount lent ❖ We need to compare benefits with cost and decide on factoring viability
13	❖ Step 1: Compute the amount lent by factor – Receivables less commission less withholding portion – this would give the amount eligible for funding and we need to deduct the interest from this to get the amount actually lent ❖ Step 2: Cost of factoring = Costs– Net benefits; Costs are commission and interest costs; benefits are lower bad debt, saving in administration. ❖ Effective cost of factoring = Step 2/Step 1 ❖ 15% recourse would indicate that factor can come back to company for 15 percent of bad debt and only 85 percent of the bad debt would be borne by the factor
	Chapter 9: Mutual Funds
1	❖ We need to first compute the closing cash balance by recording all receipts and payments ❖ NAV = (Realizable value of assets – Liabilities)/ No of units ❖ New NAV = Old NAV – Dividend. The NAV of a mutual fund will fall by the amount of dividend on its declaration
2	❖ NAV = (Realizable value of assets – Liabilities)/ No of units ❖ Cash balance = Opening cash – Expenses paid ❖ Market value of equity shares = Book value * (Index value on March 31) / (Index value on date of acquisition
3	❖ Dividends of MF can either be reinvested or paid out ❖ Return for reinvested option = [(Closing units * Closing NAV) – (Opening units * Opening NAV)] /Amount of investment ❖ Return for payout option = [(Closing units * Closing NAV) +Dividend paid out – (Opening units * Opening NAV)] /Amount of investment
4	❖ Annual earning = [D1 + (NAV1 – NAV0)] / NAV0 ❖ NAV 1 has to be calculated by calculating the closing value of all assets and dividing the same by closing units ❖ Realized earnings would include capital gain of 3 lacs and dividend income of 2 lacs. Hence total dividend would be Rs.4 lacs
5	❖ Similar to question no.3
6	❖ NAV = Total assets / No of units ❖ NAV of a MF does not undergo change with new units coming in as units will be allotted on the applicable NAV. However the total value of assets will go up by the

Qn	Summary
	amount of fresh inflow and the number of units will also go up proportionately ❖ Revised NAV is to be calculated for part three as there is a change in the price of some of the shares
7	❖ MF return = [(Individual return / (100-Initial expense ratio%)]+Expense ratio
8	❖ Annual return = [(Dividend + Capital appreciation)/Amount invested]* (12/No of months invested) * 100
9	❖ Similar to question no.8
10	❖ Sharpe ratio = Excess return / SD ❖ Treynor ratio = Excess return / Beta
11	❖ Similar to question no.2
12	❖ Holding period return refers to the return for the period whereas the annualized return is holding period return * 12 / No of months ❖ NAV for 31.03.2013 – We can compute the value of investment as on 31.03.2013 by considering a return of 115%. We need to compute the closing NAV by reducing the amount of dividend and also calculate the amount of units allotted ❖ NAV for 31.03.2014 – The Company initially had 10,000 units and on maturity it has 11,296.11 units. New units have been allotted on 31.03.2013 and 31.03.2014. The amount of dividend will be 20% of face value of units held and the units can be computed as a balancing figure. With these two we can compute NAV ❖ NAV for 31.03.2015 – The NAV can be computed with the help of holding period return
13	❖ There are 300 lakh units at the beginning of april and income of april will be split between these unit holders ❖ New purchase of 6 lakh units happen at the end of April. These units holders will also need to bring in amount towards dividend equalization. Dividend equalization of April = Income of April / 300 lakh units ❖ Income of May is to be split between 306 lakh unit holders. Dividend equalization of May = Income of May /306 lakh units ❖ Redemption of 3 lakh units in may will be eligible for their share of dividend equalization ❖ Income of June is to be split between 303 lakh unit holders. Dividend equalization of June = Income of June/303 lakh units ❖ Income available for distribution will be computing by considering the above 3 incomes adjusted for dividend equalization ❖ NAV as on June 30 = [(Opening NAV * No of units) + Portfolio appreciation + Income of three months + Infusion due to 6 lakh units – Redemption of 3 lakh units] / Closing units
14	❖ SD is given and shape ratio is given. We can compute the excess return with that information ❖ Treynor ratio and excess return is available. We can compute Beta with this information ❖ NAV of MF has two components – One is equity and the other is cash component. Equity component will fall based on Beta and market fall. Cash component will fall by the proportionate monthly expense
15	❖ NAV = [(Realizable value of assets – Liabilities)]/No of units
16	❖ Similar to question no.12
17	❖ Annual return of 15 percent would correspond to monthly return of 1.25 percent. There are two forms of return – Dividend and capital appreciation ❖ Deduct the divided from the total return to find out the amount of capital appreciation

Qn	Summary
	❖ Closing NAV = Opening NAV + Capital appreciation
18	❖ Duration of securities is given and with the help of that we can measure volatility ❖ Volatility = Duration (1+YTM) ❖ Volatility measures the percentage fall in security for a percentage increase in YTM ❖ YTM have increased by 75 basis points and hence the value of all debt funds will fall ❖ NAV = (Value of all investments + Interest accrued + Cash – Accrued expenses) / No of units
	Chapter 10: Money Market Instruments
1	❖ Dirty Price = Clean Price + Accrued Interest ❖ Accrued interest has to be calculated for the broken period of 292 days and the same would be at 12% ❖ Start proceeds = 5 Crores * (Dirty price/100) * 98% [2% margin is to be deducted] ❖ End proceeds = Start proceeds + Interest. Interest is to be charged for a period of 14 days at 5.25%
2	❖ Money raised through CP = 50,00,000 – Interest cost – issue expense – Minimum balance ❖ Cost of funds (pre-tax) = (Interest + issue expense) / Amount of money raised ❖ Cost of funds (post-tax) = Pre-tax cost * (1- Tax rate)
3	❖ We need 80 lacs 3 months and the account will give us interest of 8 percent. We need to assume the amount invested as X and get the amount of money to be invested today
4	❖ Value of bond would be present value of future interest and principal discounted at required yield
5	❖ The company needs return of 5% and the same would correspond to Rs.1,00,000. It also incurs expense of Rs.50,000 and hence total interest to be earned would be Rs.1,50,000. We need to use the normal formula for interest and assume number of months as X to get the period of investment ❖ Break-even period refer to the number of months for which we earn interest income sufficient to meet expense of Rs.50,000
6	❖ Similar to question no.2
7	❖ Flat rate of interest =(Amount of interest/Amount of lent) * (12/ Loan tenor) *100 ❖ Effective rate of interest is to be computed by calculating IRR
8	❖ The given discount yield of 8% is assumed for entire year and then the proportion yield is 2% for 90 days ❖ Issue price is X. Discount is 2% of X. Hence 1.02X would be equal to 100 ❖ Based on this we can get issue price and bond equivalent yield
9	❖ Calculate effective annual interest cost. Effective cost would be Rs.2,000 on receipt of Rs.98,000. ❖ Cost of fund = Effective annual cost + other costs like brokerage, rating fees etc
10	❖ Similar to question no.1
	Chapter 12 – Foreign Exchange Risk Management
1	❖ We will have to convert USD into INR. We will have to use the quote which ever gives us better realization. INR is to be then converted into GBP and then GBP is to be converted back into USD. ❖ If we are having a balance for more than 20 million USD then there exists an arbitrage opportunity
2	❖ We need to calculate the rate on January 28 and February 4 and find out the outflow on both dates ❖ Gain/loss due to delay = Outflow on February 4 – Outflow on January 28

Qn	Summary
	❖ Known component is SGD and unknown component is INR
	❖ Rate calculated on January 28 and February 4 is to be increased by exchange margin of 0.125%
3	❖ Normal capital budgeting problem with no special adjustment
4	❖ Forward contract = Amount of exposure / Forward rate
	❖ Futures contract: Exposure is in USD and contract is in INR. We need to first calculate the number of contracts by converting the exposure into INR at the given futures rate.
	❖ Settlement in futures contract will involve a transaction in the spot market and another transaction in the futures market. Moreover we need to consider the interest outflow for the margin money maintained
	❖ Not hedging = Amount of exposure/future spot rate
5	❖ Forward cover = Amount of exposure converted using the forward rate
	❖ Money market cover = We have USD payable in future and hence we need to create USD asset today. For this a GBP loan is to be taken on day 0 and we need to calculate the overall outflow in GBP
	❖ Currency option: Exposure is in USD and the currency option is in GBP. We need to convert the exposure into GBP at the given strike price and then take the call/put option as required. Total cost = Outflow of hedged exposure + Outflow of unhedged exposure + amount of premium
6	❖ The company needs 15 million USD and has an issue expense of 2 percent. Hence 98% would equate to 15 million. Money to be raised would be equal to 15 million divide by 98%
	❖ Issue price of GDR = [(3 shares * CMP) – 10% discount]/60
	❖ Cost of GDR = [Next year dividend/issue price] + Growth rate
7	❖ We have to first calculate cost of GDR. This rate would be used for discounting the cash flows
	❖ The cash flows for the project is to be calculated and the same will have an initial outflow, in between flows and terminal flow
	❖ The project has negative NPV and hence the project is rejected
	❖ The project from Opus point of view has to be used at a discount rate different from that of identified in part one. The interest rate in China is 10% whereas the cash flows are discounted at 11.39%. Interest rate in India is 12% and a similar discount rates it to be calculated. The project will get rejected from Opus company point of view as well
8	❖ We have to borrow rupees for 3 months and then say that if we are able to get risk-less profit at the end of 3 months. Borrowing today has to be converted into USD on day 1 and then reconverted back at end of 3 months
	❖ Similar procedure is to be repeated by borrowing money for 6 months
9	❖ Real cash flows should be converted into nominal cash flows by compounding the same at inflation rate
	❖ Inflation rates are to be used for calculating the future exchange rates
	❖ Year 3 nominal cash flows is expected to be received indefinitely in future and hence we need to calculate present value of perpetuity. P3 = Cash flow of year 4/Discount rate
	❖ Discount the above cash flows and decide on project
10	❖ Currency invoicing would mean that the exposure is to be converted into home currency on day 0 using spot rate and then the billing is done
	❖ Forward rate = We need to add the given premium in the question to arrive at forward rate. Though the points are given in descending order, we are required to add it as the word used is premium

Qn	Summary
	❖ Futures contract: Arrive at number of contracts and then calculate the total outflow with one transaction in spot market and the other one in futures contract.
11	❖ We need to compute the profits country wise if hedging through forward contract is done ❖ We need to then compute the profits if hedging was not done ❖ We need to select an option which gives better contribution
12	❖ Option 1: Individual investment and borrowing – Conversion into INR will happen after 30 days ❖ Option 2: Convert today and invest/borrow the net amount – find INR position at end of 30 days ❖ Select the option having higher INR balance
13	❖ Offer from foreign branch – The company needs to pay commission to Indian bank today – It has to take a loan for commission and hence will bear additional interest cost on same – We have to pay interest on foreign loan – convert it after 180 days and see the total INR outflow ❖ Take an INR loan today and pay the supplier immediately – Repay loan along with interest ❖ Compare both alternatives and select the one having lower outflow
14	❖ Extension of forward contract would involve cancellation of contract. Profit/loss on cancellation is to be calculated by comparing the original and revised rate ❖ Margin of 0.45% on bid rate will be deducted and margin of 0.20% will be added to the ask rate ❖ Rate of new forward contract would be the revised rate on October 31 for three months forward
15	❖ The company has a payable as well as receivable after 3 months. It can do a forward contract and MMH for net exposure ❖ The company will have a net USD payable of 3,42,000 and we have to calculate the outflow under forward and MMH ❖ The company has an Euro receivable of 5,90,000 after 4 months and we have to calculate the inflow under forward and MMH
16	❖ Calculate the gain or loss in Euros by getting the cover rate ❖ Loss or gain in euros can be converted into INR by using the INR/Euro rate
17	❖ The company currently has USD and can either make arbitrage gains by converting it into INR/GBP ❖ Option 1 – USD into INR into GBP into USD ❖ Option 2 – USD into GBP into INR into USD ❖ See if one of the above options can give arbitrage gain
18	❖ ABN amro bank wants to purchase 15 million USD and they will purchase at ask rate of the other bank
19	❖ Required return on project is 14%. It is assumed that the same is the return required in INR ❖ (1+ risk free rate) * (1+ risk premium) = (1+ risky rate). Calculate the risk premium for INR and use the risk premium for USD. Calculate the risky rate for USD and use the same for discounting
20	❖ Exchange position will get impacted whenever transaction happens irrespective of the realization. ❖ Cash position will get impacted whenever cash realization/collection happens for the transaction ❖ We can change the cash position by buying/selling currency whereas exchange position can be altered with the help of forward purchase/sale

Qn	Summary
21	❖ PPT = [(1+ Ih)/(1+ If)] = [F1/e0] ❖ IRPT = [(1+ Rh)/(1+ Rf)] = [F1/e0]
22	❖ Profitability statement of Indian company is to be prepared. Tax is to be deducted from PBT and the withholding tax is to be reduced from PAT to arrive at the repatriation amount ❖ Relevant expense from parent company point of view = Amount paid by parent – amount received back by parent ❖ Compare the above amount with sale proceeds and then decide on whether to do the project
23	❖ The company has to pay premium today and we need to consider interest cost on the same. Cover rate under FC = Spot rate + Premium + Interest on premium ❖ The cover rate has to be compared with actual rate to get the notional profit/loss
24	❖ The company needs to hedge its forex exposure as it has to receive GBP 5,00,000 after 3 months ❖ The risk can be hedged through a money market hedge as the interest rates are available
25	❖ Swap points for 2 and 3 months are given. Swap points for 2.5 months can be computed using interpolation technique ❖ Swap points are in ascending order and hence the same needs to be added to the spot rate to get the forward rate ❖ The premium/discount is to be calculated on the average rate. We need to compute average spot and forward rate. USD is the product and hence the following formula is to be used [(Forward rate – Spot rate) / Spot rate] * (12/No of months) * 100
26	❖ Similar to question no.4
27	❖ Cancellation rate = Date on which the customer appears ❖ Amount payable = Cancellation rate compared with original rate ❖ Swap loss = Amount of gain/loss to banker due to swap. Calculated by comparing original cover rate of bank with the effective rate ❖ Interest on outlay = Interest for the period of disappearance – calculated on the amount paid by bank due to swap ❖ New contract rate = New agreement rate ❖ Total cost =Amount payable + Swap loss + Interest
28	❖ The company has to pay premium today and we need to consider interest cost on the same. Cover rate under FC = Spot rate + Premium + Interest on premium ❖ The cover rate has to be compared with actual rate to get the notional profit/loss
29	❖ Get fair Rh and then decide on the flow of money to get the procedure for arbitrage
30	❖ Profit/loss = Realization under forward contract – Realization using spot rate
31	❖ Profit/loss on cancellation = Sell rate – Buy rate. One of these rates will be the originally contracted rate and the other rate would be the opposite rate identified on date of cancellation
32	❖ We are required to pay Japenese Yen whereas the options contract is in INR. We are required to sell INR in future and hence we need to take Put option ❖ Outflow = Premium payment + value of hedged outflow ❖ We need to compare the outflow under forward contract and options contract and decide the option which has lower outflow
33	❖ Use the purchasing power parity theory to calculate the future exchange rates ❖ Convert the cash flows into a single currency (INR) and then discount the same at the discount rate given in the question ❖ MIRR would involve reinvestment of cash flows at the cost of capital and then calculating an IRR with a single inflow and single outflow

Qn	Summary
34	❖ Forward contract outflow = Amount of exposure * Forward rate ❖ MMH – We need to create a matching asset in GBP. Hence we need to take a loan in USD today and calculate the overall outflow ❖ Option contract – calculate the expected outflow for every possible price considering the call option. The expected outflow has to be multiplied with probability and the sum of this amount will give the overall outflow under option contract ❖ No hedging – calculate the expected spot price using the given probabilities and then arrive at the overall outflow
35	❖ Similar to question no.27
36	❖ Paying supplier in 60 days – leading – take a rupee loan for balance 30 days and see the total outflow of INR ❖ Paying supplier in 90 days – lagging – pay interest on supplier credit and then convert it at a higher rate ❖ Select the option having lower INR outflow
37	❖ We have sold HKD and now we need to buy it to cover the transaction ❖ Cover rate: Unknown component (INR) = Known component (HKD) * (INR/USD) * (USD/HKD) ❖ Bid and ask rate is to be identified based on the action of the bank on the denominator currency ❖ Profit/loss = HKD * (Sell rate – Buy rate)
38	❖ The company has to decide on whether to take the loan in INR/USD ❖ INR will involve 14 percent interest rate and there would be no currency risk ❖ USD will involve 10 percent interest rate and the currency risk is to be covered through a forward contract ❖ Select the option which will lead to lower outflow of INR
39	❖ Expected loss = Realization using expected rates – realization using today's rates ❖ Loss using forward cover = Realization using forward rates – realization using today's rates ❖ Justification of forward cover can be determined by comparing the actual spot rates with forward rates
40	❖ Similar to question no.2
41	❖ We have already sold DKR and hence we need to buy DKR ❖ We need to compare buy rate in both markets and select the market having lower buy rate ❖ Compare sell rate and buy rate to get to the amount of profit
42	❖ We need to pay Canada dollars and the currency option is in Canadian dollar. We should buy call option as we need to pay Canadian dollars. There would be some exposure which would be unhedged. ❖ Unhedged exposure can be paid at the forward rate assuming forward rate to be fair indicator of future spot rates ❖ Compare the outflow under option route and forward contract route and decide the best option
43	❖ Our base branch is in London and hence we need to calculate the final net proceeds in GBP for the investment at various places. Select the centre which will give the highest GBP at the end of the maturity period
44	❖ Similar to question no.37
45	❖ Amount of premium = (Premium % * Amount of exposure)/(PVAF (r,n) ❖ LIBOR increase will lead to higher interest outflow and the same can be reduced by the cap option receipt. Cap option will have a payoff when the actual interest rate is

Qn	Summary
	lower than strike price
46	❖ FRA fixes the future interest rates and hence we can either block the lending/deposit rate today for a future period ❖ Settlement happens on day 0 of the FRA whereas actual interest is paid on the expiry of the loan. Hence settlement amount is to be discounted using the actual rate ❖ FRA settlement = [Amount of loan * (lending rate – borrowing rate) * no of months/12]/ (1 + Actual rate)
47	❖ IRPT = [(1+ Rh)/(1+ Rf)] = [F1/e0] ❖ Home currency refers to the first currency in the quote and foreign currency refers to the second currency in the quote ❖ Rh has to be taken for 6 months/12 months depending on the period for which forward rate is to be calculated
48	❖ Similar to question no.36
49	❖ Return = [(1+ home currency return%) * (1+appreciation rate %)] – 1
50	❖ The company has an option of lagging the receivables or doing the realization as per the original rate ❖ Lagging the receivables would involve a forward contract cancellation and the gain/loss is to be calculated ❖ Option 1: If we collect money as per the original schedule then we need to consider interest income for one month as the same could have been deposited for one month to earn interest
51	❖ Similar to question no.22
52	❖ Similar to question no.14
53	❖ Payment in 10 days will be 98000 USD multiplied with spot rate ❖ Payment in 90 days using forward contract is 100000 USD multiplied with forward rate ❖ Difference between the above two numbers is the time value of money and currency fluctuation component ❖ Time value of money component is the difference between 100000 USD and 98000 USD multiplied with 56 ❖ Currency fluctuation component is the difference between 55 and 56 rupees multiplied with 100000 USD
	Chapter 13 – Mergers and Acquisitions
1	❖ Today's value = (PAT + Depreciation) / Cost of capital. This is based on assumption that company will earn same amount of cash flow every year **Value due to strategy:** ❖ We need to compute cash flows of year 1, 2 and 3 ❖ Cash flow = PAT + Depreciation – Incremental investment in FA and CA ❖ Cash flow of year 4 = PAT + Depreciation. No incremental investment is required as sales is assumed to remain constant after year 4 onwards ❖ Revised value = Discounted cash flow of year 1, 2 and 3 + Perpetuity valuation of year 4 cash flow onwards ❖ Change in value = Revised value – today's value
2	❖ It is assumed that debt beta of proxy company is zero and based on that we can compute the overall beta of proxy company ❖ Overall beta of all three companies in similar line of business has to remain same. The debt beta is zero and the equity beta will become balancing figure ❖ Equity Beta of combined entity = Weighted average of equity beta of two companies with the amount of market capitalization being the assigned weight

Qn	Summary
3	❖ We need to calculate the market price of share for three scenarios
	❖ Impact on simpson = Current market price – Old market price
	❖ Impact on Wilson = Current market price – (Old market price * Exchange ratio)
4	❖ Compute the amount of debt and equity component of the business. Equity component = Market price of share * No of shares * 55%
	❖ Compute beta of proxy company as equity beta * weight of equity + debt beta * tax adjusted weight of debt
	❖ The beta of furniture manufacturing company has to match with beta of proxy company and the balancing figure would be the equity beta
	❖ Cost of equity is computed using CAPM formula
	❖ Cost of debt is computed using (Interest after tax + Average other costs)/ (Average funds employed)
	❖ Compute WACC. This would be the nominal WACC.
	❖ (1+ Nominal discount rate) = (1+ real discount rate) * (1 + inflation rate)
	❖ This will give the real WACC and the same would be used for discounting purpose
	❖ Terminal value will the value of the cash flows from 6th year onwards. If it ends in 15 years then we need to multiply it with PVAF factor for 10 years and then discount it to bring it back to year 0. If infinite life is there then it would be valued as perpetuity and then brought back to year 0
	❖ Similar calculation is to be done for real estate division
	❖ Combine both values to today's company value and decide whether de-merger is beneficial
5	❖ Return on shares can be computed using CAPM formula
	❖ Impact of merger: We need to first compute the current value of Mr.X holding. We need to then use the given percentages and compute his revised holding of merged entity.
	❖ Revised market value of merged entity: Earnings = Earnings of Bull limited + earnings of bear limited + Synergy benefits. These earnings are to be divided at the revised cost of equity as per CAPM
	❖ Revised holding of Mr.X = (Revised % * Value of entity) – value of earlier holdings
6	❖ C Plc can be valued on the basis of current book value and also on the basis of residual cash flow (dividends)
	❖ Value as per residual cash flow = Residual cash flow / (Ke-G)
	❖ Minimum Price = Book value
	❖ Maximum price = Market value accretion due to merger / No of shares
	❖ Floor price = Current market price
7	❖ Existing price = D1/(ke-G). Ke will be the required return of shareholders and growth rate will be computed as retention ratio * return on investment. D0 is already paid and D1 will be the current dividend increased by the growth rate
	❖ Value post take-over: We need to compute the total earnings of combined entity = (earnings of company 1* Growth rate) + (Earnings of company 2 * Growth rate) + Synergy benefits. We need to compute the amount of dividends paid by applying the payout ratio and also the growth is to be calculated. Value of company = next year dividends/ (Ke-G)
	❖ Maximum amount to be paid = Combined value – Standalone value of Hanky Limited
8	❖ The combined entity will have equity capital of Rs.200 lacs and hence they can have maximum debt of Rs.60 lacs.
	❖ The two entities currently have debt of Rs.30 lacs and hence can they take additional debt of Rs.30 lacs
	❖ Possible liquidity = Current marketable securities + Incremental debt. We need to

Qn	Summary
	compare possible liquidity with consideration payable of Rs.65 lacs and see if the company has adequate liquidity
9	❖ The value has been calculated as 525 lacs using the formula – Cash flow of next year/ (WACC-G) ❖ This can help us in getting WACC and the same would help us in getting the proportion of debt and equity ❖ We need to change the proportion of debt and equity as per the market value and get WACC. The revised market value is to be calculated based on formula given in point no.1
10	❖ Yes limited before merger is the standalone entity. We need to consider the standalone cash flows and get today value by discounting them at 15%. ❖ Yes limited after merger is the combined entity. We need to consider the combined cash flows and get today value by discounting them at 15% ❖ Terminal value at year 5 = Year 6 cash flow / (Cost of capital – growth rate) ❖ Value of acquisition = Value post merger – Value before merger ❖ Gain to shareholders = Value of acquisition – Consideration paid. Consideration paid is equal to 1/3rd value of the combined entity as we are giving 0.5 share for every 1 share
11	❖ Problem on internal construction ❖ Capital reserve on internal construction = Gain on preference share reduction + Reduction in equity share capital + Gain on foregoing of interest accrued + Gain on trade creditors + Gain on L&B revaluation – Write off of Plant and Machinery – Provision for doubtful debts – cost of issue of debentures – Preliminary expenses – profit and loss account ❖ Revised balance sheet is to be prepared post making all these adjustments
12	❖ We need to calculate retained earnings of 4 years and then compare the current networth with revised networth to identify whether there is an increase of 20 percent ❖ Retained earnings = EBIT – Interest – Tax – Dividends ❖ Interest has to be calculated on debentures using loan amortization table and 8% Loan can be calculated directly ❖ The management wont agree for 18 shares demand as the revised shareholding of ven-cap will be more than the management. Company would not like to give majority holding to the equity investor
13	❖ Similar to question no.9
14	❖ Swap ratio is computed by exchanging the base variable of two companies ❖ EPS post acquisition = Revised earnings/Revised shares ❖ MPS = EPS * PE Multiple ❖ Market value = MPS * No of shares ❖ Gain/loss = Revised value – Earlier value
15	❖ Similar to question no.7
16	❖ Similar to question no.8
17	❖ Expected value of debt of Simple Limited = 460 lacs * 0.2 + 460 lacs * 0.6 + 410 lacs * 0.2. In the third scenario debt holders will have to bear loss as the entity value is only Rs.410 lacs ❖ Expected value of equity is to be computed in similar way. Then we have to compute debt and equity value of Dimple limited ❖ We need to add both debt and equity values to get the value of the merged entity
18	❖ Value of firm will be calculated with free cash flow of firm discounted at WACC. We should not deduct the interest cost while calculating this

Qn	Summary
	❖ Value of equity = Value of firm – value of debt
	❖ Free cash flow of firm is PAT + Depreciation – Additional capex and WC
	❖ Cash flow after 8 years will grow at a constant rate and the same would take the character of a growing perpetuity. Value at end of year 8 = Cash flow of year 9 / (Cost of equity – Growth rate)
	❖ The above cash flow will have to be discounted and brought to the base of year 0
19	❖ Market value = MPS * No of shares; MPS = EPS * PE Multiple
	❖ New share price = EPS * PE Multiple; EPS = Combined earnings of two companies/ (Existing shares of RIL + New shares issued)
	❖ Part 3: Total earnings will undergo a change and hence EPS will change and consequently the market price of combined firm will increase
20	❖ We will have to compute steady cash flows of the company. Existing PAT has to be converted into PBT and the same should be adjusted for the extra-ordinary items
	❖ The revised PBT would increase by the amount of profit from new product and post that we can compute future maintainable PAT
	❖ Value of company = Future maintainable PAT / Cost of capital
	❖ Value of equity = Value of firm – Value of debt. Based on the value of equity we can compute the share price
21	❖ Similar to question no.1
22	❖ To maintain EPS at current level the exchange ratio should be based on EPS
	❖ EPS = MPS/PE Multiple
	❖ The company will get incremental earnings of Rs.15.75 lacs due to the acquisition. Existing PBT of that company would be at around Rs.22.5 lacs. Hence it can pay a maximum of (Rs.22.5 lacs/15%)
23	❖ We need to compute the number of shares to be issued based on all three parameters such as earnings, book value and market price
	❖ Number of shares to be issued = Weighted average of the shares computed with weights being as given in the question
	❖ Swap ratio = Shares to be issued/ Existing shares of target company
	❖ Promoter holding = (Existing shares + New shares to be issued)/Revised number of shares
	❖ EPS post acquisition = Combined earnings of two companies / Number of shares
	❖ Expected MPS = EPS * PE Multiple
	❖ Market capitalization = MPS * No of shares
	❖ Free float market capitalization = Market capitalization * Percentage of shared held by non-promoters
24	❖ EPS of combined company = Combined earnings / Total shares
	❖ Impact on XYZ EPS can be calculated by comparing old EPS with new EPS
	❖ Impact on ABC Limited can be calculated by comparing old EPS with proportionate new EPS. ABC Limited will be getting only 0.7 share of XYZ and hence the proportionate EPS would be lower
	❖ Swap ratio of 1:1: We need to compute EPS and based on the existing PE Multiple the market price of share is to be calculated. Gain for XYZ Limited can be calculated by comparing old MPS with New MPS
	❖ Gain for ABC Limited can be done by comparing the old MPS with new MPS as they get 1 share for every share held
	❖ Maximum ratio will be the one wherein the post-merger market price does not get reduced
25	❖ EPS = EAT/NO of shares
	❖ MPS can be split into EPS and PE Multiple
	❖ Book value per share = Value of networth/ No of shares

Qn	Summary
	❖ EPS = Book value per share * Return on equity
	❖ EPS growth rate = ROE * Retention ratio
	❖ Share price ratios can be based on market price and intrinsic value. The final ratio would be more closer towards the lower limit as the acquiring company is better in terms of various parameters
26	❖ Compute the number of shares to be issued based on various parameters. Exchange ratio is normally computed by swapping the base variable. However in case of negative variables like Gross NPA, we should not swap the variables
	❖ Shares to be issued would be the weighted average of the shares to be issued based on the four parameters
	❖ CAR = Total capital/Risky weighted assets
27	❖ True cost of merger =Amount of consideration – Current value of target company
28	❖ The value of company can be computed as free cash flow / (Cost of capital – Growth rate)
	❖ Based on the above formula the cost of capital would be 12%. This would be the weighted cost of 20% and 10%. The weights would turn out to be 20% and 80%
	❖ We can assume equity to be 20 lacs and debt to be 80 lacs. The market value of equity would be 60 lacs and debt would be 72 lacs. This would make the weight as 5:6 and based on same Cost of capital would be 14.55% and we can then calculate the revised value
29	❖ Compute the number of shares to be issued for both alternatives
	❖ Post-merger EPS = Combined earnings / Revised total number of shares
	❖ Impact on EPS: Cauliflower can be checked by comparing the old EPS with new EPS. Cabbage can be checked by comparing the old EPS with the proportionate new EPS
30	❖ Benefits of acquisition = Current market value + Present value of synergies + Present value of savings
	❖ Shares to be issued = Total benefits / Number of shares
	❖ Minimum price for managerial interest = (Value of current holding + PV of over-payments to directors) / Number of shares
31	❖ Compute PAT of the company for year 1, 2, 3 and 4
	❖ Free cash flow = PAT + Depreciation – Capital expenditure – Incremental working capital requirements
	❖ We need to compute free cash flow of year 4 and the same would remain grow at constant rate in future. The above cash flow has to be first valued at the end of year 3. PV of growing perpetuity (year 3) = [Free cash flow of year 4 / (WACC – Growth rate)]
	❖ This cash flow is to be discounted back to year 0 and then the company valuation is to be found out
32	❖ Promoters are currently holding 84%. Their holding is to be reduced to 75% by issuing bonus shares. Revised shares = (63 lacs/75%)
	❖ Existing shares = (63/84%). Difference between the existing shares and revised shares will provide the number of bonus shares to be issued
	❖ The current free float market cap is 19.20 crores and the same would represent the holding of non-promoters. Hence the overall market cap would be 19.20 crores/16%.
	❖ We can compute the CMP with this information and then the PE Multiple can be calculated
	❖ Bonus ratio = Shares to be issued divided by existing shares by minority shareholders
	❖ Revised free float market cap = Total market cap * Shareholding by non-promoters

Qn	Summary
	(25%)
33	❖ The cash inflow from division is 5 lacs for 6 years and terminal flow of 2 lacs
	❖ Consideration = Equity shareholders (5,25,000) + external liabilities (5,00,000) +Debentures (2,00,000) – realizable value of assets
	❖ Calculate NPV and decide on acquisition
34	❖ Valuation can be based on CMP and based on cash flow
	❖ Valuation based on CMP = CMP * No of shares
	❖ Valuation based on cash flows = Discounted value of cash flows at 12%
35	❖ MPS = EPS * PE Multiple
	❖ Shares should be issued on the basis of EPS if the same is not to be diluted
	❖ Shares should be issued on the basis of MPS if the same is not to be diluted
36	❖ Net assets of H Limited = Total assets – contingent liability
	❖ Net assets of B Limited = Total assets
	❖ Earning capitalized value of H Limited = Weighted FMP/Capitalization rate
	❖ Earnings capitalized value of B Limited = Weighted FMP/Capitalization rate
	❖ Fair value = (Net assets value * 1 + Earnings capitalized value*3)/4
37	❖ We will have to compute steady cash flows of the company. Existing PAT has to be converted into PBT and the same should be adjusted for the extra-ordinary items
	❖ The revised PBT would increase by the amount of profit from new product and post that we can compute future maintainable PAT
	❖ Value of company = Future maintainable PAT / Cost of capital
	❖ Value of equity = Value of firm – Value of debt. Based on the value of equity we can compute the share price
38	❖ Similar to question no.10
39	❖ EPS = EAES / No of shares
	❖ PE = MPS/EPS
	❖ Part two: The share exchange has to be done on the basis of CMP. Post-merger EPS = Combined earnings / Revised number of shares
	❖ Part three: EPS can be maintained if the exchange ratio is made on the basis of EPS
40	❖ Sum on internal reconstruction
	❖ Similar to question no.11
41	❖ PE based = Total earnings * PE Multiple
	❖ Dividend based = Amount of dividend / average dividend yield
	❖ Dividend growth = Next year dividend / (Ke – Growth rate)
	❖ Book value = Book value of shareholders fund
	❖ Net realizable value = Book value + Excess in building – lower realization of stock
42	❖ Day 0 Inflow = Capital gain on office premises – Payment to debentures
	❖ Year 1 to 5 inflow = Operating cash flow of 10 crores + Synergy benefit of 2 crores
	❖ Terminal flow = 5 * Operating cash flow
	❖ Discount the above cash flows at cost of capital and arrive at the maximum value of acquisition
43	❖ Calculate the value of cash flows discounted at 8%. This will give the valued based on discounted cash flow method
	❖ Net assets = Total assets – Outside liabilities
	❖ Number of shares = Average value of two methods / 500 per share
	❖ Basis of allocation: Find out the fully equivalent paid up shares and find the number of shares for both categories.

Question No.1 (May 2017 RTP)

Jumble Consultancy Group has determined relative utilities of cash flows of two forthcoming projects of its client company as follows :

Cash Flow in ₹	-15000	-10000	-4000	0	15000	10000	5000	1000
Utilities	-100	-60	-3	0	40	30	20	10

The distribution of cash flows of project A and Project B are as follows:

Project A					
Cash Flow (₹)	-15000	- 10000	15000	10000	5000
Probability	0.10	0.20	0.40	0.20	0.10
Project B					
Cash Flow (₹)	- 10000	-4000	15000	5000	10000
Probability	0.10	0.15	0.40	0.25	0.10

Which project should be selected and why ?

Question No.2 (November 2016 RTP, May 2014 RTP)

A & Co. is contemplating whether to replace an existing machine or to spend money on overhauling it. A & Co. currently pays no taxes. The replacement machine costs ₹ 90,000 now and requires maintenance of ₹ 10,000 at the end of every year for eight years. At the end of eight years it would have a salvage value of ₹ 20,000 and would be sold. The

existing machine requires increasing amounts of maintenance each year and its salvage value falls each year as follows:

Year	Maintenance (₹)	Salvage (₹)
Present	0	40,000
1	10,000	25,000
2	20,000	15,000
3	30,000	10,000
4	40,000	0

The opportunity cost of capital for A & Co. is 15%.

Required:

When should the company replace the machine?

(Notes: Present value of an annuity of ₹ 1 per period for 8 years at interest rate of 15% : 4.4873; present value of ₹ 1 to be received after 8 years at interest rate of 15% : 0.3269).

Question No.3 (November 2016 RTP)

XYZ Ltd. is planning to procure a machine at an investment of ₹ 40 lakhs. The expected cash flow after tax for next three years is as follows:

₹ (in lakh)

Year – 1		Year – 2		Year - 3	
CFAT	Probability	CFAT	Probability	CFAT	Probability
12	.1	12	.1	18	.2
15	.2	18	.3	20	.5
18	.4	30	.4	32	.2
32	.3	40	.2	45	.1

The Company wishes to consider all possible risks factors relating to the machine.

The Company wants to know:

(i)   the expected NPV of this proposal assuming independent probability distribution with 7% risk free rate of interest.

(ii)   the possible deviations on expected values.

Question No.4 (May 2016 RTP)

L & R Limited wishes to develop new virus-cleaner software. The cost of the pilot project would be ₹ 2,40,000. Presently, the chances of the product being successfully launched on a commercial scale are rated at 50%. In case it does succeed L&R can further invest a sum of ₹ 20 lacs to market the product. Such an effort can generate perpetually, an annual net after tax cash income of ₹ 4 lacs. Even if the commercial launch fails, they can make an investment of a smaller amount of ₹ 12 lacs with the hope of gaining perpetually a sum of ₹ 1 lac. Evaluate the proposal, adopting decision tree approach. The applicable discount rate is 10%.

Question No.5 (May 2016 RTP)

IPL already in production of Fertilizer is considering a proposal of building a new plant to produce pesticides. Suppose, the PV of proposal is ₹ 100 crore without the abandonment option. However, it market conditions for pesticide turns out to be favourable the PV of proposal shall increase by 30%. On the other hand market conditions remain sluggish the PV of the proposal shall be reduced by 40%. In case company is not interested in continuation of the project it can be disposed off for ₹ 80 crore.

If the risk free rate of interest is 8% than what will be value of abandonment option

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Question No.6 (May 2016 RTP)

XYZ Ltd. requires ₹ 8,00,000 for a new project. Useful life of project - 4 years. Salvage value - Nil. Depreciation Charge ₹ 2,00,000 p.a. Expected revenues & costs (excluding depreciation) ignoring inflation.

Year	1	2	3	4
Revenues	₹ 6,00,000	₹ 7,00,000	₹ 8,00,000	₹ 8,00,000
Costs	₹ 3,00,000	₹ 4,00,000	₹ 4,00,000	₹ 4,00,000

If applicable Tax Rate is 60% and cost of capital is 10% then calculate NPV of the project, if inflation rates for revenues & costs are as follows:

Year	Revenues	Costs
1	10%	12%
2	9%	10%
3	8%	9%
4	7%	8%

Question No.7 (November 2015 RTP)

XY Ltd. has under its consideration a project with an initial investment of ₹ 1,00,000. Three probable cash inflow scenarios with their probabilities of occurrence have been estimated as below:

Annual cash inflow (₹)	20,000	30,000	40,000
Probability	0.1	0.7	0.2

The project life is 5 years and the desired rate of return is 20%. The estimated terminal values for the project assets under the three probability alternatives, respectively, are ₹ 0, 20,000 and 30,000.

You are required to:

(i)   Find the probable NPV;

(ii) Find the worst-case NPV and the best-case NPV; and

(iii) State the probability occurrence of the worst case, if the cash flows are perfectly positively correlated over time.

Question No.8 (May 2015 RTP)

JHK Private Ltd. is considering 3 projects (not mutually exclusive) has no cash reserves, but could borrow upto ₹ 60 crore @ of 10% p.a. Though borrowing above this amount is also possible, but it shall be at a much higher rate of interest.

The initial capital outlay required, the NPV and the duration of each of these project is as follows:

	Initial Capital Outlay (₹ Crore)	NPV (₹ Crore)	Duration (Years)
Project X	30.80	5.50	6
Project Y	38.00	7.20	7
Project Z	25.60	6.50	Indefinite

Other information:

1. Cost of capital of JHK is 12%.

2. Applicable tax rate is 30%.

3. All projects are indivisible in nature and cannot be postponed.

You are required to:

(a) Comment whether given scenario is a case of hard capital rationing or soft capital rationing.

(b) Which project (or combination thereof) should be accepted if these investment opportunities are likely to be repeated in future also?

(c) Assuming that these opportunities are not likely to be available in future then and Government is ready to support Project Y on following terms then which projects should be accepted.

    (i)   A cash subsidy of ₹ 7 crore shall be available.

    (ii) 50% of initial cash outlay shall be available at subsidized rate of 8% and repaid in 8 equal installments payable at the end of each year.

Question No.9 (May 2015 RTP)

TMC is a venture capital financier. It received a proposal for financing requiring an investment of ₹45 crore which returns ₹600 crore after 6 years if succeeds. However, it may be possible that the project may fail at any time during the six years.

The following table provide the estimates of probabilities of the failure of the projects.

Year	1	2	3	4	5	6
Probability of Failure	0.28	0.25	0.22	0.18	0.18	0.10

In the above table the probability that the project fails in the second year is given that it has survived throughout year 1. Similarly for year 2 and so forth.

TMC is considering an equity investment in the project. The beta of this type of project is 7. The market return and risk free rate of return are 8% and 6% respectively. You are required to compute the expected NPV of the venture capital project and advice the TMC.

Question No.10 (November 2014 RTP)

XYZ Food Pvt. Ltd., a franchisee of Domino's (World famous food chain for delivering pizza at home) is considering a proposal of acquiring a fleet of motorbikes for delivery of pizzas at home of customers. Since pizzas are also delivered in late night and bikes are handled by different delivery boys (due shift working) the use of fleet will be very heavy. Hence it is expected that the motorbike shall be virtually worthless and scrapped after a period of 3 years. However they are taken out of services before 3 years there will be a positive 'abandonment' cash flow.

The initial cost of the bike will be ₹1,00,000. The expected post tax benefit (cash inflows) from the use of bike and abandonment cash inflows are as follows:

Year	Operating Cash Flows (₹)	Abandonment Cash Flows at end of year (₹)
1	42,000	62,000
2	40,000	40,000
3	35,000	0

The cost of capital of XYZ Pvt. Ltd. is 10%. You are required to evaluate the proposal of acquisition of bikes and recommend preferable life of the same.

Question No.11 (May 2014 RTP)

Unnat Ltd. is considering investing ₹ 50,00,000 in a new machine. The expected life of machine is five years and has no scrap value. It is expected that 2,00,000 units will be produced and sold each year at a selling price of ₹ 30.00 per unit. It is expected that the variable costs to be ₹ 16.50 per unit and fixed costs to be ₹ 10,00,000 per year. The cost of capital of Unnat Ltd. is 12% and acceptable level of risk is 20%.

You are required to measure the sensitivity of the project's net present value to a change in the following project variables:

(i)   sale price;

(ii) sales volume;

(iii) variable cost;

and discuss the use of sensitivity analysis as a way of evaluating project risk.

On further investigation it is found that there is a significant chance that the expected sales volume of 2,00,000 units per year will not be achieved. The sales manager of Unnat Ltd. suggests that sales volumes could depend on expected economic states that could be assigned the following probabilities:

State of Economy	Annual Sales (in Units)	Prob.
Poor	1,75000	0·30
Normal	2,00,000	0·60
Good	2,25,000	0·10

Calculate expected net present value of the project and give your decision whether company should accept the project or not.

Question No.12 (November 2013 RTP)

Trouble Free Solutions (TFS) is an authorized service center of a reputed domestic air conditioner manufacturing company. All complaints/ service related matters of Air conditioner are attended by this service center. The service center employs a large number of mechanics, each of whom is provided with a motor bike to attend the complaints. Each mechanic travels approximately 40000 kms per annuam. TFS decides to continue its present policy of always buying a new bike for its mechanics but wonders whether the present policy of replacing the bike every three year is optimal or not. It is of believe that as new models are entering into market on yearly basis, it wishes to consider whether a replacement of either one year or two years would be better option than present three year period. The fleet of bike is due for replacement shortly in near future.

The purchase price of latest model bike is ₹ 55,000. Resale value of used bike at current prices in market is as follows:

Period	₹
1 Year old	35,000
2 Year old	21,000
3 Year old	9,000

Running and Maintenance expenses (excluding depreciation) are as follows:

Year	Road Taxes Insurance etc. (₹)	Petrol Repair Maintenance etc. (₹)
1	3,000	30,000
2	3,000	35,000
3	3,000	43,000

Using opportunity cost of capital as 10% you are required to determine optimal replacement period of bike.

Question No.13 (May 2013 RTP)

Shashi Co. Ltd has projected the following cash flows from a project under evaluation:

Year	0	1	2	3
₹ (in lakhs)	(72)	30	40	30

The above cash flows have been made at expected prices after recognizing inflation. The firm's cost of capital is 10%. The expected annual rate of inflation is 5%. Show how the viability of the project is to be evaluated. PVF at 10% for 1-3 years are 0.909, 0.826 and 0.751.

Question No.14 (November 2016)

KLM Ltd. requires ₹ 15,00,000 for a new project.

Useful life of project is 3 years.

Salvage value - NIL.

Depreciation is ₹ 5,00,000 p.a.

Given below are projected revenues and costs (excluding depreciation) ignoring inflation:

Year →	1	2	3
Revenues in ₹	10,00,000	13,00,000	14,00,000
Costs in ₹	5,00,000	6,00,000	6,50,000

Applicable tax rate is 35%. Assume cost of capital to be 14% (after tax). The inflation rates for revenues and costs are as under:

Year	Revenues %	Costs %
1	9	10

2	8	9
3	6	7

PVF at 14%, for 3 years =0.877, 0.769 and 0.675

Show amount to the nearest rupee in calculations.

You are required to calculate act present value of the project.   (8 Marks)

Question No.15 (November 2016)

The municipal corporation of a city with mass population is planning to construct a flyover that will replace the intersection of two busy highways X and Y. Average traffic per day is

10,000 vehicles on highway X and 8,000 vehicles on highway Y. 70% of the vehicles are private and rest are commercial vehicles. The flow of traffic across and between aforesaid highways is controlled by traffic lights. Due to heavy flow, 50% of traffic on each of the highways is delayed. Average loss of time due to delay is 1.3 minute in highway X and 1.2 minute in highway Y. The cost of time delayed is estimated to be ₹ 80 per hour for commercial vehicle and ₹ 30 for private vehicle.

The cost of stop and start is estimated to be ₹ 1.20 for commercial vehicle and ₹ 0.80 for private vehicle. The cost of operating the traffic lights is – 80,000 a year. One policeman is required to be posted for 3 hours a day at the crossing which costs ₹ 150 per hour.

Due to failure to obey traffic signals, eight fatal accidents and sixty non-fatal accidents occurred in last 4 years. On an average, insurance settlements per fatal and non-fatal accidents are ₹ 5,00,000 and ₹ 15,000 respectively.

To eliminate the delay of traffic and the accidents caused due to traffic light violations, the flyover has been designed. It will add a quarter of kilometer to the distance of 20% of total traffic. No posting of policeman will be required at the flyover. The flyover will require investment of ₹3 Cr. Extra maintenance cost would be ₹70,000 a year.

The incremental operating cost for commercial vehicle will be ₹5 per km and ₹2 for non-commercial vehicle. Expected economic life of the flyover is 30 years having no salvage value. The cost of capital for the project is 8%. (corresponding capital recovery rate is 0.0888).

You are required to calculate:

(i) total net benefits to users,

(ii) annual cost to the state; and

(iii) benefit cost ratio   (8 Marks)

Question No.16 (May 2016)

MNL Ltd. is considering investment in one of three mutually exclusive projects: AB, BC, CD. The company's cost of capital is 15% and the risk-free interest rate is 10%. The income-tax rate for the company is 34%. MNL has gathered the following basic cash flows and risk index data for each project:

Projects	AB	BC	CD
Initial Investment	12,00,000	10,00,000	15,00,000
Cash Inflows – **Year**			
1	5,00,000	5,00,000	4,00,000
2	5,00,000	4,00,000	5,00,000
3	5,00,000	5,00,000	6,00,000
4	5,00,000	3,00,000	10,00,000
Risk Index	1.80	1.00	0.60

Using the Risk Adjusted Discount Rate, determine the risk adjusted NPV for each of the project. Which project should be accepted by the company?   (10 Marks)

Question No.17 (May 2015)

A manufacturing unit engaged in the production of automobile parts is considering a proposal of purchasing one of the two plants, details of which are given below:

Particulars	Plant A	Plant B
Cost	₹20,00,000	₹38,00,000
Installation charges	₹4,00,000	₹2,00,000
Life	20 years	15 years
Scrap value after full life	₹4,00,000	₹4,00,000

Output per minute (units)	200	400

The annual costs of the two plants are as follows:

Particulars	Plant A	Plant B
Running hours per annum	2,500	2,500
Costs:	(In ₹)	(In ₹)
Wages	1,00,000	1,40,000
Indirect materials	4,80,000	6,00,000
Repairs	80,000	1,00,000
Power	2,40,000	2,80,000
Fixed Costs	60,000	80,000

Will it be advantageous to buy Plant A or Plant B? Substantiate your answer with the help of comparative unit cost of the plants. Assume interest on capital at 10 percent. Make other relevant assumptions:

Note: 10 percent interest tables

	20 Years	15 Years
Present value of ₹ 1	0.1486	0.2394
Annuity of ₹ 1 (capital recovery factor with 10% interest)	0.1175	0.1315

Question No.18 (November 2014)

Gretel Limited is setting up a project for manufacture of boats at a cost of ₹ 300 lakhs. It has to decide whether to locate the plant in next to the sea shore (Area A) or in a inland area with no access to any waterway (Area B). If the project is located in Area B then Gretel Limited receives a cash subsidy of ₹ 20 lakhs from the Central Government. Besides, the taxable profits to the extent of 20% is exempt for 10 years in Area B. The project envisages a borrowing of ₹ 200 lakhs in either case. The rate of Interest per annum is 12% in Area A and 10% in Area B.

The borrowing of principal has to be repaid in 4 equal installments beginning from the end of the 4th year.

With the help of the following information, you are required to suggest the proper location for the project to the CEO of Gretel Limited. Assume straight line depreciation with no residual value, income tax 50% and required rate of return 15%.

Year	Earnings before Depreciation, Interest and Tax (EBDIT) (₹ In lakhs)	
	Area A	Area B
1	(6)	(50)
2	34	(50)
3	54	10

4	74	20
5	108	45
6	142	100
7	156	155
8	230	190
9	330	230
10	430	330

The PVIF @ 15% for 10 years are as below:

Year	1	2	3	4	5	6	7	8	9	10
PVIF	0.87	0.76	0.66	0.57	0.50	0.43	0.38	0.33	0.28	0.25

(10 Marks)

Question No.19 (May 2014)

ABC Chemicals is evaluating two alternative systems for waste disposal, System A and System B, which have lives of 6 years and 4 years respectively. The initial investment outlay and annual operating costs for the two systems are expected to be as follows:

	System A	System B
Initial Investment Outlay	₹ 5 million	₹ 4 million
Annual Operating Costs	₹ 1.5 million	₹ 1.6 million
Salvage value	₹ 1 million	₹ 0.5 million

If the hurdle rate is 15%, which system should ABC Chemicals choose?

The PVIF @ 15% for the six years are as below:

Year	1	2	3	4	5	6
PVIF	0.8696	0.7561	0.6575	0.5718	0.4972	0.4323

(5 Marks)

Question No.20 (November 2013)

The Easygoing Company Limited is considering a new project with initial investment, for a product "Survival". It is estimated that IRR of the project is 16% having an estimated life of 5 years.

Financial Manager has studied that project with sensitivity analysis and informed that annual fixed cost sensitivity is 7.8416%, whereas cost of capital (discount rate) sensitivity is 60%.

Other information available are:

Profit Volume Ratio (P/V) is 70%,

Variable cost ₹ 60/- per unit

Annual Cash Flow ₹57,500/-

Ignore Depreciation on initial investment and impact of taxation.

Calculate

(i)   Initial Investment of the Project

(ii)   Net Present Value of the Project

(iii) Annual Fixed Cost

(iv) Estimated annual unit of sales

(v)   Break Even Units

Cumulative Discounting Factor for 5 years

8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%
3.993	3.890	3.791	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127

Question No.21 (May 2013)

Ramesh owns a plot of land on which he intends to construct apartment units for sale. No. of apartment units to be constructed may be either 10 or 15. Total construction costs for these alternatives are estimated to be ₹ 600 lakhs or ₹ 1025 lakhs respectively. Current market price for each apartment unit is ₹ 80 lakhs. The market price after a year for apartment units will depend upon the conditions of market. If the market is buoyant, each apartment unit will be sold for ₹ 91 lakhs, if it is sluggish, the sale price for the same will be ₹ 75 lakhs. Determine the current value of vacant plot of land. Should Ramesh start construction now or keep the land vacant? The yearly rental per apartment unit is ₹ 7 lakhs and the risk free interest rate is 10% p.a.

Assume that the construction cost will remain unchanged.   (5 Marks)

Question No.22 (May 2013)

XYZ Ltd. is planning to procure a machine at an investment of ₹ 40 lakhs. The expected cash flow after tax for next three years is as follows :

₹ (in lakh)

Year – 1		Year – 2		Year - 3	
CFAT	Probability	CFAT	Probability	CFAT	Probability
12	.1	12	.1	18	.2
15	.2	18	.3	20	.5
18	.4	30	.4	32	.2
32	.3	40	.2	45	.1

The Company wishes to consider all possible risks factors relating to the machine.

The Company wants to know:

(i)   the expected NPV of this proposal assuming independent probability distribution with 7% risk free rate of interest.

(ii)   the possible deviations on expected values.   (8 Marks)

Question No.23 (May 2012)

A machine used on a production line must be replaced at least every four years.

Costs incurred to run the machine according to its age are :

Age of the Machine (years)					
	0	1	2	3	4
Purchase price (in ₹)	60,000				
Maintenance (in ₹)		16,000	18,000	20,000	20,000
Repair (in ₹)		0	4,000	8,000	16,000
Scrap Value (in ₹)		32,000	24,000	16,000	8,000

Future replacement will be with identical machine with same cost. Revenue is unaffected by the age of the machine. Ignoring inflation and tax, determine the optimum replacement cycle. PV factors of the cost of capital of 15% for the respective four years are 0.8696, 0.7561, 0.6575 and 0.5718.   (10 Marks)

Question No.24 (May 2012)

DEF Ltd has been regularly paying a dividend of ₹ 19,20,000 per annum for several years and it is expected that same dividend would continue at this level in near future. There are 12,00,000 equity shares of ₹ 10 each and the share is traded at par.

The company has an opportunity to invest ₹ 8,00,000 in one year's time as well as further ₹ 8,00,000 in two year's time in a project as it is estimated that the project will generate cash inflow of ₹ 3,60,000 per annum in three year's time which will continue for ever. This investment is possible if dividend is reduced for next two years.

Whether the company should accept the project? Also analyze the effect on the market price of the share, if the company decides to accept the project.   (8 Marks)

Question No.25 (May 2017)

Ram Chemical is in production Line of Chemicals and considering a proposal of building new plant to produce pesticides. The Present Value (PV) of new proposal is ₹ 150 crores (After considering scrap value at the end of life of project). Since this is a new product market, survey indicates following variation in Present Value (PV):

Condition Favourable in first year	PV will increase 30% from original estimate
Condition sluggish in first year	PV will decrease by 40% from original Figures.

In addition Rama Chemical has a option to abandon the project at the end of Year and dispose it at ₹ 100 crores. If risk free rate of interest is 8%, what will be present value of put option?

(5 Marks)

Chapter 3: Leasing Decisions

Question No.1 (May 2017 RTP)

P Ltd. has decided to acquire a machine costing ₹ 50 lakhs through leasing. Quotations from 2 leasing companies have been obtained which are summarised below:

	Quote A	Quote B
Lease term	3 years	4 years
Initial lease rent (₹ lakhs)	5.00	1.00
Annual lease rent (payable in arrears) (₹ lakhs)	21.06	19.66

P Ltd. evaluates investment proposals at 10% cost of capital and its effective tax rate is 30%. Terminal payment in both cases is negligible and may be ignored.

Make calculations and show which quote is beneficial to P Ltd. Present value factors at 10% rate for years 1-4 are respectively 0.91, 0.83, 0.75 and 0.68. Calculations may be rounded off to 2 decimals in lakhs.

Question No.2 (November 2016 RTP)

R Ltd., requires a machine for 5 years. There are two alternatives either to take it on lease or buy. The company is reluctant to invest initial amount for the project and approaches their bankers. Bankers are ready to finance 100% of its initial required amount at 15% rate of interest for any of the alternatives.

Under lease option, upfront Security deposit of ₹ 5,00,000/- is payable to lessor which is equal to cost of machine. Out of which, 40% shall be adjusted equally against annual lease rent. At the end of life of the machine, expected scrap value will be at book value after providing, depreciation @ 20% on written down value basis.

Under buying option, loan repayment is in equal annual installments of principal amount, which is equal to annual lease rent charges. However in case of bank finance for lease option, repayment of principal amount equal to lease rent is adjusted every year, and the balance at the end of 5th year.

Assume Income tax rate is 30%, interest is payable at the end of every year and discount rate is @ 15% p.a. The following discounting factors are given:

Year	1	2	3	4	5
Factor	0.8696	0.7562	0.6576	0.5718	0.4972

Which option would you suggest on the basis of net present values?

Question No.3 (May 2016 RTP)

With the following data available compute the Break Even Lease Rental (BELR) that ABC Ltd. should charge from lessee.

Cost of Machine	₹ 150 Lakh
Expected Useful Life	5 year

Salvage Value of Machine at the end of 5 years	₹ 10 lakh
Rate of Depreciation (WDV)	25%
K_o	14%
Applicable Tax Rate	35%

Machine will constitute a separate block for depreciation purpose.

Question No.4 (November 2015 RTP)

Khalid Tour Operator Ltd. is considering buying a new car for its fleet for local touring purpose. Purchase Manager has identified Renault Duster model car for acquisition.

Company can acquire it either by borrowing the fund from bank at 12% p.a. or go for leasing option involving yearly payment (in the end) of ₹ 2,70,000 for 5 years.

The new car shall cost ₹ 10,00,000 and would be depreciable at 25% as per WDV method for its owner. The residual value of car is expected to be ₹ 67,000 at the end of 5 years.

The corporate tax rate is 33%. You are required to:

(a) Calculate which of the two options borrowings or leasing shall be financially more advantageous for the Company.

(b) Measure the sensitivity of Leasing/ Borrowing Decision in relation to each of the following parameters:

    (i)   Rate of Borrowing

    (ii)   Residual Value

    (iii) Initial Outlay

Among above which factor is more sensitive.

Question No.5 (November 2014 RTP)

AGD Co is a profitable company which is considering the purchase of a machine costing ₹ 32,00,000. If purchased, AGD Co would incur annual maintenance costs of ₹ 2,50,000. The machine would be used for three years and at the end of this period would be sold for ₹ 5,00,000. Alternatively, the machine could be obtained under an operating lease for an annual lease rental of ₹ 12,00,000 per year, payable in advance. AGD Co can claim depreciation @ 25% on WDV basis. Annual lease rental will be paid in the beginning of each year.

The company pays tax on profits at an annual rate of 30% and all tax liabilities are paid one year in arrears.

Required:

(1) Using an after-tax borrowing rate of 7%, evaluate whether AGD Co should purchase or lease the new machine.

(2) Suppose a bank had offered to lend AGD Co ₹ 32,00,000 for a period of five years interest payable every six months, then you are required to:

(i) Calculate the Annual Percentage Rate (APR) implied by the bank's offer with interest payable every six months.

(ii) Calculate the amount of installment payable at the end of each six-month period if the offered loan is to be repaid in equal installments.

Question No.6 (May 2014 RTP)

. A Company is planning to acquire a machine costing ₹ 5,00,000. Effective life of the machine is 5 years. The Company is considering two options. One is to purchase the machine by lease and the other is to borrow ₹ 5,00,000 from its bankers at 10% interest p.a. The Principal amount of loan will be paid in 5 equal instalments to be paid annually. The machine will be sold at ₹ 50,000 at the end of 5ᵗʰ year. Following further informations are given:

(a) Principal, interest, lease rentals are payable on the last day of each year.

(b) The machine will be fully depreciated over its effective life.

(c) Tax rate is 30% and after tax. Cost of Capital is 8%.

Compute the lease rentals payable which will make the firm indifferent to the loan option.

Question No.7 (November 2013 RTP)

Sundaram Ltd. discounts its cash flows at 16% and is in the tax bracket of 35%. For the acquisition of a machinery worth ₹10,00,000, it has two options – either to acquire the asset by taking a bank loan @ 15% p.a. repayable in 5 yearly installments of ₹2,00,000 each plus interest or to lease the asset at yearly rentals of ₹3,34,000 for five (5) years. In both the cases, the instalment is payable at the end of the year. Depreciation is to be applied at the rate of 15% using 'written down value' (WDV) method. You are required to advise which of the financing options is to be exercised and why.

Year	1	2	3	4	5
P.V factor @16%	0.862	0.743	0.641	0.552	0.476

Question No.8 (May 2013 RTP)

BidTown Chemicals has received a notice from Pollution Control Board of their city to get installed wastage affluent plant to improve waste generation. The cost of installation of plant is €5 million with a life span of 4 years. After 4 years the plant shall be disposed at 10% of its installation cost.

Due to installation of plant there will be an incremental cash flow, estimated at 2 million p.a. for the four years.

The company has two options to acquire plant:

(a) Borrow funds at 10% (pre-tax) rate from a bank and acquire machine. The loan is repayable in 4 equal installments.

(b) Obtain a financial lease of €2 million payable at the end of the year.

At present the company is ungeared with beta 3. If company takes the loan the D/E ratio of company would become 0.30. Company is in tax bracket of 40%. Depreciation is allowable @25% as per WDV method. Further risk free rate of return and market return are 6% and 8% respectively.

Ignoring the tax gain on the loss due to disposal of plant, you are required to calculate which option of acquiring the plant the company should go for.

Question No.9 (November 2012 RTP)

ABC Company has decided to acquire a ₹ 5,00,000 pulp control device that has a useful life of ten years. A subsidy of ₹ 50,000 is available at the time the device is acquired and placed into service. The device would be depreciated on straight-line basis and no salvage value is expected. The company is in the 50% tax bracket. If the acquisition is financed with a lease, lease payments of ₹ 55,000 would be required at the beginning of each year. The company can also borrow at 10% repayable in equal instalments. Debt payments would be due at the beginning of each year:

(i)   What is the present value of cash outflow for each of these financing alternatives, using the after-tax cost of debt?

(ii)   Which of the two alternatives is preferable?

Question No.10 (May 2016)

Hi-tech Software Ltd. (HSL) has a complete "Software Developing Unit" costing ₹ 70 lakhs. It is this type of block of assets that have no book value as at 31st March, 2016 as it entitled to 100% rate of depreciation under Income Tax Act, 1961. The company is facing acute fund crunch as it lacks order from Middle East and was toying with the idea of taking term loan. Eastern Financier (EF), a reputed finance company, gave the idea of "buy & lease back" to tide over the fund crunch. EF agreed to buy the software developing unit at ₹ 50 lakhs and lease it back to HSL for lease rental of ₹ 9 lakhs p.a. for a period of 5 years. HSL decides to put the entire net proceeds in a fixed deposit at a nationalized bank at yearly interest of 8.75% for 5 years to generate cash flow much needed for day to day operation.

Central Financier (CF) another financier, gave a proposal of selling a similar software developing unit at ₹ 30 lakhs to HSL and they will buy back after 5 years at a price of ₹ 5 lakhs provided the Annual Maintenance Contract (AMC) @ ₹ 1.50 lakhs per annum is entrusted to them. The new machine is also entitled to 100% rate of depreciation under Income Tax Act, 1961. CF also agreed to buy the existing software developing unit at ₹ 50 lakhs. HSL would utilize the net sale proceeds to finance this machine.

The marginal rate of tax of HSL is 34% and its weighted average cost of capital is 12%.

Which offer HSL should accept?

Year	1	2	3	4	5
Discounting factor @ 12%	.893	.797	.712	.636	.567

(8 Marks)

Question No.11 (November 2015)

The Finance manager of ABC Corporation is analyzing firms policy regarding computers which are now being leased on yearly basis on rental amounting to ₹ 1,00,000 per year. The computers can be bought for ₹ 5,00,000. The purchase would be financed by 16% and the loan is repayable in 4 equal annual installments.

On account of rapid technological progress in the computer industry, it is suggested that a 4-year economic life should be used instead of a 10-year physical life. It is estimated that the computers would be sold for ₹ 2,00,000 at the end of 4 years.

The company uses the straight line method of depreciation. Corporate tax rate is 35%.

(i) Whether the equipment be bought or be taken on lease?

(ii) Analyze the financial viability from the point of view of the lessor, assuming 14% cost of capital.

(iii) Determine the minimum lease rent at which lessor would break even.   (8 Marks)

Question No.12 (May 2015)

R Ltd., requires a machine for 5 years. There are two alternatives either to take it on lease or buy. The company is reluctant to invest initial amount for the project and approaches their bankers. Bankers are ready to finance 100% of its initial required amount at 15% rate of interest for any of the alternatives.

Under lease option, upfront Security deposit of ₹ 5,00,000/- is payable to lessor which is equal to cost of machine. Out of which, 40% shall be adjusted equally against annual lease rent. At the end of life of the machine, expected scrap value will be at book value after providing, depreciation @ 20% on written down value basis.

Under buying option, loan repayment is in equal annual installments of principal amount, which is equal to annual lease rent charges. However in case of bank finance for lease option, repayment of principal amount equal to lease rent is adjusted every year, and the balance at the end of 5th year.

Assume Income tax rate is 30%, interest is payable at the end of every year and discount rate is @ 15% p.a. The following discounting factors are given:

Year	1	2	3	4	5
Factor	0.8696	0.7562	0.6576	0.5718	0.4972

Which option would you suggest on the basis of net present values?   (8 Marks)

Question No.13 (November 2013)

ABC Ltd. is contemplating have an access to a machine for a period of 5 years. The company can have use of the machine for the stipulated period through leasing arrangement or the requisite amount can be borrowed to buy the machine. In case of leasing, the company received a proposal to pay annual end of year rent of ₹ 2.4 lakhs for a period of 5 years.

In case of purchase (which costs ₹10,00,000/-) the company would have a 12%, 5 years loan to be paid in equated installments, each installment becoming due to the beginning of each years. It is estimated that the machine can be sold for ₹2,00,000/- at the end of 5th year. The company uses straight line method of depreciation. Corporate tax rate is 30%. Post tax cost of capital of ABC Ltd. is 10%.

You are required to advice

(i) Whether the machine should be bought or taken on lease.

(ii) Analyse the financial viability from the point of view of the lessor assuming 12% post tax cost of capital.

	PV of ₹1@10% for 5 years	PV of ₹1 @ 12% for 5 years
1	.909	.893
2	.826	.797
3	.751	.712
4	.683	.636
5	.621	.567

(10 Marks)

Question No.14 (May 2017)

SD Ltd. wants to purchase a machine worth ₹ 25,00,000. It has two options:

Either (i) to acquire the Asset by taking a Bank Loan @ 12% p.a. repayable in 5 yearly instalments of ₹ 5,00,000 each plus interest or, (ii) to lease the Asset at yearly rental of ₹ 7,00,000 for five years.

In both the cases, the instalment is payable at the end of the year.

The Company discounts its Cash Flows @ 14% (after tax).

Depreciation is to be taken at 20% on Written Down Value method (WDV).

The Company's tax rate is 34%.

You are required to advise which of the financing options is to be exercised and reason thereof.

Year	1	2	3	4	5	
Present Value Factor (PVF) 14%	0.877	0.769	0.675	0.592	0.519	(Total 3.432)

Chapter 4: Dividend Decision

Question No.1 (May 2017 RTP, November 2013 RTP)

. X Ltd., has 8 lakhs equity shares outstanding at the beginning of the year. The current market price per share is ₹ 120. The Board of Directors of the company is contemplating ₹ 6.4 per share as dividend. The rate of capitalization, appropriate to the risk-class to which the company belongs, is 9.6%:

(i)   Based on M-M Approach, calculate the market price of the share of the company, when the dividend is – (a) declared; and (b) not declared.

(ii)   How many new shares are to be issued by the company, if the company desires to fund an investment budget of ₹ 3.20 crores by the end of the year assuming net income for the year will be ₹ 1.60 crores?

Question No.2 (May 2016 RTP, November 2014 RTP, May 2013 RTP)

The following information pertains to M/s XY Ltd.

Earnings of the Company	₹ 5,00,000
Dividend Payout ratio	60%
No. of shares outstanding	1,00,000
Equity capitalization rate	12%
Rate of return on investment	15%

(i)   What would be the market value per share as per Walter's model?

(ii)   What is the optimum dividend payout ratio according to Walter's model and the market value of Company's share at that payout ratio?

Question No.3 (November 2015 RTP)

Telbel Ltd. is considering undertaking a major expansion an immediate cash outlay of ₹ 150 crore. The Board of Director of company are expecting to generate an additional profit of ₹ 15.30 crore after a period of one year. Further, it is expected that this additional profit shall grow at the rate of 4% for indefinite period in future.

Presently, Telbel Ltd. is completely equity financed and has 50 crore shares of ₹10 each. The current market price of each share is ₹ 22.60 (cum dividend). The company has paid a dividend of ₹ 1.40 per share in last year. For the last few years dividend is increasing at a compound rate of 6% p.a. and it is expected to be continued in future also. This growth rate shall not be affected by expansion project in any way.

Board of Directors are considering following ways of financing the possible expansion:

(1)   A right issue on ratio of 1:5 at price of ₹15 per share.

(2)   A public issue of shares.

In both cases the dividend shall become payable after one year.

You as a Financial Consultant required to:

(a) Determine whether it is worthwhile to undertake the project or not.

(b) Calculate ex-dividend market price of share if complete expansion is financed from the right issue.

(c) Calculate the number of new equity shares to be issued and at what price assuming that new shareholders do not suffer any loss after subscribing new shares.

(d) Calculate the total benefit from expansion to existing shareholders under each of two financing option.

Question No.4 (May 2014 RTP)

. Mr. A is contemplating purchase of 1,000 equity shares of a Company. His expectation of return is 10% before tax by way of dividend with an annual growth of 5%. The Company's last dividend was ₹ 2 per share. Even as he is contemplating, Mr. A suddenly finds, due to a Budget announcement Dividends have been exempted from Tax in the hands of the recipients. But the imposition of Dividend Distribution Tax on the Company is likely to lead to a fall in dividend of 20 paise per share. A's marginal tax rate is 30%.

Required:

Calculate what should be Mr. A's estimates of the price per share before and after the Budget announcement?

Question No.5 (November 2012 RTP)

The following information is supplied to you:

	₹
Total Earnings	2,00,000
No. of equity shares (of ₹100 each)	20,000
Dividend paid	1,50,000
Price/Earning ratio	12.5

(i) Ascertain whether the company is the following an optimal dividend policy.

(ii) Find out what should be the P/E ratio at which the dividend policy will have no effect on the value of the share.

(iii) Will your decision change, if the P/E ratio is 8 instead of 12.5?

Question No.6 (May 2016)

SAM Ltd. has just paid a dividend of ₹ 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 ₹ 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 ₹ 2,000 p.a. from this investment.

Show that the market value of the share is affected by the decision of the Board. Also show 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%.

Question No.7 (May 2015)

The following information is collected from the annual reports of J Ltd:

Profit before tax	₹ 2.50 crore
Tax rate	40 percent
Retention ratio	40 percent
Number of outstanding shares	50,00,000
Equity capitalization rate	12 percent
Rate of return on investment	15 percent

What should be the market price per share according to Gordon's model of dividend policy? (4 Marks)

Question No.8 (November 2014)

Goldilocks Ltd. was started a year back with equity capital of ₹ 40 lakhs. The other details are as under:

Earnings of the company	₹ 4,00,000
Price Earnings ratio	12.5
Dividend paid	₹ 3,20,000
Number of Shares	40,000

Find the current market price of the share. Use Walter's Model.

Find whether the company's D/P ratio is optimal, use Walter's formula.   (5 Marks)

Question No.9 (November 2014)

Buenos Aires Limited has 10 lakh equity shares outstanding at the beginning of the year 2013. The current market price per share is ₹ 150. The current market price per share is ₹ 150. The company is contemplating a dividend of ₹ 9 per share. The rate of capitalization, appropriate to its risk class, is 10%.

(i) Based on MM approach, calculate the market price of the share of the company when:

    (1) Dividend is declared

    (2) Dividend is not declared

(ii)   How many new shares are to be issued by the company, under both the above options, if the Company is planning to invest ₹ 500 lakhs assuming a net income of ₹ 200 lakhs by the end of the year?   *(8 Marks)*

Question No.10 (May 2013)

ABC Limited has a capital of ₹ 10 lakhs in equity shares of ₹ 100 each. The shares are currently quoted at par. The company proposes to declare a dividend of ₹ 15 per share at the end of the current financial year. The capitalisation rate for the risk class of which the company belongs is 10%.

What will be the market price of share at the end of the year, if

(i)   a dividend is declared ?

(ii)   a dividend is not declared ?

(iii)   assuming that the company pays the dividend and has net profits of ₹ 6,00,000 and makes new investment of ₹ 12,00,000 during the period, how many new shares should be issued? Use the MM model.   *(6 Marks)*

Question No.11 (November 2012)

X Ltd. earns ₹ 6 per share having a capitalization rate of 10 percent and has a return on investment of 20%. According to Walter's model, what should be the price of the share at 25% dividend payout?

Question No.12 (November 2012)

Given the following information:

Current Dividend	₹ 5.00
Discount Rate	10%
Growth rate	2%

(i)   Calculate the present value of the stock.

(ii)   Is the stock over valued if the price is ₹ 40, ROE = 8% and EPS = ₹ 3.00. Show your calculations under the PE Multiple approach and Earnings Growth model.   *(8 Marks)*

Question No.13 (May 2012)

In December, 2011 AB Co.'s share was sold for ₹ 146 per share. A long term earnings growth rate of 7.5% is anticipated. AB Co. is expected to pay dividend of ₹ 3.36 per share.

(i)   What rate of return an investor can expect to earn assumng that dividends are expected to grow along with earnings at 7.5% per year in perpetuity?

(ii)   It is expected that AB Co. will earn about 10% on book Equity and shall retain 60% of earnings. In this case, whether, there would be any change in growth rate and cost of Equity?   *(6 Marks)*

Question No.14 (May 2012)

X Ltd has an internal rate of return @ 20%. It has declared dividend @ 18% on its equity shares, having face value of ₹ 10 each. The payout ratio is 36% and Price Earning Ratio is 7.25. Find the cost of equity according to Walter's Model and hence determine the limiting value of its shares in case the payout ratio is varied as per the said model.

Question No.15 (May 2017)

You are requested to find out the approximate dividend payment ratio as to have the Share Price at ₹ 56 by using Walter Model, based on following information available for a Company.

	Amount ₹
Net Profit	50 lakhs
Outstanding 10% Preference Shares	80 lakhs
Number of Equity Shares	5 lakhs
Return on Investment	15%
Cost of Capital (after Tax) (K_e)	12%

(5 Marks)

Question No.16 (November 2017 RTP)

Rahul Ltd. has surplus cash of ₹ 100 lakhs and wants to distribute 27% of it to the shareholders. The company decides to buy back 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 ₹ 3.

You are required to determine:

(i) The price at which the shares can be re-purchased, if the market capitalization of the company should be ₹ 210 lakhs after buyback,

(ii) The number of shares that can be re-purchased, and

(iii) The impact of share re-purchase on the EPS, assuming that net income is the same.

Chapter 5: Indian Capital Market

Question No.1 (May 2017 RTP, May 2014 RTP, November 2017 RTP)

Derivative Bank entered into a plain vanilla swap through on OIS (Overnight Index Swap) on a principal of ₹ 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 ₹ 317 net on settlement, calculate Fixed rate and interest under both legs.

Notes:

(i)   Sunday is Holiday.

(ii)   Work in rounded rupees and avoid decimal working.

Question No.2 (May 2017 RTP, November 2017 RTP)

The following market data is available:

Spot USD/JPY 116.00

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.

1.   What should be 3 months FRA rate at 3 months forward?

2.   The 6 & 12 months LIBORS are 5% & 6.5% respectively. A bank is quoting 6/12 USD FRA at 6.50 – 6.75%. Is any arbitrage opportunity available?

Calculate profit in such case.

Question No.3 (May 2017 RTP)

Given below is the Balance Sheet of S Ltd. as on 31.3.2008:

Liabilities	₹ (in lakh)	Assets	₹ (in lakh)
Share capital (share of ₹ 10)	100	Land and building	40
Reserves and surplus		Plant and machinery	80
Long Term Debts	40	Investments	10
	30	Stock	20
		Debtors	15
		Cash at bank	5
	170		170

You are required to work out the value of the Company's, shares on the basis of Net Assets method and Profit-earning capacity (capitalization) method and arrive at the fair price of the shares, by considering the following information:

(i)   Profit for the current year ₹ 64 lakhs includes ₹ 4 lakhs extraordinary income and ₹ 1 lakh income from investments of surplus funds; such surplus funds are unlikely to recur.

(ii) In subsequent years, additional advertisement expenses of ₹ 5 lakhs are expected to be incurred each year.

(iii) Market value of Land and Building and Plant and Machinery have been ascertained at ₹ 96 lakhs and ₹ 100 lakhs respectively. This will entail additional depreciation of ₹ 6 lakhs each year.

(iv) Effective Income-tax rate is 30%.

(v)   The capitalization rate applicable to similar businesses is 15%.

Question No.4 (May 2017 RTP, November 2014 RTP, November 2013 RTP, May 2012)

A company is long on 10 MT of copper @ ₹ 474 per kg (spot) and intends to remain so for the ensuing quarter. The standard deviation of changes of its spot and future prices are 4% and 6% respectively, having correlation coefficient of 0.75.

What is its hedge ratio? What is the amount of the copper future it should short to achieve a perfect hedge?

Question No.5 (May 2017 RTP)

Miss K holds 10,000 shares of IBS Bank @ 2,738.70 when 1 month Index Future was trading @ 6,086 The share has a Beta (β) of 1.2. How many Index Futures should she short to perfectly hedge his position. A single Index Future is a lot of 50 indices.

Justify your result in the following cases:

(i)   when the Index zooms by 1%

(ii) when the Index plummets by 2%.

Question No.6 (November 2016 RTP)

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%

You are required to show 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 £. It should be part of working notes.

Question No.7 (November 2016 RTP)

Suppose a dealer quotes 'All-in-cost' for a generic swap at 8% against six month LIBOR flat. If the notional principal amount of swap is ₹ 5,00,000.

(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 6% on the effective date of swap.

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.

Question No.8 (November 2016 RTP, November 2017 RTP)

A trader is having in its portfolio shares worth ₹ 85 lakhs at current price and cash ₹ 15 lakhs. The beta of share portfolio is 1.6. After 3 months the price of shares dropped by 3.2%.

Determine:

(i)   Current portfolio beta

(ii)   Portfolio beta after 3 months if the trader on current date goes for long position on ₹ 100 lakhs Nifty futures.

Question No.9 (May 2016 RTP, November 2015 RTP, November 2013 RTP)

BSE	5000
Value of portfolio	₹ 10,10,000
Risk free interest rate	9% p.a.
Dividend yield on Index	6% p.a.
Beta of portfolio	1.5

We assume that a future contract on the BSE index with four months maturity is used to hedge the value of portfolio over next three months. One future contract is for delivery of 50 times the index.

Based on the above information calculate:

(i)   Price of future contract.

(ii)   The gain on short futures position if index turns out to be 4,500 in three months.

Question No.10 (November 2015 RTP)

NoBank offers a variety of services to both individuals as well as corporate customers. NoBank generates funds for lending by accepting deposits from customers who are paid interest at PLR which keeps on changing.

NoBank is also in the business of acting as intermediary for interest rate swaps. Since it is difficult to identify matching client, NoBank acts counterparty to any party of swap.

Sleepless approaches NoBank who have already have ₹ 50 crore outstanding and paying interest @PLR+80bp p.a. The duration of loan left is 4 years. Since Sleepless is expecting increase in PLR in coming year, he asked NoBank for arrangement of interest of interest rate swap that will give a fixed rate of interest.

As per the terms of agreement of swap NoBank will borrow ₹50 crore from Sleepless at PLR+80bp per annuam and will lend ₹ 50 crore to Sleepless at fixed rate of 10% p.a. The settlement shall be made at the net amount due from each other. For this services NoBank will charge commission @0.2% p.a. if the loan amount. The present PLR is 8.2%.

You as a financial consultant of NoBank have been asked to carry out scenario analysis of this arrangement.

Three possible scenarios of interest rates expected to remain in coming 4 years are as follows:

	Year 1	Year 2	Year 3	Year 4
Scenario 1	10.25	10.50	10.75	11.00
Scenario 2	8.75	8.85	8.85	8.85
Scenario 3	7.20	7.40	7.60	7.70

Assuming that cost of capital is 10%, whether this arrangement should be accepted or not.

Question No.11 (November 2015 RTP)

From the following data for Government securities, calculate the forward rates:

Face value (₹)	Interest rate	Maturity (Year)	Current price (₹)
1,00,000	0%	1	91,500
1,00,000	10%	2	98,500
1,00,000	10.5%	3	99,000

Question No.12 (May 2015 RTP)

Mr. Careless was employed with ABC Portfolio Consultants. The work profile of Mr. Careless involves advising the clients about taking position in Future Market to obtain hedge in the position they are holding. Mr. ZZZ, their regular client purchased 100,000 shares of X Inc. at a price of $22 and sold 50,000 shares of A plc for $40 each having beta 2. Mr. Careless advised Mr. ZZZ to take short position in Index Future trading at $1,000 each contract.

Though Mr. Careless noted the name of A plc along with its beta value during discussion with Mr. ZZZ but forgot to record the beta value of X Inc.

On next day Mr. ZZZ closed out his position when:

- Share price of X Inc. dropped by 2%

- Share price of A plc appreciated by 3%

- Index Future dropped by 1.5%

Mr. ZZZ, informed Mr. Careless that he has made a loss of $114,500 due to the position taken. Since record of Mr. Careless was incomplete he approached you to help him to find the number of contract of Future contract he advised Mr. ZZZ to be short to obtain a complete hedge and beta value of X Inc.

You are required to find these values.

Question No.13 (May 2015 RTP)

Mr. X, is a Senior Portfolio Manager at ABC Asset Management Company. He expects to purchase a portfolio of shares in 90 days. However he is worried about the expected price increase in shares in coming day and to hedge against this potential price increase he decides to take a position on a 90-day forward contract on the Index. The index is currently trading at 2290. Assuming that the continuously compounded dividend yield is 1.75% and risk free rate of interest is 4.16%, you are required to determine:

(a) Calculate the justified forward price on this contract.

(b) Suppose after 28 days of the purchase of the contract the index value stands at 2450 then determine gain/ loss on the above long position.

(c) If at expiration of 90 days the Index Value is 2470 then what will be gain on long position.

Note: Take 365 days in a year and value of $e^{0.005942}$ = 1.005960, $e^{0.001849}$ = 1.001851.

Question No.14 (May 2015 RTP, May 2013 RTP)

Sensex futures are traded at a multiple of 50. Consider the following quotations of Sensex futures in the 10 trading days during February, 2014:

Day	High	Low	Closing
4-2-14	3306.4	3290.00	3296.50
5-2-14	3298.00	3262.50	3294.40
6-2-14	3256.20	3227.00	3230.40
7-2-14	3233.00	3201.50	3212.30

10-2-14	3281.50	3256.00	3267.50
11-2-14	3283.50	3260.00	3263.80
12-2-14	3315.00	3286.30	3292.00
14-2-14	3315.00	3257.10	3309.30
17-2-14	3278.00	3249.50	3257.80
18-2-14	3118.00	3091.40	3102.60

Abshishek bought one sensex futures contract on February, 04. The average daily absolute change in the value of contract is ₹ 10,000 and standard deviation of these changes is ₹ 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.

Question No.15 (November 2014 RTP)

Two companies ABC Ltd. and XYZ Ltd. approach the DEF Bank for FRA (Forward Rate Agreement). They want to borrow a sum of ₹ 100 crores 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.

(i)   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.

(ii) 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 in 2 years turns out to be

(a)   4.50%

(b)   5.50%

Question No.16 (November 2014 RTP, May 2013 RTP)

Pragya Limited has issued 75,000 equity shares of ₹ 10 each. The current market price per share is ₹ 24. The company has a plan to make a rights issue of one new equity share at a price of ₹ 16 for every four share held.

You are required to:

(i)   Calculate the theoretical post-rights price per share;

(ii) Calculate the theoretical value of the right alone;

(iii) Show the effect of the rights issue on the wealth of a shareholder, who has 1,000 shares assuming he sells half of his rights; and exercise the remaining 50%.

(iv) Show the effect, if the same shareholder does not take any action and ignores the issue.

Question No.17 (November 2014 RTP, November 2013 RTP)

. A Mutual Fund is holding the following assets in ₹ Crores :

Investments in diversified equity shares	90.00
Cash and Bank Balances	10.00
	100.00

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%. How many index futures he should short for perfect hedging? One index future consists of 50 units.

Substantiate your answer assuming the Fund Manager's apprehension will materialize. Portfolio Theory

Question No.18 (November 2014 RTP, May 2012)

On 31-8-2011, the value of stock index was ₹ 2,200. The risk free rate of return has been 8% per annum. The dividend yield on this Stock Index is as under:

Month	Dividend Paid (p.a.)
January	3%
February	4%
March	3%
April	3%
May	4%
June	3%
July	3%
August	4%
September	3%
October	3%
November	4%
December	3%

Assuming that interest is continuously compounded daily, find out the future price of contract deliverable on 31-12-2011. Given: $e^{0.01583} = 1.01593$

Question No.19 (May 2014 RTP)

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*

*Since Premium paid for Cap = Premium received for Floor

Using the following data you are required to determine:

(i)   Effective interest paid out at each reset date,

(ii)   The average overall effective rate of interest p.a.

Reset Date	LIBOR (%)
31-12-2013	6.00
30-06-2014	7.00
31-12-2014	5.00
30-06-2015	3.75
31-12-2015	3.25
30-06-2016	4.25

Question No.20 (May 2014 RTP)

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%

3 month €50,000 future contract maturing in a period of 3 months is quoted at 94.15 (5.85%).

You are required to determine:

(a)   How a FRA, shall be useful if the actual interest rate after 6 months turnout to be:
        (i)   4.5%   (ii) 6.5%
(b)   How 3 moths Future contract shall be useful for company if interest rate turns out as mentioned in part (a) above.

Question No.21 (November 2013 RTP)

Suppose current price of an index is ₹13,800 and yield on index is 4.8% (p.a.). A 6-month future contract on index is trading at ₹14,340.

Assuming that Risk Free Rate of Interest is 12%, show how Mr. X (an arbitrageur) can earn an abnormal rate of return irrespective of outcome after 6 months. You can assume that after 6 months index closes at ₹ 10,200 and ₹ 15,600 and 50% of stock included in index shall pay divided in next 6 months.

Also calculate implied risk free rate.

Question No.22 (November 2013 RTP)

Abhishek Ltd. has a surplus cash of ₹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 ₹3.

You are required to determine:

(a) The price at which the shares can be repurchased, if the market capitalization of the company should be ₹ 200 lakhs after buyback.

(b) The number of shares that can be re-purchased.

(c) The impact of share re-purchase on the EPS, assuming the net income is same.

Question No.23 (November 2013 RTP)

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.

Question No.24 (May 2013 RTP)

A wheat trader has planned to sell 440000 kgs of wheat after 6 months from now. The spot price of wheat is ₹ 19 per kg and 6 months future on same is trading at ₹ 18.50 per kg (Contract Size= 2000 kg). The price is expected to fall to as low as ₹ 17.00 per kg 6 month hence. What trader can do to mitigate its risk of reduced profit? If he decides to make use of future market what would be effective realized price for its sale when after 6 months is spot price is ₹ 17.50 per kg and future contract price for 6 months is ₹ 17.55.

Question No.25 (May 2013 RTP, November 2012 RTP)

Drilldip Inc. a US based company has a won a contract in India for drilling oil filed. The project will require an initial investment of ₹ 500 crore. The oil field along with equipments will be sold to Indian Government for ₹ 740 crore in one year time. Since the Indian Government will pay for the amount in Indian Rupee (₹) the company is worried about exposure due exchange rate volatility.

You are required to:

(a) Construct a swap that will help the Drilldip to reduce the exchange rate risk.

(b) Assuming that Indian Government offers a swap at spot rate which is 1US$ = ₹ 50 in one year, then should the company should opt for this option or should it just do nothing. The spot rate after one year is expected to be 1US$ = ₹ 54. Further you may also assume that the Drilldip can also take a US$ loan at 8% p.a.

Question No.26 (May 2013 RTP, November 2012 RTP)

(a) Suppose that a 1-year cap has a cap rate of 8% and a notional amount of ₹ 100 crore. The frequency of settlement is quarterly and the reference rate is 3-month MIBOR. Assume that 3-month MIBOR for the next four quarters is as shown below.

Quarters	3-months MIBOR (%)
1	8.70
2	8.00
3	7.80
4	8.20

You are required to compute payoff for each quarter.

(b) Suppose that a 1-year floor has a floor rate of 4% and a notional amount of ₹ 200 crore. The frequency of settlement is quarterly and the reference rate is 3-month MIBOR. Assume that 3-month MIBOR for the next four quarters is as shown below.

Quarters	3 - months IBOR (%)
1	4.70
2	4.40
3	3.80
4	3.40

You are required to compute payoff for each quarter.

Question No.27 (May 2013 RTP)

The current market price of an equity share of Penchant Ltd is ₹ 420. Within a period of 3 months, the maximum and minimum price of it is expected to be ₹ 500 and ₹ 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 ₹ 450 ? Given $e^{0.02} = 1.0202$

Question No.28 (November 2012 RTP)

Suppose that there is a future contract on a share presently trading at ₹ 1000. The life of future contract is 90 days and during this time the company will pay dividends of ₹ 7.50 in 30 days, ₹ 8.50 in 60 days and ₹ 9.00 in 90 days.

Assuming that the Compounded Continuously Risk free Rate of Interest (CCRRI) is 12% p.a. you are required to find out:

(a)   Fair Value of the contract if no arbitrage opportunity exists.

(b)   Value of Cost to Carry.

[Given $e^{-0.01}$ = 0.9905, $e^{-0.02}$ = 0.9802, $e^{-0.03}$ = 0.97045 and $e^{0.03}$ = 1.03045]

Question No.29 (November 2012 RTP)

A call and put exist on the same stock each of which is exercisable at ₹ 60. They now trade for:

Market price of Stock or stock index	₹ 55
Market price of call	₹ 9
Market price of put	₹ 1

Calculate the expiration date cash flow, investment value, and net profit from:

(i)   Buy 1.0 call

(ii)   Write 1.0 call

(iii) Buy 1.0 put

(iv) Write 1.0 put

for expiration date stock prices of ₹ 50, ₹ 55, ₹ 60, ₹ 65, ₹ 70.

Question No.30 (November 2016)

Details about portfolio of shares of an investor is as below:

Shares	No. of shares (lakh)	Price per share	Beta
A Ltd.	3.00	₹ 500	1.40
B Ltd.	4.00	₹ 750	1.20
C Ltd.	2.00	₹ 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:

(i)   Dispose off a part of his existing portfolio to acquire risk free securities, or

(ii)   Take appropriate position on Nifty Futures which are currently traded at ₹ 8125 and each Nifty points is worth ₹ 200.

You are required to determine:

(1)   portfolio beta,

(2)   the value of risk free securities to be acquired,

(3)   the number of shares of each company to be disposed off,

(4)   the number of Nifty contracts to be bought/sold; and

(5)   the value of portfolio beta for 2% rise in Nifty.   (8 Marks)

Question No.31 (May 2016)

Fresh Bakery Ltd.' s share price has suddenly started moving both upward and downward on a rumour that the company is going to have a collaboration agreement with a multinational company in bakery business. If the rumour turns to be true, then the stock price will go up but if the rumour turns to be false, then the market price of the share will crash. To protect from this an investor has purchased the following call and put option:

(i)   One 3 months call with a striking price of ₹ 52 for ₹ 2 premium per share.

(ii) One 3 months put with a striking price of ₹ 50 for ₹ 1 premium per share.

Assuming a lot size of 50 shares, determine the followings:

(1)   The investor's position, if the collaboration agreement push the share price to ₹ 53 in 3 months.

(2)   The investor's ending position, if the collaboration agreement fails and the price crashes to ₹ 46 in 3 months time.   (5 Marks)

Question No.32 (November 2015)

Mr. Dayal is interested in purchasing equity shares of ABC Ltd. which are currently selling at ₹ 600 each. He expects that price of share may go upto ₹ 780 or may go down to ₹ 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 ₹ 630.

(i)   What combination of share and option should Mr. Dayal select if he wants a perfect hedge?

(ii) What should be the value of option today (the risk free rate is 10% p.a.)?

(iii) What is the expected rate of return on the option?   (5 Marks)

Question No.33 (November 2015)

On April 1, 2015, an investor has a portfolio consisting of eight securities as shown below:

Security	Market Price	No. of Shares	Value
A	29.40	400	0.59
B	318.70	800	1.32
C	660.20	150	0.87
D	5.20	300	0.35
E	281.90	400	1.16
F	275.40	750	1.24
G	514.60	300	1.05
H	170.50	900	0.76

The cost of capital for the investor is 20% p.a. continuously compounded. The investor fears a fall in the prices of the shares in the near future. Accordingly, he approaches you for the advice to protect the interest of his portfolio.

You can make use of the following information:

(i)   The current NIFTY value is 8500.

(ii)   NIFTY futures can be traded in units of 25 only.

(iii)   Futures for May are currently quoted at 8700 and Futures for June are being quoted at 8850.

You are required to calculate:

(i)   the beta of his portfolio.

(ii)   the theoretical value of the futures contract for contracts expiring in May and June.

        Given ($e^{0.03}$ =1.03045, $e^{0.04}$ = 1.04081, $e^{0.05}$ =1.05127)

(iii)   the number of NIFTY contracts that he would have to sell if he desires to hedge until June in each of the following cases:

        (A)   His total portfolio

        (B)   50% of his portfolio

        (C)   120% of his portfolio   (8 Marks)

Question No.34 (November 2015)

X Ltd. is a Shoes manufacturing company. It is all equity financed and has a paid-tip Capital of ₹ 10,00,000 (₹ 10 per share)

X Ltd. has hired Swastika consultants to analyse the future earnings. The report of Swastika consultants states as follows:

(i)   The earnings and dividend will grow at 25% for the next two years.

(ii)   Earnings are likely to grow at the rate of 10% from 3rd year and onwards.

(iii)   Further, if there is reduction in earnings growth, dividend payout ratio will increase to 50%.

The other data related to the company are as follows:

Year	EPS (₹)	Net Dividend per share (₹)	Share Price (₹)
2010	6.30	2.52	63.00
2011	7.00	2.80	46.00

2012	7.70	3.08	63.75
2013	8.40	3.36	68.75
2014	9.60	3.84	93.00

You may assume that the tax rate is 30% (not expected to change in future) and post tax cost of capital is 15%.

By using the Dividend Valuation Model, calculate

(i)   Expected Market Price per share

(ii) P/E Ratio.   (6 Marks)

Question No.35 (November 2014)

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 though a GDR issue. It considers the following factors in pricing the issue:

(i)   The expected domestic market price of the share is ₹ 300

(ii)   3 shares underly each GDR

(iii) Underlying shares are priced at 10% discount to the market price

(iv)   Expected exchange rate is ₹ 60/$

You are required to compute 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%. (8 Marks)

Question No.36 (May 2014)

MNP Ltd. has declared and paid annual dividend of ₹ 4 per share. It is expected to grow @ 20% for the next two years and 10% thereafter. The required rate of return of equity investors is 15%. Compute the current price at which equity shares should sell.

Note: Present Value Interest Factor (PVIF) @ 15%:

For year 1 = 0.8696;

For year 2 = 0.7561   (5 Marks)

Question No.37 (November 2013)

A trader is having in its portfolio shares worth ₹ 85 lakhs at current price and cash ₹ 15 lakhs. The beta of share portfolio is 1.6. After 3 months the price of shares dropped by 3.2%.

Determine:

(i)   Current portfolio beta

(ii)   Portfolio beta after 3 months if the trader on current date goes for long position on ₹ 100 lakhs Nifty futures.   (5 Marks)

Question No.38 (November 2013)

Ram buys 10,000 shares of X Ltd. at a price of ₹ 22 per share whose beta value is 1.5 and sells 5,000 shares of A Ltd. at a price of ₹ 40 per share having a beta value of 2. He obtains a complete hedge by Nifty futures at ₹ 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%.

What is the overall profit/loss to Ram?   (6 Marks)

Question No.39 (November 2013)

A share of Tension-free Economy Ltd. is currently quoted at a price earnings ratio of 7.5 times. The retained earning being 37.5% is ₹ 3 per share.

Calculate

(i)   *The company's cost of equity, if investors' expected rate of return is 12%.*

(ii) *Market price of share, if anticipated growth rate is 13% per annum with same cost of capital.*

(iii) *Market price per share, if the company's cost of capital is 18% and anticipated growth rate is 15% per annum, assuming other conditions remaining the same.*

Question No.40 (May 2013)

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

$e^{(0.015858)} = 1.01598$

Question No.41 (November 2012)

You as an investor had purchased a 4 month call option on the equity shares of X Ltd. of ₹ 10, of which the current market price is ₹ 132 and the exercise price ₹150. You expect the price to range between ₹ 120 to ₹ 190. The expected share price of X Ltd. and related probability is given below:

Expected Price (₹)	120	140	160	180	190
Probability	.05	.20	.50	.10	.15

Compute the following:

(1) *Expected Share price at the end of 4 months.*

(2) *Value of Call Option at the end of 4 months, if the exercise price prevails.*

(3) *In case the option is held to its maturity, what will be the expected value of the call option?*   *(8 Marks)*

Question No.42 (May 2012)

Indira has a fund of ₹ 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.   *(8 Marks)*

Question No.43 (May 2012, November 2017 RTP)

Sumana wanted to buy shares of EIL which has a range of ₹ 411 to ₹ 592 a month later. The present price per share is ₹ 421. Her broker informs her that the price of this share can sore up to ₹ 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 ₹ 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 ₹ 592 so that buying of a one month CALL of EIL at the execution price of ₹ 522 is justified. Advice her. Take the risk free interest to be 3.60% and $e^{0.036} = 1.037$.   *(8 Marks)*

Question No.44 (May 2017)

A is an investor and having in its Portfolio Shares worth ₹ 1,20,00,000 at current price and Cash ₹ 10,00,000. The Beta (β) of Share Portfolio is 1.4. After four months the price of shares dropped by 1.8%.

You are required to determine:

(i)   Current Portfolio Beta and

(ii)   Portfolio Beta after four months-if A on current date goes for long position on ₹ 1,30,00,000 Nifty futures.

Show calculations in ₹ Lakhs with four decimal points.   (5 Marks)

Question No.45 (May 2017)

P Ltd. has current earnings of ₹ 6 per share with 10,00,000 shares outstanding. The company plans to issue 80,000, 8% convertible preference shares of ₹ 100 each at par. The preference shares are convertible into 2 equity shares for each preference share held. The equity share has a current market price of ₹ 42 per share. Calculate:

(i)   What is preference share's conversion value?

(ii)   What is conversion premium?

(iii) Assuming that total earnings remain the same, calculate the effect of the issue on the basic earning per share (A) before conversion (B) after conversion.

(iv)   If profits after tax increases by ₹ 20 Lakhs what will be the basic EPS, (A) before conversion and (B) on a fully diluted basis?   (8 Marks)

Question No.46 (November 2017 RTP)

The share of X Ltd. is currently selling for ₹ 300. Risk free interest rate is 0.8% per month. A three months futures contract is selling for ₹ 312. Develop an arbitrage strategy and show what your riskless profit will be 3 month hence assuming that X Ltd. will not pay any dividend in the next three months.

Question No.1 (May 2017 RTP)

G holds securities as detailed herein below:

Security	Face Value (₹)	Numbers	Coupon Rate (%)	Maturity Years	Annual Yield (%)
(i) Bond A	1,000	100	9	3	12
(ii) Bond B	1,000	100	10	5	12
(iii) Preference Shares C	100	1,000	11	*	13*
(iv) Preference Shares C	100	1,000	12	*	13*

* Likelihood of being called (redeemed) at a premium over par.

Compute the current value of G's portfolio.

Question No.2 (May 2017 RTP)

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 ₹ 32 lakhs annually on an average before deduction of income-tax, 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%.

Compute the value per equity share of the company.

Question No.3 (May 2017 RTP)

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

Face value of bond	₹ 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	₹ 45
Market price of convertible bond	₹ 1175

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

Required: Calculate as of today:

(i)   Straight Value of bond.

(ii)   Conversion Value of the bond.

(iii) Conversion Premium.

(iv)   Percentage of downside risk.

(v)   Conversion Parity Price.

t	1	2	3
$PVIF_{0.095, t}$	0.9132	0.8340	0.7617

Question No.4 (May 2017 RTP)

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

Calculate Exponential Moving Average (EMA) of Sensex during the above period. The 30 days simple moving average of Sensex can be assumed as 15,000. The value of exponent for 30 days EMA is 0.062.

Give detailed analysis on the basis of your calculations.

Question No.5 (November 2016 RTP, May 2015 RTP, May 2013 RTP, November 2012 RTP)

The following data is related to 8.5% Fully Convertible (into Equity shares) Debentures issued by JAC Ltd. at ₹ 1000.

Market Price of Debenture	₹ 900

Conversion Ratio	30
Straight Value of Debenture	₹ 700
Market Price of Equity share on the date of Conversion	₹ 25
Expected Dividend Per Share	₹ 1

You are required to calculate:

(a) Conversion Value of Debenture

(b) Market Conversion Price

(c) Conversion Premium per share

(d) Ratio of Conversion Premium

(e) Premium over Straight Value of Debenture

(f) Favourable income differential per share

(g) Premium pay back period

Question No.6 (November 2016 RTP)

The following is the Yield structure of AAA rated debenture:

Period	Yield (%)
3 months	8.5%
6 months	9.25
1 year	10.50
2 years	11.25
3 years and above	12.00

(i) Based on the expectation theory calculate the implicit one-year forward rates in year 2 and year 3.

(ii) If the interest rate increases by 50 basis points, what will be the percentage change in the price of the bond having a maturity of 5 years? Assume that the bond is fairly priced at the moment at ₹ 1,000.

Question No.7 (November 2016 RTP, May 2014 RTP)

M/s Transindia Ltd. is contemplating calling ₹ 3 crores of 30 years, ₹ 1,000 bond issued 5 years ago with a coupon interest rate of 14 per cent. The bonds have a call price of ₹ 1,140 and had initially collected proceeds of ₹ 2.91 crores due to a discount of ₹ 30 per bond. The initial floating cost was ₹ 3,60,000. The Company intends to sell ₹ 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 ₹ 1,000. The estimated floatation cost is ₹ 4,00,000. 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 their proceeds, then used to retire old bonds, the company expects a two months period of overlapping interest during which interest must be paid on both the old and new bonds. What is the feasibility of refunding bonds?

Question No.8 (May 2016 RTP)

Following Financial data are available for PQR Ltd. for the year 2008:

	(₹ in lakh)
8% debentures	125
10% bonds (2007)	50
Equity shares (₹ 10 each)	100

Reserves and Surplus	300
Total Assets	600
Assets Turnovers ratio	1.1
Effective interest rate	8%
Effective tax rate	40%
Operating margin	10%
Dividend payout ratio	16.67%
Current market Price of Share	₹ 14
Required rate of return of investors	15%

You are required to:

(i)   Draw income statement for the year

(ii)   Calculate its sustainable growth rate

(iii)   Calculate the fair price of the Company's share using dividend discount model, and

(iv)   What is your opinion on investment in the company's share at current price?

Question No.9 (May 2016 RTP)

The following data are available for a bond

Face value	₹ 1,000
Coupon Rate	16%
Years to Maturity	6
Redemption value	₹ 1,000
Yield to maturity	17%

Calculate the duration and volatility of this bond?

Question No.10 (November 2015 RTP)

Two companies A Ltd. and B Ltd. paid a dividend of ₹3.50 per share. Both are anticipating that dividend shall grow @ 8%. The beta of A Ltd. and B Ltd. are 0.95 and 1.42 respectively.

The yield on GOI Bond is 7% and it is expected that stock market index shall increase at an annual rate of 13%. You are required to determine:

(a)   Value of share of both companies.

(b)   Why there is a difference in the value of shares of two companies.

(c)   If current market price of share of A Ltd. and B Ltd. are ₹74 and ₹55 respectively. As an investor what course of action should be followed?

Question No.11 (November 2015 RTP, November 2017 RTP)

The data given below relates to a convertible bond:

Face value	₹ 250
Coupon rate	12%
No. of shares per bond	20
Market price of share	₹ 12
Straight value of bond	₹ 235
Market price of convertible bond	₹ 265

Calculate:

(i)   Stock value of bond.

(ii)   The percentage of downside risk.

(iii) The conversion premium

(iv)   The conversion parity price of the stock.

Question No.12 (November 2015 RTP)

Delta Ltd.'s current financial year's income statement reports its net income as ₹ 15,00,000. Delta's marginal tax rate is 40% and its interest expense for the year was ₹ 15,00,000. The company has ₹ 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%.

(i)   Compute the operating income or EBIT earned by Delta Ltd. in the current year.

(ii)   What is Delta Ltd.'s Economic Value Added (EVA) for the current year?

(iii) Delta Ltd. has 2,50,000 equity shares outstanding. According to the EVA you computed in (ii), how much can Delta pay in dividend per share before the value of the company would start to decrease? If Delta does not pay any dividends, what would you expect to happen to the value of the company?

Question No.13 (May 2015 RTP)

Suppose Mr. A is offered a 10% Convertible Bond (par value ₹ 1,000) which either can be redeemed after 4 years at a premium of 5% or get converted into 25 equity shares currently trading at ₹ 33.50 and expected to grow by 5% each year. You are required to determine the minimum price Mr. A shall be ready to pay for bond if his expected rate of return is 11%.

Question No.14 (May 2015 RTP)

ABC Ltd. has divisions A,B & C. The division C has recently reported on annual operating profit of ₹ 20,20,00,000. This figure arrived at after charging ₹ 3 crores full cost of advertisement expenditure for launching a new product. The benefits of this expenditure is expected to be lasted for 3 years.

The cost of capital of division C is ₹11% and cost of debt is 8%.

The Net Assets (Invested Capital) of Division C as per latest Balance Sheet is ₹ 60 crore, but replacement cost of these assets is estimated at ₹84 crore.

You are required to compute EVA of the Division C.

Question No.15 (May 2015 RTP)

The total market value of the equity share of O.R.E. Company is ₹ 60,00,000 and the total value of the debt is ₹ 40,00,000. The treasurer estimate that the beta of the stock is currently 1.5 and that the expected risk premium on the market is 10 per cent. The Treasury bill rate is 8 per cent.

Required:

(1)   What is the beta of the Company's existing portfolio of assets?

(2)   Estimate the Company's Cost of capital and the discount rate for an expansion of the company's present business.

Question No.16 (November 2014 RTP, November 2013 RTP)

Calculate the value of share from the following information:

Profit of the company	₹ 290 crores
Equity capital of company	₹ 1,300 crores
Par value of share	₹ 40 each
Debt ratio of company	27
Growth rate of the company for first 5 years	8%
Growth rate of the company for the 6 year and onward	5%

Beta 0.1; risk free interest rate	8.7%
Market returns	10.3%
Capital expenditure per share	₹ 47
Depreciation per share	₹ 39
Change in Working capital	₹ 3.45 per share

Question No.17 (May 2014 RTP)

Mr. A is planning for making investment in bonds of one of the two companies X Ltd. and Y Ltd. The detail of these bonds is as follows:

Company	Face Value	Coupon Rate	Maturity Period
X Ltd.	₹ 10,000	6%	5 Years
Y Ltd.	₹ 10,000	4%	5 Years

The current market price of X Ltd.'s bond is ₹ 10,796.80 and both bonds have same Yield To Maturity (YTM). Since Mr. A considers duration of bonds as the basis of decision making, you are required to calculate the duration of each bond and you decision.

Question No.18 (May 2014 RTP)

ABC Limited's shares are currently selling at ₹ 13 per share. There are 10,00,000 shares outstanding. The firm is planning to raise ₹ 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?

Question No.19 (May 2014 RTP)

ABC Ltd. has ₹ 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 ₹ 300 million issue of 6 year bonds carrying a coupon rate of 10 per cent. Issue cost of the new bond will be ₹ 6 million and the call premium is 4 per cent. ₹ 9 million being the unamortized portion of issue cost of old bonds can be written off no 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.

Question No.20 (November 2013 RTP)

Consider the following operating information gathered from 3 companies that are identical except for their capital structures:

	P Ltd.	Q Ltd.	R Ltd.
Total invested capital	€100,000	€100,000	€100,000
Debt/assets ratio	0.80	0.50	0.20
Shares outstanding	6,100	8,300	10,000
Before-tax cost of debt	14%	12%	10%
Cost of equity	26%	22%	20%
Operating income, (EBIT)	€25,000	€25,000	€25,000
Net Income	€8,970	€12,350	€14,950
Tax rate	35%	35%	35%

(a) Compute the weighted average cost of capital, WACC, for each firm.

(b) Compute the Economic Value Added, EVA, for each firm.

(c) Based on the results of your computations in part b, which firm would be considered the best investment? Why?

(d) Assume the industry P/E ratio generally is 15 ×. Using the industry norm, estimate the price for each share.

(e) What factors would cause you to adjust the P/E ratio value used in part d so that it is more appropriate?

Question No.21 (November 2012 RTP)

The following data are available for a bond

Face value	₹ 1,000
Coupon Rate	16%
Years to Maturity	6
Redemption value	₹ 1,000
Yield to maturity	17%

What is the current market price, duration and volatility of this bond? Calculate the expected market price, if increase in required yield is by 75 basis points.

Question No.22 (November 2016)

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 ₹ 100.

The relevant present value table is as follows.

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.   (5 Marks)

Question No.23 (May 2016)

Bright Computers Limited is planning to issue a debenture series with a face value of ₹ 1,000 each for a term of 10 years with the following coupon rates:

Years	Rates
1-4	8%
5-8	9%
9-10	13%

The current market rate on similar debenture is 15% p.a. The company proposes to price the issue in such a way that a yield of 16% compounded rate of return is received by the investors. The redeemable price of the debenture will be at 10% premium on maturity. What should be the issue price of debenture?

Pv @ 16% for 1 to 10 years are: .862, .743, .641, .552, .476, .410, .354, .305, .263, .227 respectively.   (5 Marks)

Question No.24 (May 2016)

Calculate the value of share of Avenger Ltd. from the following information:

Equity capital of company	₹ 1,200 crores
Profit of the company	₹ 300 crores
Par value of share	₹ 40 each
Debt ratio of company	25
Long run growth rate of the company	8%
Beta 0.1; risk free interest rate	8.7%
Market returns	10.3%
Change in working capital per share	₹ 4
Depreciation per share	₹ 40
Capital expenditure per share	₹ 48

Question No.25 (November 2015)

The following data is available for a bond:

Face Value	₹ 1,000
Coupon Rate	11%
Years to Maturity	6
Redemption Value	₹ 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.   (5 Marks)

Question no.26 (November 2015)

Mr. A will need ₹ 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	₹ 1,000	₹ 1,000
Coupon	7% payable annually	8% payable annually
Years to maturity	1	4
Current price	₹ 972.73	₹ 936.52
Current yield	10%	10%

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.   (6 Marks)

Question No.27 (May 2015)

On 31st March, 2013, the following information about Bonds is available:

Name of Security	Face Value ₹	Maturity Date	Coupon Rate	Coupon Date(s)
Zero coupon	10,000	31st March, 2023	N.A.	N.A.
T-Bill	1,00,000	20th June, 2013	N.A.	N.A.

| 10.71% GOI 2023 | 100 | 31st March, 2023 | 10.71 | 31st March |
| 10 % GOI 2018 | 100 | 31st March, 2018 | 10.00 | 31st March & 31st October |

Calculate:

(i) If 10 years yield is 7.5% p.a. what price the Zero Coupon Bond would fetch on 31st March, 2013?

(ii) What will be the annualized yield if the T-Bill is traded @ 98500?

(iii) If 10.71% GOI 2023 Bond having yield to maturity is 8%, what price would it fetch on April 1, 2013 (after coupon payment on 31st March)?

(iv) If 10% GOI 2018 Bond having yield to maturity is 8%, what price would it fetch on April 1, 2013 (after coupon payment on 31st March)?   **(8 Marks)**

Question No.28 (May 2014)

RST Ltd.'s current financial year's income statement reported its net income as ₹25,00,000. The applicable corporate income tax rate is 30%.

Following is the capital structure of RST Ltd. at the end of current financial year:

	₹
Debt (Coupon rate = 11%)	40 lakhs
Equity (Share Capital + Reserves & Surplus)	125 lakhs
Invested Capital	165 lakhs

Following data is given to estimate cost of equity capital:

	₹
Beta of RST Ltd.	1.36
Risk –free rate i.e. current yield on Govt. bonds	8.5%
Average market risk premium (i.e. Excess of return on market portfolio over risk-free rate)	9%

Required:

(i) Estimate Weighted Average Cost of Capital (WACC) of RST Ltd.; and

(ii) Estimate Economic Value Added (EVA) of RST Ltd.   **(4 + 4 = 8 Marks)**

Question No.29 (May 2014)

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

Face value of bond	₹ 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	₹ 45
Market price of convertible bond	₹ 1175

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

Required: Calculate as of today:

(i)   Straight Value of bond.

(ii) Conversion Value of the bond.

(iii) Conversion Premium.

(iv) Percentage of downside risk.

(v)   Conversion Parity Price.

t	1	2	3
$PVIF_{0.095, t}$	0.9132	0.8340	0.7617

(4 +1+1+1++1= 8 Marks)

Question No.30 (November 2013)

ABC Ltd. issued 9%, 5 year bonds of ₹ 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

(ii) Expected price of bond in the market   (5 Marks)

Question No.31 (May 2013)

X Limited, just declared a dividend of ₹ 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 ₹ 360.00 after three years.

You are required to determine:

(i)   the maximum amount Mr. B should pay for shares, if he requires a rate of return of 13% per annum.   (4 Marks)

(ii) 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.   (2 Marks)

(iii) 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

(2 Marks)

Question No.32 (May 2013)

M/s. Earth Limited has 11% bond worth of ₹ 2 crores outstanding with 10 years remaining to maturity.

The company is contemplating the issue of a ₹ 2 crores 10 year bond carring the coupon rate of 9% and use the proceeds to liquidate the old bonds.

The unamortized portion of issue cost on the old bonds is ₹ 3 lakhs which can be written off no sooner the old bonds are called. The company is paying 30% tax and it's after tax cost of debt is 7%. Should Earth Limited liquidate the old bonds?

You may assume that the issue cost of the new bonds will be ₹ 2.5 lakhs and the call premium is 5%.   (6 Marks)

Question No.33 (November 2012)

With the help of the following information of Jatayu Limited compute the Economic Value Added:

Capital Structure	Equity capital ₹ 160 Lakhs
	Reserves and Surplus ₹ 140 lakhs
	10% Debentures ₹ 400 lakhs
Cost of equity	14%
Financial Leverage	1.5 times
Income Tax Rate	30%

Question No.34 (November 2012)

Following Financial Data for Platinum Ltd. are available:

For the year 2011:	(₹ In lakhs)
Equity Shares (₹ 10 each)	100
8% Debentures	125
10% Bonds	50

Reserve and Surplus	200
Total Assets	500
Assets Turnover Ratio	1.1
Effective Tax Rate	30%
Operating Margin	10%
Required rate of return of investors	15%
Dividend payout ratio	20%
Current market price of shares	₹13

You are required to:

(i)   Draw income statement for the year

(ii)   Calculate the sustainable growth rate

(iii)   Compute the fair price of the company's share using dividend discount model, and

(iv)   Draw your opinion on investment in the company's share at current price.   (8 Marks)

Question No.35 (November 2012)

Tiger Ltd. is presently working with an Earning Before Interest and Taxes (EBIT) of ₹90 lakhs. Its present borrowings are as follows:

	₹ In lakhs
12% term loan	300
Working capital borrowings:	
From Bank at 15%	200
Public Deposit at 11 %	100

The sales of the company are growing and to support this, the company proposes to obtain additional borrowing of ₹100 lakhs expected to cost 16%. The increase in EBIT is expected to be 15%.

Calculate the change in interest coverage ratio after the additional borrowing is effected and comment on the arrangement made.   (8 Marks)

Chapter 7: Portfolio Management

Question No.1 (May 2017 RTP)

Sunrise Limited last year paid dividend of ₹ 20 per share with an annual growth rate of 9%. The risk-free rate is 11% and the market rate of return is 15%. The company has a beta factor of 1.50. However, due to the decision of the Board of Director to grow inorganically in the recent past beta is likely to increase to 1.75.

You are required to find out under Capital Asset Pricing Model

(i) The present value of the share

(ii) The likely value of the share after the decision.

Question No.2 (May 2017 RTP, November 2016 RTP)

A company has a choice of investments between several different equity oriented mutual funds. The company has an amount of ₹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:

(i)   If the company invests 20% of its investment in the first two mutual funds and an equal amount in the mutual funds C, D and E, what is the beta of the portfolio?

(ii) 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?

(iii) 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?

Question No.3 (November 2016 RTP)

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:

(i)   Portfolio beta.

(ii)   If the PM seeks to reduce the beta to 0.8, how much risk free investment should he bring in?

(iii) If the PM seeks to increase the beta to 1.2, how much risk free investment should he bring in?

Question No.4 (November 2016 RTP, May 2012)

A has portfolio having following features:

Security	β	Random Error σ_{ei}	Weight
L	1.60	7	0.25
M	1.15	11	0.30
N	1.40	3	0.25
K	1.00	9	0.20

You are required to find out the risk of the portfolio if the standard deviation of the market index (σ_m) is 18%.

Question No.5 (May 2016 RTP)

Suppose if Treasury Bills give a return of 5% and Market Return is 13%, then determine

(i)   The market risk premium

(ii) β Values and required returns for the following combination of investments.

Treasury Bill	100	70	30	0
Market	0	30	70	100

Question No.6 (May 2016 RTP)

. The following information is available of Jay Kay Ltd. and of Market (Index)

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

Compute Beta Value of the company at the end of the year 2005.

Question No.7 (May 2016 RTP)

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. What would be the portfolio risk if equal amount of money is allocated among these stocks?

	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		

Question No.8 (November 2015 RTP)

. A study by a Mutual fund has revealed the following data in respect of three securities:

Security	σ (%)	Correlation with Index, Pm
A	20	0.60
B	18	0.95
C	12	0.75

The standard deviation of market portfolio (BSE Sensex) is observed to be 15%.

(i)   What is the sensitivity of returns of each stock with respect to the market?

(ii)   What are the covariances among the various stocks?

(iii) What would be the risk of portfolio consisting of all the three stocks equally?

(iv)   What is the beta of the portfolio consisting of equal investment in each stock?

(v)   What is the total, systematic and unsystematic risk of the portfolio in (iv)?

Question No.9 (November 2015 RTP)

An investor holds two stocks A and B. An analyst prepared ex-ante probability distribution for the possible economic scenarios and the conditional returns for two stocks and the market index as shown below:

Economic scenario	Probability	Conditional Returns %		
		A	B	Market
Growth	0.40	25	20	18
Stagnation	0.30	10	15	13
Recession	0.30	-5	-8	-3

The risk free rate during the next year is expected to be around 11%. Determine whether the investor should liquidate his holdings in stocks A and B or on the contrary make fresh investments in them. CAPM assumptions are holding true.

Question No.10 (May 2015 RTP, November 2013 RTP)

Following data is related to Company X, Market Index and Treasury Bonds for the current year and last 4 years:

| Year | Company X | | Market Index | | |
	Average Share Price (P)	Dividend Per Share (D)	Average Market Index	Market Dividend Yield	Return on Treasury Bonds
2010	₹ 139	₹ 7.00	1300	3%	7%
2011	₹ 147	₹ 8.50	1495	5%	9%
2012	₹ 163	₹ 9.00	1520	5.5%	8%
2013	₹ 179	₹ 9.50	1640	4.75%	8%
2014 (Current Year)	₹ 203.51	₹ 10.00	1768	5.5%	8%

With the above data estimate the beta of Company X's share.

Question No.11 (May 2015 RTP, November 2013 RTP)

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?

Question No.12 (November 2014 RTP)

Mr. A has a portfolio of ₹ 5 crore consisting of equity shares of X Ltd. and Y Ltd. with beta of 1.15. Other information is as follows:

Spot Value of Index Future   = 21000

Multiplier   = 150

You are requested to reduce beta of portfolio to 0.85 and increase beta to 1.45 by using:

(a)   Change in composition through Risk Free securities

(b)   Index futures

Question No.13 (May 2014 RTP)

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:

(a)   The Betas of the two stocks.

(b)   Expected return of each stock, if the market return is equally likely to be 7% or 25%.

(c)   The Security Market Line (SML), if the risk free rate is 7.5% and market return is equally likely to be 7% or 25%.

(d)   The Alphas of the two stocks.

Question No.14 (May 2014 RTP)

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 short-term 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:

(i)   Calculate the risk of XYZ's short-term investment portfolio relative to that of the market;

(ii)   Whether XYZ should change the composition of its portfolio.

Question No.15 (May 2013 RTP)

The following information is available in respect of Security X

Equilibrium Return	15%
Market Return	15%
7% Treasury Bond Trading at	$140
Covariance of Market Return and Security Return	225%
Coefficient of Correlation	0.75

You are required to determine the Standard Deviation of Market Return and Security Return.

Question No.16 (May 2013 RTP, November 2017 RTP)

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?

Question No.17 (November 2012 RTP)

Suppose that economy A is growing rapidly and you are managing a global equity fund that has so far invested only in developed-country stocks. Now you have decided to add stocks of economy A to your portfolio. The table below shows the expected rates of return, standard deviations, and correlation coefficients (all estimated for the aggregate stock market of developed countries and stock market of Economy A).

	Developed country stocks	Stocks of Economy A
Expected rate of return (annualized percent)	10	15
Risk [Annualized Standard Deviation (%)]	16	30
Correlation Coefficient (ρ)	0.30	

Assuming the risk-free interest rate to be 3%, you are required to determine:

(a)   What percentage of your portfolio should you allocate to stocks of Economy A if you want to increase the expected rate of return on your portfolio by 0.5%?

(b)   What will be the standard deviation of your portfolio assuming that stocks of Economy A are included in the portfolio as calculated above?

(c)   Also show how well the Fund will be compensated for the risk undertaken due to inclusion of stocks of Economy A in the portfolio?

Question No.18 (November 2012 RTP)

An investor has decided to invest to invest ₹ 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(%)
0.20	12	16
0.25	14	10
0.25	-7	28
0.30	28	-2

You are required to

(i)   Comment on return and risk of investment in individual shares.

(ii) Compare the risk and return of these two shares with a Portfolio of these shares in equal proportions.

(iii) Find out the proportion of each of the above shares to formulate a minimum risk portfolio.

Question No.19 (November 2016)

The following information is available in respect of Security A:

Equilibrium Return	*12%*
Market Return	*12%*
6% Treasury Bond trading at	*₹120*
Co-variance of Market Return and Security Return	*196%*
Coefficient of Correlation	*0.80*

You are required to determine the Standard Deviation of:

(i)   Market Return and

(ii) Security Return

Question No.20 (November 2016)

The returns and market portfolio for a period of four years are as under:

Year	% Return of Stock B	% Return on Market Portfolio
1	10	8
2	12	10
3	9	9
4	3	-1

For stock B, you are required to determine:

(i)   characteristic line; and

(ii)   the Systematic and Unsystematic risk.   (8 Marks)

Question No.21 (November 2016)

Mr. Abhishek is interested in investing ₹ 2,00,000 for which he is considering following three alternatives:

(i)   Invest ₹ 2,00,000 in Mutual Fund X (MFX)

(ii)   Invest ₹ 2,00,000 in Mutual Fund Y (MFY)

(iii)   Invest ₹ 1,20,000 in Mutual Fund X (MFX) and ₹ 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
M	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,

(ill)   expected return, systematic risk and unsystematic risk; and

(iv)   Sharpe ratio, Treynor ratio and Alpha of MFX, MFY and Portfolio Mix   (8 Marks)

Question No.22 (May 2016)

XYZ Ltd. paid a dividend of ₹ 2 for the current year. The dividend is expected to grow at 40% for the next 5 years and at 15% per annum thereafter. The return on 182 days T-bills is 11% per annum and the market return is expected to be around 18% with a variance of 24%.

The co-variance of XYZ's return with that of the market is 30%. You are required to calculate the required rate of return and intrinsic value of the stock.   (8 Marks)

Question No.23 (May 2016)

Abinash is holding 5,000 shares of Future Group Limited. Presently the rate of dividend being paid by the company is ₹5 per share and the share is being sold at ₹50 per share in the market. However, several factors are likely to change during the course of the year as indicated below:

	Existing	Revised
Risk free rate	12.5%	10%
Market risk premium	6%	4.8%
Expected growth rate	5%	8%
Beta value	1.5	1.25

In view of the above factors whether Abinash should buy, hold or sell the shares? Narrate the reason for the decision to be taken. (8 Marks)

Question No.24 (May 2015)

Mr. Shyam is holding the following securities:

Particulars of Securities	Cost ₹	Dividend Interest ₹	Market Price ₹	Beta
Equity shares:				
Gold Ltd.	10,000	1,725	9,800	0.6
Silver Ltd.	15,000	1,000	16,200	0.8
Bronze Ltd.	14,000	700	20,000	0.6
GOI Bonds	36,000	3,600	34,500	1.0

Average return of the portfolio is 15.7%.

Using Average Beta, Calculate:

(i) Expected rate of return in each case, using the Capital Asset Pricing Model (CAPM)

(ii) Risk free rate of return (8 Marks)

Question No.24 (May 2015)

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)   (8 Marks)

Question No.26 (November 2014)

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 ₹ 2.00. The beta of Platinum Ltd. equity stock is 1.2.

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

(ii)   How would the equilibrium price change 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?   (8 Marks)

Question No.27 (November 2014)

An investor is holding 5,000 shares of X Ltd. Current year dividend rate is ₹ 3/share. Market price of the share is ₹ 40 each. The investor is concerned about several factors which are likely to change during the next financial year as indicated below:

	Current Year	Next Year
Dividend paid/anticipated per share (₹)	3	2.5
Risk free rate	12%	10%
Market Risk Premium	5%	4%
Beta Value	1.3	1.4
Expected growth	9%	7%

In view of the above, advise whether the investor should buy, hold or sell the shares.

Question No.28 (November 2013)

Mr. Ram is holding the following securities:

Particulars of Securities	Cost ₹	Dividends	Market Price	Beta
Equity Shares:				
Gold Ltd.	11,000	1,800	12,000	0.6
Silver Ltd.	16,000	1,000	17,200	0.8
Bronze Ltd.	12,000	800	18,000	0.6
GOI Bonds	40,000	4,000	37,500	1.0

Calculate:

(i) *Expected rate of return in each case, using the Capital Asset Pricing Model (CAPM).*

(ii) *Average rate of return, if risk free rate of return is 14%.*   *(8 Marks)*

Question No.29 (November 2012)

Mr. FedUp wants to invest an amount of ₹ 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.*   *(8 Marks)*

Question No.30 (May 2017)

A Stock costing ₹ 150 pays no dividends. The possible prices at which the stock may be sold for at the end of the year with the respective probabilities are:

Price ↓ (in ₹)	Probability ↓
130	0.2
150	0.1
160	0.1
165	0.3
175	0.1
180	0.2
Total	1.0

You are required to:

(i) *calculate the Expected Return,*

(ii) *calculate the Standard Deviation (σ) of Returns.*

    Show calculations upto three decimal points.   *(8 Marks)*

Question No.31 (May 2017)

The following information are available with respect of Krishna Ltd.

Year	Krishna Ltd. Average share price	Dividend per Share	Average Market Index	Dividend Yield	Return on Govt. bonds
	₹	₹			
2012	245	20	2013	4%	7%
2013	253	22	2130	5%	6%
2014	310	25	2350	6%	6%
2015	330	30	2580	7%	6%

Compute Beta Value of the Krishna Ltd. at the end of 2015 and state your observation.

(8 Marks)

Question No.32 (May 2017)

The five portfolios of a mutual fund experienced following result during last 10 years periods :

Portfolio	Average annual return %	Standard Deviation	Correlation with the market return
A	20.0	2.3	0.8869
B	17.0	1.8	0.6667
C	18.0	1.6	0.600
D	16.0	1.8	0.867
E	13.5	1.9	0.5437

Market risk   :   1.2

Market rate of return   :   14.3%

Risk free rate   :   10.1%

Beta may be calculated only upto two decimal. Rank the portfolio using JENSEN'S ALPHA method.   (8 Marks)

Question No.33 (November 2017 RTP)

ABC Ltd. manufactures Car Air Conditioners (ACs), Window ACs and Split ACs constituting 60%, 25% and 15% of total market value. The stand-alone Standard Deviation and Coefficient of Correlation with market return of Car AC and Window AC is as follows:

	S.D.	Coefficient of Correlation
Car AC	0.30	0.6
Window AC	0.35	0.7

No data for stand-alone SD and Coefficient of Correlation of Split AC is not available. However, a company who derives its half value from Split AC and half from Window AC has a SD of 0.50 and Coefficient of correlation with market return is 0.85. Index has a return of 10% and has SD of 0.20. Further, the risk-free rate of return is 4%.

You are required to determine:

(i)   Beta of ABC Ltd.

(ii)   Cost of Equity of ABC Ltd.

Assuming that ABC Ltd. wants to raise debt of an amount equal to half of its Market Value then determine equity beta, if yield of debt is 5%.

Question No.34 (November 2017 RTP)

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

Chapter 8: Financial Services

Question No.1 (November 2016 RTP, May 2013 RTP, November 2012 RTP)

Extracts from the forecasted financial statements of ABC Ltd. are given below.

	₹ '000	₹ '000
Turnover		21,300
Cost of sales		16,400
Gross Profit		**4,900**
Non-current assets		3,000
Current assets		
Inventory	4,500	
Trade receivables	3,500	8,000
Total Assets		**11,000**
Trade payables	3,000	
Overdraft	3,000	6,000
Equity Shares	1,000	
Reserves	1,000	2,000
Debentures		3,000
Total Liabilities		**11,000**

XYZ Fincorp, a factor has offered to manage the trade receivables of ABC Ltd. under a servicing and factor-financing agreement. XYZ expects to reduce the average trade receivables period of ABC from its current level to 35 days; to reduce bad debts from 0.9% of turnover to 0.6% of turnover; and to save of ABC ₹ 40,000 per year on account of administration costs.

The XYZ would also make an advance to ABC of 80% of the revised book value of trade receivables. The interest rate on the advance would be 2% higher than the ABC currently pays on its overdraft i.e. 7%. The XYZ would charge a fee of 0.75% of turnover on a with-recourse basis, or a fee of 1.25% of turnover on a non-recourse basis.

Assuming 365 days in a year and all sales and purchases are on credit, you are required to evaluate the proposal of XYZ Fincorp.

Question No.2 (May 2016 RTP)

Mr. Stanley Joseph has secured from a housing bank, a six year housing loan of ₹ 12,00,000. The loan was structured as follows:

Loan Amount	---	₹ 12,00,000
Repayment	---	Six equated annual installments, payable in arrears.
Reference Base	---	Prime Lending Rate
Reference Rate	---	9% on the date of loan
Interest on Loan	---	1 percentage point over reference rate of 9%
Annual Installment	---	₹ 2,75,530

Two years after the loan was granted, the prime rate moves down to 8% and the effective rate on the loan automatically stood revised to 9%. Determine the revised amount of instalment.

Question No.3 (May 2016 RTP)

You have a housing loan with one of India's top housing finance companies. The amount outstanding is ₹ 1,89,540. You have now paid an installment. Your next installment falls due a year later. There are five more installments to go, each being ₹ 50,000. Another housing finance company has offered to take over this loan on a seven year repayment basis. You will be required to pay ₹ 36,408 p.a. with the first installment falling a year later. The processing fee is 3% of amount taken over. For swapping you will have to pay ₹ 12,000 to the first company. Should you swap the loan?

[Given (PVAF 10%, 5) = 3.791 and (PVAF 8%, 7) = 5.206]

Question No.4 (May 2016 RTP)

A company is considering engaging a factor, the following information is available:

(i)   The current average collection period for the Company's debtors is 80 days and ½% of debtors default. The factor has agreed to pay money due after 60 days and will take the responsibility of any loss on account of bad debts.

(ii)   The annual charge for the factoring is 2% of turnover payable annually in arrears. Administration cost saving is likely to be ₹ 1,00,000 per annum.

(iii) Annual sales, all on credit, are ₹ 1,00,00,000. Variable cost is 80% of sales price. The Company's cost of borrowing is 15% per annum. Assume the year is consisting of 365 days.

Should the Company enter into a factoring agreement?

Question No.5 (November 2015 RTP, November 2013)

M/s Atlantic Company Limited with a turnover of ₹ 4.80 croresis expecting growth of 25% for forthcoming year. Average credit period is 90 days. The past experience shows that bad debt losses are 1.75% on sales. The Company's administering cost for collecting receivable is ₹ 6,00,000/-.

It has decided to take factoring services of Pacific Factors on terms that factor will by receivable by charging 2% commission and 20% risk with recourse. The Factor will pay advance on receivables to the firm at 16% interest rate per annum after withholding 10% as reserve.

Calculate the effective cost of factoring to the firm. (Assume 360 days in a year).

Question No.6 (May 2015 RTP)

A Ltd. has an export sale of ₹ 50 crore of which 20% is paid by importers in advance of dispatch and for balance the average collection period is 60 days. However, it has been observed that these payments have been running late by 18 days. The past experience indicates that bad debt losses are 0.6% on Sales. The expenditure incurred for efforts in receivable collection are ₹ 60,00,000 p.a.

So far A Ltd. had no specific arrangements to deal with export receivables, following two proposals are under consideration:

(i) A non-recourse export factoring agency is ready to buy A Ltd.'s receivables by charging 2% commission. The factor will pay an advance on receivables to the firm at an interest rate of MIBOR + 1.75% after withholding 20% as reserve.

(ii) Insu Ltd. an insurance company has offered a comprehensive insurance policy at a premium of 0.45% of the sum insured covering 85% of risk of non-payment. A Ltd. can assign its right to a bank in return of an advance of 75% of the value insured at MIBOR+1.50%.

Assuming that MIBOR is 6% and A Ltd. can borrow from its bank at MIBOR+2% by using existing overdraft facility determine the which of the two proposal should be accepted by A Ltd. (1 Year = 360 days).

Question No.7 (November 2014 RTP)

. M/s Atlantic Company Limited with a turnover of ₹ 4.80 crores is expecting growth of 25% for forthcoming year. Average credit period is 90 days. The past experience shows that bad debt losses are 1.75% on sales. The Company's administering cost for collecting receivable is ₹ 6,00,000/-.

It has decided to take factoring services of Pacific Factors on terms that factor will by receivable by charging 2% commission and 20% risk with recourse. The Factor will pay advance on receivables to the firm at 16% interest rate per annum after withholding 10% as reserve.

Calculate the effective cost of factoring to the firm. (Assume 360 days in a year).Dividend

Question No.8 (May 2013 RTP)

Sa Re Gama Electronic is in the business of selling consumer durables. In order to promote its sales it also financing the goods to its customer allowing them to make some cash down payment and balance in installments.

In a deal of LCD TV with selling price of ₹ 50,000, a customer can purchase it for cash down payment of ₹ 10,000 and balance amount by adopting any of the following option:

Tenure of Monthly Installments	Equated Monthly Installment (₹)
12	3,800
24	2,140

You are required to determine the flat and effective rate of interest for each alternative.

Question No.9 (November 2016)

Projected sales for the next year of Z Ltd. is ₹ 1000 Cr. The company manages its accounts receivables internally. Its present annual cost of sales ledger administration is ₹ 11 Cr. The company finances its investment on debtors through a mix of bank credit and own long term funds in the ratio of 60 : 40. Current cost of bank credit and long term funds are 10% and 12% respectively. The past experience indicates that bad debt losses are 1.5% on total sales.

The company has a credit policy of 2/10, net 30. On an average, 40% of receivables are collected within the discount period and rest are collected 70 days after the invoice date. Over the years, gross profit is maintained at 20% and the same is expected to be continued in future.

To enable the management focus on promotional activities and get rid of escalating cost associated with in house management of debtors, the company is considering the possibility of availing the services of Fairgrowth Factors Ltd. for managing receivables of the company.

According to the proposal of the factor, it would pay advance to the tune of 85% of receivables with 20% interest and 81% of receivables with 21% interest for the recourse and non-recourse agreements respectively. The proposal provides for guaranteed payment within 30 days from the date of invoice. The factoring commission would be 4% without recourse and 2% with recourse.

If the company goes for the factoring arrangement, the staff would be under burdened and concentrate more on promotional activities and consequently additional sales of ₹ 100 Cr. would be achieved. Assume that all sales of the company are credit sales and the year is of 360 days.

You are required to:

(i)   calculate cost of in house management of receivables,

(ii)   compute cost of Fairgrowth Factors Ltd. proposal (with recourse and without recourse),

(iii) calculate net benefits under recourse factoring and non-recourse factoring; and

(iv) decide the best option for the company.   *(8 Marks)*

Question No.10 (May 2015)

PQR Ltd. has credit sales of ₹ 165 crores during the financial year 2014-15 and its average collection period is 65 days. The past experience suggests that bad debt losses are 4.28% of credit sales.

Administration cost incurred in collection of its receivables is ₹ 12,35,000 p.a. A factor is prepared to buy the company's receivables by charging 1.95% commission. The factor will pay advance on receivables to the company at an interest rate of 16% p.a. after withholding 15% as reserve.

Estimate the effective cost of factoring to the company assuming 360 days in a year.

Question No.11 (November 2014)

Beanstalk Ltd. manages its accounts receivable internally by its sales and credit department. The cost of sales ledger administration stands at ₹ 10 crores annually. The company has a credit policy of 2/10, net 30. Past experience of the company has been that on an average 40 percent of the customers avail of the discount by paying within 10 days while the balance of the receivables are collected on average 90 days after the invoice date. Bad debts of the company are currently 1.5 percent of total sales. The projected sales for the next year are ₹ 1,000 crores.

Beanstalk Ltd. finances its investment in debtors through a mix of bank credit and own long term funds in the ratio of 70:30. The current cost of bank credit and long term funds are 13 percent and 15 percent respectively.

With escalating cost associated with the in house management of debtors coupled with the need to unburden the management with the task so as to focus on sales promotion, the Company is examining the possibility of outsourcing its factoring service for managing its receivable and has two proposals on hand with a guaranteed payment within 30 days.

The main elements of the Proposal I from Finebank Factors Ltd. are:

- Advance, 88 percent and 84 percent for the recourse and non recourse arrangements.

- Discount charge in advance, 21 percent for with recourse and 22 percent without recourse.

- Commission, 4.5 percent without recourse and 2.5 percent with recourse.

The main elements of the Proposal II from Roughbank Factors Ltd. are:

- Advance, 84 percent with recourse and 80 percent without recourse respectively.

  - Discount charge upfront without recourse 21 percent and with recourse 20 percent.

  - Commission upfront, without recourse 3.6 percent and with recourse 1.8 percent.

The opinion of the Chief Marketing Manager is that in the context of the factoring arrangement, his staff would be able exclusively focus on sales promotion which would result in additional sales of 10% of projected sales. Kindly advice as a financial consultant on the alternative proposals. What advice would you give? Why? (12 Marks)

Question No.12 (May 2014)

The credit sales and receivables of DEF Ltd. at the end of year are estimated at ₹ 561 lakhs and ₹ 69 lakhs respectively.

The average variable overdraft interest rate is 5% p.a.

DEF Ltd. is considering a factoring proposal for its receivables on a non-recourse basis at an annual fee of 1.25% of credit sales.

As a result, DEF Ltd. will save ₹ 1.5 lakhs p.a. in administrative cost and ₹ 5.25 lakhs p.a. as bad debts.

The factor will maintain a receivables collection period of 30 days and will provide 80% of receivables as advance at an interest rate of 7% p.a. You may take 365 days in a year for the purpose of calculation of receivables.

Required:

Evaluate the viability of factoring proposal.   (8 Marks)

Question No.13 (May 2017)

AC Co. Ltd. has a turnover of ₹ 1600 Lakhs and is expecting growth of 17.90% for the next year. Average credit period is 100 days. The Bad Debt losses are about 1.50% on sales. The administrative cost for collecting receivables is ₹ 8,00,000. The AC Co. Ltd. decides to make use of Factoring Services by FS Ltd. on terms as under:

(i)   that the factor will charge commission of 1.75%.

(ii)·   15% Risk with recourse and

(iii)   Pay an advance on receivables to AC Co. Ltd. at 14% p.a. interest after withholding 10% as reserve.

You are required to calculate the effective cost of factoring to AC Co. Ltd. for the year.

Assume 360 days in a year.

Show amount in Lakhs of ₹ with two decimal points.   (8 Marks)

Chapter 9: Mutual Funds

Question No.1 (May 2017 RTP)

A mutual fund made an issue of 10,00,000 units of ₹ 10 each on January 01, 2008. No entry load was charged. It made the following investments:

Particulars	₹
50,000 Equity shares of ₹ 100 each @ ₹ 160	80,00,000
7% Government Securities	8,00,000
9% Debentures (Unlisted)	5,00,000
10% Debentures (Listed)	5,00,000
	98,00,000

During the year, dividends of ₹ 12,00,000 were received on equity shares. Interest on all types of debt securities was received as and when due. At the end of the year equity shares and 10% debentures are quoted at 175% and 90% respectively. Other investments are at par.

Find out the Net Asset Value (NAV) per unit given that operating expenses paid during the year amounted to ₹ 5,00,000. Also find out the NAV, if the Mutual fund had distributed a dividend of ₹ 0.80 per unit during the year to the unit holders.

Question No.2 (November 2016 RTP, May 2014)

Based on the following data, estimate the Net Asset Value (NAV) on per unit basis of a Regular Income Scheme of a Mutual Fund on 31-3-2015:

	₹ (in lakhs)
Listed Equity shares at cost (ex-dividend)	40.00
Cash in hand (As on 1-4-2014)	5.00
Bonds & Debentures at cost of these, Bonds not listed	8.96
& not quoted	2.50
Other fixed interest securities at cost	9.75
Dividend accrued	1.95
Amount payable on shares	13.54
Expenditure accrued	1.76

Current realizable value of fixed income securities of face value of ₹ 100 is ₹ 96.50.

Number of Units (₹ 10 face value each): 275000

All the listed equity shares were purchased at a time when market portfolio index was 12,500. On NAV date, the market portfolio index is at 19,975.

There has been a diminution of 15% in unlisted bonds and debentures valuation.

Listed bonds and debentures carry a market value of ₹ 7.5 lakhs, on NAV date.

Operating expenses paid during the year amounted to ₹ 2.24 lakhs.

Question No.3 (May 2016 RTP)

Orange purchased 200 units of Oxygen Mutual Fund at ₹ 45 per unit on 31st December, 2009. In 2010, he received ₹ 1.00 as dividend per unit and a capital gains distribution of ₹ 2 per unit.

Required:

(i) Calculate the return for the period of one year assuming that the NAV as on 31st December 2010 was ₹ 48 per unit.

(ii) Calculate the return for the period of one year assuming that the NAV as on 31st December 2010 was ₹ 48 per unit and all dividends and capital gains distributions have been reinvested at an average price of ₹ 46.00 per unit.

Question No.4 (November 2014 RTP, May 2013)

On 1-4-2012 ABC Mutual Fund issued 20 lakh units at ₹ 10 per unit. Relevant initial expenses involved were ₹ 12 lakhs. It invested the fund so raised in capital market instruments to build a portfolio of ₹ 185 lakhs. During the month of April, 2012 it disposed off some of the instruments costing ₹ 60 lakhs for ₹ 63 lakhs and used the proceeds in purchasing securities for ₹ 56 lakhs. Fund management expenses for the month of April, 2012 was ₹ 8 lakhs of which 10% was in arrears. In April, 2012 the fund earned dividends amounting to ₹ 2 lakhs and it distributed 80% of the realized earnings. On 30-4-2012 the market value of the portfolio was ₹ 198 lakhs.

Mr. Akash, an investor, subscribed to 100 units on 1-4-2012 and disposed off the same at closing NAV on 30-4-2012. What was his annual rate of earning?

Question No.5 (May 2014 RTP)

A Mutual Fund having 300 units has shown its NAV of ₹ 8.75 and ₹ 9.45 at the beginning and at the end of the year respectively. The Mutual Fund has given two options:

(i) Pay ₹ 0.75 per unit as dividend and ₹ 0.60 per unit as a capital gain, or

(ii) These distributions are to be reinvested at an average NAV of ₹ 8.65 per unit.

What difference it would make in terms of return available and which option is preferable?

Question No.6 (November 2013 RTP, May 2012)

A Mutual Fund Co. has the following assets under it on the close of business as on:

Company	No. of Shares	1st February 2012 Market price per share ₹	2nd 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 ₹ 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.

Question No.7 (May 2013 RTP)

. 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?

Question No.8 (November 2012 RTP, May 2013)

Mr. Sinha has invested in three Mutual fund schemes as per details below:

	Scheme X	Scheme Y	Scheme Z
Date of Investment	01.12.2011	01.01.2012	01.03.2012
Amount of Investment	₹ 5,00,000	₹ 1,00,000	₹ 50,000
Net Asset Value at entry date	₹ 10.50	₹ 10.00	₹ 10.00

| Dividend received upto 31.03.2012 | ₹ 9,500 | ₹ 1,500 | Nil |
| NAV as at 31.3.2012 | ₹ 10.40 | ₹ 10.10 | ₹ 9.80 |

You are required to calculate the effective yield on per annum basis in respect of each of the three schemes to Mr. Sinha upto 31.03.2012.

Question No.9 (November 2016, May 2015)

Mr. A has invested in three Mutual Fund (MF) schemes as per the details given below:

Particulars	MF 'A'	MF 'B'	MF 'C'
Date of Investment	01-11-2015	01-02-2016	01-03-2016
Amount of investment (₹)	1,00,000	2,00,000	2,00,000

Net Asset Value (NAV) at entry date (₹)	10.30	10.00	10.10
Dividend Received upto 31-3-2016 (₹)	2,850	4,500	NIL
NAV as on 31-3-2016 (₹)	10.25	10.15	10.00

Assume 1 year = 365 days.

Show the amount of rupees upto two decimal points.

You are required to find out the effective yield (upto three decimal points) on per annum basis in respect of each of the above three Mutual Fund (MF) schemes upto 31-3-2016.

Question No.10 (May 2016, November 2017 RTP)

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%.   (5 Marks)

Question No.11 (May 2016)

Calculate the NAV of a regular income scheme on per unit basis of Red Bull mutual fund from the following information:

Particulars	₹ in crores
Listed shares at cost (ex-dividend)	30
Cash in hand	0.75
Bonds & Debentures at cost (ex-interest)	2.30
Of these, bonds not listed & not quoted	1.0
Other fixed interest securities at cost	2.50
Dividend accrued	0.8
Amount payable on shares	8.32
Expenditure accrued	1.00
Value of listed bonds & debentures at NAV date	10

Number of units (₹10 face value)	30 lakhs
Current realizable value of fixed income securities of face value of ₹ 100 is	106.50
The listed shares were purchased when index was	7100
and the Present index is	9000

Unlisted bonds and debentures are at cost. Other fixed interest securities are also at cost.   (6 Marks)

Question No.12 (November 2015)

Mr. X on 1.7.2012, during the initial public offer of a Mutual Fund (MF) invested ₹ 1,00,000 at Face Value of ₹ 10. On 31.3.2013, the MF declared a dividend of 10% when Mr. X calculated that his holding period return was 115%. On 31.3.2014, MF again declared a dividend of 20%. On 31.3.2015, Mr. X redeemed all his investment which had accumulated to 11,296.11 units when his holding period return was 202.17%.

Calculate the NAVs as on 31.03.2013, 31.03.2014 and 31.03.2015.   (8 Marks)

Question No.13 (November 2015)

On 1st April, an open ended scheme of mutual fund had 300 lakh units outstanding with Net Assets Value (NAV) of ₹ 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:

	₹ 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

(i)   Income available for distribution;

(ii) Issue price at the end of April;

(iii) repurchase price at the end of May; and

(iv) net asset value (NAV) as on 30th June.   (8 Marks)

Question No.14 (May 2015)

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 ₹ 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 ₹ 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.

For calculation, consider 12 months in a year and ignore number of days for particular month.   **(8 Marks)**

Question No.15 (November 2014)

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 ₹ 2,50,000 and other liabilities of ₹ 2,00,000. Calculate the NAV per unit of the Scheme Rudolf.   **(4 Marks)**

Question No.16 (November 2013)

On 01-07-2010, Mr. X Invested ₹ 50,000/- at initial offer in Mutual Funds at a face value of ₹ 10 each per unit. On 31-03-2011, a dividend was paid @ 10% and annualized yield was 120%. On 31-03-2012, 20% dividend and capital gain of ₹ 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 31-03-2011, 31-03-2012 and 31-03-2013.

For calculations consider a year of 12 months.   **(5 Marks)**

Question No.17 (November 2012)

The following information is extracted from Steady Mutual Fund's Scheme:

- Asset Value at the beginning of the month   - ₹ 65.78

- Annualised return   -15 %

- *Distributions made in the nature of Income*   - ₹ *0.50 and* ₹ *0.32*

   & *Capital gain (per unit respectively).*

You are required to:

(1) *Calculate the month end net asset value of the mutual fund scheme (limit your answers to two decimals).*

(2) *Provide a brief comment on the month end NAV.*

Question No.18 (November 2017 RTP)

Based on the following data, estimate the Net Asset Value (NAV) 1st July 2016 on per unit basis of a Debt Fund:

Name of Security	Face Value ₹	Purchase Price ₹	Maturity Date	No. of Securities	Coupon Date(s)	Duration of Bonds
10.71% GOI 2028	100	104.78	31st March, 2028	100000	31st March	7.3494
10 % GOI 2023	100	100.00	31st March, 2023	50000	31st March & 30th September	5.086
9.5 % GOI 2021	100	97.93	31st December, 2021	40000	30th June & 31st December	4.3949
8.5% SGL 2025	100	91.36	30th June 2025	20000	30th June	6.5205

Number of Units (₹ 10 face value each): 100000

All securities were purchased at a time when applicable Yield to Maturity (YTM) was 10%. On NAV date, the required yield increased by 75 basis point and Cash in hand and accrued expenses were ₹ 6,72,800 and ₹ 2,37,400 respectively.

Chapter 10: Money Market Instruments

Question No.1 (May 2016 RTP)

Bank A enters into a Repo for 14 days with Bank B in 12% GOI Bonds 2017 at a rate of 5.25% for ₹ 5 Crore. Assuming that the clean price be 99.42, initial margin be 2% and days of accrued interest be 292, you are required to determine:

(a) Dirty Price

(b) Start Proceeds (First Leg)

(c) Repayment at Maturity (Second Leg)

Note: Assume number of days in a year as 360.

Question No.2 (November 2015 RTP)

AXY Ltd. is able to issue commercial paper of ₹ 50,00,000 every 4 months at a rate of 12.5% p.a. The cost of placement of commercial paper issue is ₹ 2,500 per issue. AXY Ltd. is required to maintain line of credit ₹ 1,50,000 in bank balance. The applicable income tax rate for AXY Ltd. is 30%. What is the cost of funds (after taxes) to AXY Ltd. for commercial paper issue? The maturity of commercial paper is four months.

Question No.3 (November 2014 RTP, May 2014 RTP, November 2012 RTP)

M Ltd. has to make a payment on 30th January, 2010 of ₹ 80 lakhs. It has surplus cash today, i.e. 31st October, 2009; and has decided to invest sufficient cash in a bank's Certificate of Deposit scheme offering an yield of 8% p.a. on simple interest basis. What is the amount to be invested now?

Question No.4 (November 2013 RTP)

Nominal value of 10% bonds issued by a company is ₹100. The bonds are redeemable at ₹110 at the end of year 5.

Determine the value of the bond if required yield is (i) 5%, (ii) 5.1%, (iii) 10% and (iv) 10.1%.

Question No.5 (November 2014, November 2017 RTP)

Wonderland Limited has excess cash of ₹ 20 lakhs, which it wants to invest in short term marketable securities. Expenses relating to investment will be ₹ 50,000.

The securities invested will have an annual yield of 9%.

The company seeks your advice

(i)   as to the period of investment so as to earn a pre-tax income of 5%.

(ii)   the minimum period for the company to break even its investment expenditure over time value of money.   (5 Marks)

Question No.6 (May 2014, May 2017)

AXY Ltd. is able to issue commercial paper of ₹ 50,00,000 every 4 months at a rate of 12.5% p.a. The cost of placement of commercial paper issue is ₹ 2,500 per issue. AXY Ltd. is required to maintain line of credit ₹ 1,50,000 in bank balance. The applicable income tax rate for AXY Ltd. is 30%. What is the cost of funds (after taxes) to AXY Ltd. for commercial paper issue? The maturity of commercial paper is four months.   (5 Marks)

Question No.7 (May 2014)

GKL Ltd. is considering installment sale of LCD TV as a sales promotion strategy.

In a deal of LCD TV, with selling price of ₹ 50,000, a customer can purchase it for cash down payment of ₹ 10,000 and balance amount by adopting any of the following options:

Tenure of Monthly installments	Equated Monthly installment
12	₹ 3800
24	₹ 2140

Required:

Estimate the flat and effective rate of interest for each alternative.

$PVIFA_{2.05\%, 12} = 10.5429$ $PVIFA_{2.10\%, 12} = 10.5107$

$PVIFA_{2.10\%, 24} = 18.7014$ $PVIFA_{2.12\%, 24} = 18.6593$ *(4 Marks)*

Question No.8 (November 2012)

Calculate the Current price and the Bond equivalent yield (using simple compounding) of a money market instrument with face value of ₹ 100 and discount yield of 8% in 90 days. Take 1 year 360 days.

Question No.9 (May 2012)

LMN & Co. plans to issue Commercial Paper (CP) of ₹ 1,00,000 at a price of ₹ 98,000.

Maturity Period: *4 Months*

Expenses for issue of CP are :

(i)   Brokerage   0.10%

(ii) Rating Charges   0.60%   and

(iii) Stamp Duty   0.15%

Find the effective interest rate per annum and the cost of Fund.   *(5 Marks)*

Question No.10 (May 2017)

Bank A enter into a Repo for 14 days with Bank B in 10% Government of India Bonds 2018 @ 5.65% for ₹ 8 crore. Assuming that clean price be ₹ 99.42 and initial Margin be 2% and days of accrued interest be 262 days. You are required to determine

(i)   Dirty Price

(ii) Repayment at maturity. (consider 360 days in a year).   *(4 Marks)*

Chapter 12 - Foreign Exchange Risk Management

Question No.1 (May 2017 RTP)

Bharat Silk Limited, an established exporter of silk materials, has a surplus of US$ 20 million as on 31st May 2015. The banker of the company informs the following exchange rates that are quoted at three different forex markets:

GBP/ INR	99.10	at London
INR/ GBP	0.01	at London
USD/ INR	64.10	at Mumbai
INR/ US$	0.02	at Mumbai
USD/ GBP	0.65	at New York
GBP/ USD	1.5530	at New York

Assuming that there are no transaction costs, advice the company how to avail the arbitrage gain from the above quoted spot exchange rates.

Question No.2 (May 2017 RTP)

On January 28, 2010 an importer customer requested a bank to remit Singapore Dollar (SGD) 25,00,000 under an irrevocable LC. However, due to bank strikes, the bank could effect the remittance only on February 4, 2010. The interbank market rates were as follows:

	January, 28	February 4
Bombay US$1	= ₹ 45.85/45.90	45.91/45.97
London Pound 1	= US$ 1.7840/1.7850	1.7765/1.7775
Pound 1	= SGD 3.1575/3.1590	3.1380/3.1390

The bank wishes to retain an exchange margin of 0.125%. How much does the customer stand to gain or lose due to the delay? (Calculate rate in multiples of .0001)

Question No.3 (May 2017 RTP, November 2016 RTP, May 2014)

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. 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:

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%.

Assuming that 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, estimate Net Present Value (NPV) of the proposed project in India.

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

Question No.4 (November 2016 RTP, May 2014 RTP)

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%

Suppose the XYZ Ltd. has opted for Future Contracts for hedging the risk and on September 1, 2009 the spot rate US $/₹ is 0.02133 and currency future rate is 0.02134, then what will be the variation margin in INR to settle the futures contract.

Question No.5 (November 2016 RTP)

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.

Currency options are available under which one option contract is for US$ 21250. The option premium for US$ at a strike price of GBP 0.58825/USD is GBP 0.036 (call option) and GBP 0.056 (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?

Question No.6 (November 2016 RTP, November 2017 RTP)

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 though a GDR issue. It considers the following factors in pricing the issue:

(i)   The expected domestic market price of the share is ₹ 300

(ii) 3 shares underly each GDR

(iii) Underlying shares are priced at 10% discount to the market price

(iv) Expected exchange rate is ₹ 60/$

You are required to compute 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%.

Question No.7 (May 2016 RTP)

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 a piece of 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 ₹ 200 per share (Face Value = ₹ 10) in the domestic market. The company has currently paid a 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. Current Fixed Operating costs is CN¥ 22,00,000 per year which is expected to rise at the rate of inflation.

The tax rate applicable in China for business 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 ₹ 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

(a)   Identify expected future cash flows in China and determine NPV of the project in CN¥.

(b)   Determine whether Opus Technologies should go for the project or not, assuming that there neither there is any restriction nor any charges/taxes payable on the transfer of funds from China to India.

Question No.8 (May 2016 RTP)

Following are the rates quoted at Mumbai for British Pound (£):

Spot (£/₹)	52.60/70	Interest Rates	India	London
3 m Forward	20/70	3 months	8%	5%
6 m Forward	50/75	6 months	10%	8%

Verify whether there is any scope for covered interest arbitrage, if you can borrow in rupees.

Question No.9 (November 2015 RTP, May 2013)

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
Cash flows in Indian ₹ (000)	-50,000	-1,500	-2,000	-2,500
Cash flows in African Rands (000)	-2,00,000	+50,000	+70,000	+90,000

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 ₹ 1.

You are required to calculate the net present value of the proposed investment considering the following:

(i) African Rand cash flows are converted into rupees and discounted at a risk adjusted rate.

(ii) All cash flows for these projects will be discounted at a rate of 20% to reflect it's high risk.

(iii) Ignore taxation.

	Year - 1	Year - 2	Year - 3
PVIF@20%	.833	.694	.579

Question No.10 (November 2015 RTP)

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.

(i) Invoice the German firm in Sterling using the current exchange rate to calculate the invoice amount.

(ii) Alternative of invoicing the German firm in € and using a forward foreign exchange contract to hedge the transaction risk.

(iii) 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	0.60-0.55 Euro Cents
6 months further contract is currently trading at	€1.1760/£
6 months future contract size is	£62500
Spot rate and 6 months future rate	€1.1785/£

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.

Question No.11 (November 2015 RTP, May 2014 RTP)

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	₹225	₹395	₹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/₹	US$/₹	Euro/₹
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.

Question No.12 (November 2015 RTP)

AMK Ltd. an Indian based company has subsidiaries in U.S. and U.K.

Forecasts of surplus funds for the next 30 days from two subsidiaries are as below:

U.S.	$12.5 million
U.K.	£ 6 million

Following exchange rate information is obtained:

	$/₹	£/₹
Spot	0.0215	0.0149
30 days forward	0.0217	0.0150

Annual borrowing/deposit rates (Simple) are available.

₹	6.4%/6.2%
$	1.6%/1.5%
£	3.9%/3.7%

The Indian operation is forecasting a cash deficit of ₹500 million.

It is assumed that interest rates are based on a year of 360 days.

(i) Calculate the cash balance at the end of 30 days period in ₹ for each company under each of the following scenarios ignoring transaction costs and taxes:

(a) Each company invests/finances its own cash balances/deficits in local currency independently.

(b) Cash balances are pooled immediately in India and the net balances are invested/borrowed for the 30 days period.

(ii) Which method do you think is preferable from the parent company's point of view?

Question No.13 (May 2015 RTP)

Sun Ltd. is planning to import equipment from Japan at a cost of 3,400 lakh yen. The company may avail loans at 18 percent per annum with which it can import the equipment. The company has also an offer from Osaka branch of an India based bank extending credit of 180 days at 2 percent per annum against opening of an irrecoverable letter of credit.

Additional information:

Present exchange rate   ₹100 = 340 yen

180 day's forward rate   ₹100 = 345 yen

Commission charges for letter of credit at 2 per cent per 12 months.

Advice the company whether the offer from the foreign branch should be accepted.

Question No.14 (May 2015 RTP)

An exporter requests his bank to extend the forward contract for US$ 20,000 which is due for maturity on 31st October, 2014, for a further period of 3 months. He agrees to pay the required margin money for such extension of the contract.

Contracted Rate – US$ 1= ₹ 62.32

The US Dollar quoted on 31-10-2014:-

Spot – 61.5000/61.5200

3 months' Discount -0.93% /0.87%

Margin money from bank's point of view for buying and selling rate is 0.45% and 0.20% respectively.

Compute:

(i) The cost to the importer in respect of the extension of the forward contract, and

(ii) The rate of new forward contract.

Question No.15 (May 2015 RTP, November 2013 RTP)

Columbus Surgicals Inc. is based in US, has recently imported surgical raw materials from the UK and has been invoiced for £ 480,000, payable in 3 months. It has also exported surgical goods to India and France.

The Indian customer has been invoiced for £ 138,000, payable in 3 months, and the French customer has been invoiced for € 590,000, payable in 4 months.

Current spot and forward rates are as follows:

£ / US$

Spot:	0.9830 – 0.9850
Three months forward:	0.9520 – 0.9545

US$ / €

Spot:	1.8890 – 1.8920
Four months forward:	1.9510 – 1.9540

Current money market rates are as follows:

UK:	10.0% – 12.0% p.a.
France:	14.0% – 16.0% p.a.
USA:	11.5% – 13.0% p.a.

You as Treasury Manager are required to show how the company can hedge its foreign exchange exposure using Forward markets and Money markets hedge and suggest which the best hedging technique is.

Question No.16 (November 2014 RTP)

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 61.4300/4500
Spot US $ 1	EURO 1.4250/4350

What will be the gain or loss in the transaction?

Question No.17 (November 2014 RTP)

. Followings are the spot exchange rates quoted at three different forex markets:

USD/INR	59.25/ 59.35 in Mumbai
GBP/INR	102.50/ 103.00 in London
GBP/USD	1.70/ 1.72 in New York

The arbitrageur has USD1,00,00,000. Assuming that bank wishes to retain an exchange margin of 0.125%, explain whether there is any arbitrage gain possible from the quoted spot exchange rates.

Question No.18 (November 2013 RTP)

ABN-Amro Bank, Amsterdam, wants to purchase ₹15 million against US$ for funding their Vostro account with Canara Bank, New Delhi. Assuming the inter-bank, rates of US$ is ₹51.3625/3700, what would be the rate Canara Bank would quote to ABN-Amro Bank? Further, if the deal is struck, what would be the equivalent US$ amount.

Question No.19 (May 2013 RTP)

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 ₹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%.

Question No.20 (May 2013 RTP)

You as a dealer in foreign exchange have the following position in Swiss Francs on 31st October, 2009:

	Swiss Francs
Balance in the Nostro A/c Credit	1,00,000
Opening Position Overbought	50,000
Purchased a bill on Zurich	80,000
Sold forward TT	60,000
Forward purchase contract cancelled	30,000
Remitted by TT	75,000
Draft on Zurich cancelled	30,000

What steps would you take, if you are 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?

Question No.21 (May 2013 RTP)

(i) The rate of inflation in USA is likely to be 3% per annum and in India it is likely to be 6.5%. The current spot rate of US $ in India is ₹ 43.40. Find the expected rate of US $ in India after one year and 3 years from now using purchasing power parity theory.

(ii) 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?

Question No.22 (November 2012 RTP)

A USA 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 US parent 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 US 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 in the US. The software developed will be sold in the US market for US $ 12.0 millions. Other estimates are as follows:

Rent for fully furnished unit with necessary hardware in India	₹15,00,000
Man power cost (80 software professional will be working for 10 hours each day)	₹400 per man hour
Administrative and other costs	₹12,00,000

Advise the US Company on the financial viability of the project. The rupee-dollar rate is ₹48/$.

Question No.23 (November 2012 RTP)

A company is considering hedging its foreign exchange risk. It has made a purchase on 1st. January, 2008 for which it has to make a payment of US $ 50,000 on September 30, 2008. The present exchange rate is 1 US $ = ₹ 40. It can purchase forward 1 US $ at ₹ 39. The company will have to make a upfront premium of 2% of the forward amount purchased. The cost of funds to the company is 10% per annum and the rate of corporate tax is 50%. Ignore taxation. Consider the following situations and compute the Profit/Loss the company will make if it hedges its foreign exchange risk:

(i)   If the exchange rate on September 30, 2008 is ₹ 42 per US $.

(ii) If the exchange rate on September 30, 2008 is ₹ 38 per US $.

Question No.24 (November 2012 RTP)

An Indian exporting firm, Rohit and Bros., would be cover itself against a likely depreciation of pound sterling. The following data is given:

Receivables of Rohit and Bros	:	£500,000
Spot rate	:	₹ 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?

Question No.25 (November 2016)

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

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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,

You are required to:

(i) ascertain swap points for 2 months and 15 days. (For June 20, 2016),

(ii) determine foreign exchange rate for June 20, 2016, and

(iii) compute the annual rate of premium/discount of US$ on INR, on an average rate.

Question No.26 (November 2016, May 2015)

LMN Ltd. is an export oriented business house based in Mumbai. The Company invoices in customer's currency. The receipt of US $ 6,00,000 is due on 1st September, 2016.

Market information as at 1st June 2016 is :

Exchange Rates	US$/₹	Exchange Rates US $ / ₹		Contract Size
Spot	0.01471	Currency Futures		
1 Month Forward	0.01464	June	0.01456	₹ 30,00,000
3 Months Forward	0.01458	September	0.01449	

	Initial Margin (₹)	Interest Rates in India %
June	12,000	8.00 p.a.
September	16,000	8.50 p.a.

On 1st September, 2016, the spot rate US $/₹ is 0.01461 and currency futures rate is US $/₹ 0.01462.

It may be assumed that variation in Margin would be settled on the maturity of the futures contract.

Which of the following methods would be most advantageous for LMN Ltd.:

(i) using Forward Contract,

(ii) using Currency Futures; and

(iii) not hedging Currency Risks

Show the calculations and comment.   (8 Marks)

Question No.27 (November 2016)

On 10th July, an importer entered into a forward contract with bank for US $ 50,000 due on 10th September at an exchange rate of ₹66.8400. The bank covered its position in the interbank market at ₹66.6800.

How the bank would react if the customer requests on 20th September:

(i)   to cancel the contract?

(ii)   to execute the contract?

(iii) to extend the contract with due date to fall on 10th November?

The exchange rates for US$ in the interbank market were as below:

		10th September	20th September
Spot	US$1 =	66.1500/1700	65.9600/9900
Spot/September		66.2800/3200	66.1200/1800
Spot/October		66.4100/4300	66.2500/3300
Spot/November		66.5600/6100	66.4000/4900

Exchange margin was 0.1% on buying and selling.

Interest on outlay of funds was 12% p.a.

You are required to show the calculations to:

(i)   cancel the Contract,

(ii)   execute the Contract, and

(iii) extend the Contract as above.   (8 Marks)

Question No.28 (November 2016)

A company is considering hedging its foreign exchange risk. It has made a purchase on 1st July, 2016 for which it has to make a payment of US$ 60,000 on December 31, 2016. The present exchange rate is 1 US $ = ₹ 65. It can purchase forward 1 $ at ₹ 64. The company will have to make an upfront premium @ 2% of the forward amount purchased. The cost of funds to the company is 12% per annum.

In the following situations, compute the profit/loss the company will make if it hedges its foreign exchange risk with the exchange rate on 31st December, 2016 as :

(i)   ₹ 68 per US $.

(ii)   ₹ 62 per US $.

(iii) ₹ 70 per US $.

(iv)   ₹ 65 per US $.   (8 Marks)

Question No.29 (May 2016)

Following information is given:

Exchange rate-

Canadian dollar 0.666 per DM (spot)

Canadian Dollar 0.671 per DM (3 months)

Interest rate –

DM 7.5% p.a.

Canadian Dollar - 9.5% p.a.

To take the possible arbitrage gains, what operations would be carried out?   *(8 Marks)*

Question no.30 (May 2016)

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.   *(8 Marks)*

Question no.31 (November 2015)

A bank enters into a forward purchase TT covering an export bill for Swiss Francs 1,00,000 at ₹ 32.4000 due 25th April and covered itself for same delivery in the local inter bank market at ₹ 32.4200. However, on 25th March, exporter sought for cancellation of the contract as the tenor of the bill is changed.

In Singapore market, Swiss Francs were quoted against dollars as under:

Spot	*USD 1 = Sw. Fcs. 1.5076/1.5120*
One month forward	*1.5150/ 1.5160*
Two months forward	*1.5250 / 1.5270*
Three months forward	*1.5415/ 1.5445*

and in the interbank market US dollars were quoted as under:

Spot	*USD 1 = ₹ 49.4302/.4455*
Spot / April	*.4100/.4200*
Spot/May	*.4300/.4400*
Spot/June	*.4500/.4600*

Calculate the cancellation charges, payable by the customer if exchange margin required by the bank is 0.10% on buying and selling.   *(5 Marks)*

Question No.32 (November 2015)

XYZ, an Indian firm, will need to pay JAPANESE YEN (JY) 5,00,000 on 30th June. In order to hedge the risk involved in foreign currency transaction, the firm is considering two alternative methods i.e. forward market cover and currency option contract.

On 1st April, following quotations (JY/INR) are made available:

Spot	3 months forward
1.9516/1.9711.	1.9726./1.9923

The prices for forex currency option on purchase are as follows:

Strike Price	JY 2.125
Call option (June)	JY 0.047
Put option (June)	JY 0.098

For excess or balance of JY covered, the firm would use forward rate as future spot rate.

You are required to recommend cheaper hedging alternative for XYZ. **(5 Marks)**

Question No.33 (November 2015)

XYZ Ltd., a company based in India, manufactures very high quality modem 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 (₹) and Nepalese Currency (NC) cash flows 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 (₹) at the forward rate and discounted at the Indian rate.*

(ii) *Inflation rates in Nepal and India are expected to be 9% and 8% p.a. respectively. The current exchange rate is ₹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 ₹ 1 @9%.

	Present Value	Future Value
Year 1	0.917	1.188

Year 2	0.842	1.090
Year 3	0.772	1

Question No.34 (November 2015)

ABC Ltd., a US Firm, will need £ 5,00,000 in 180 days. In this connection, the following information is available:

Spot Rate 1£ = $ 2.00

180 days forward rate of £ as of today is $ 1.96

Interest rates are as follows:	US	UK
180 days deposit rate	5.0%	4.5%
180 days borrowing rate	5.5%	5.0%

A call option on £ that expires in 180 days has an exercise price of $ 1.97 and a premium of $ 0.04.

ABC Ltd. has forecasted the spot rates for 180 days as below:

Future rate	Probability
$ 1.91	30%
$ 1.95	50%
$ 2.05	20%

Which of the following strategies would be cheaper to ABC Ltd.?

(i)   Forward Contract;

(ii)   A money market hedge;

(iii) A call option contract; and

(iv) No hedging option   (8 Marks)

Question No.35 (May 2015)

An importer booked a forward contract with his bank on 10th April for USD 2,00,000 due on 10th June @ ₹64.4000. The bank covered its position in the market at ₹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
Sport/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

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   (9 Marks)

Question No.36 (May 2015)

DEF Ltd. has imported goods to the extent of US$ 1 crore. The payment terms are 60 days interest-free credit. For additional credit of 30 days, interest at the rate of 7.75% p.a. will be charged.

The banker of DEF Ltd. has offered a 30 days loan at the rate of 9.5% p.a. Their quote for the foreign exchange is as follows:

Spot rate INR/US$ 62.50

60 days forward rate INR/US$ 63.15

90 days forward rate INR/US$ 63.45

Which one of the following options would be better?

(i)   Pay the supplier on 60th day and avail bank loan for 30 days.

(ii)   Avail the supplier's offer of 90 days credit.   (5 Marks)

Question No.37 (November 2014, May 2014)

Edelweiss Bank Ltd. sold Hong Kong dollar 2 crores value spot to its customer at ₹ 8.025 and covered itself in the London market on the same day, when the exchange rates were

US$ 1 =HK $ 7.5880- 7.5920

Local interbank market rates for US $ were

Spot US $ 1 – ₹60.70-61.00

Calculate the cover rate and ascertain the profit or loss on the transaction. Ignore brokerage.   *(5 Marks)*

Question No.38 (November 2014)

Gibralater Limited has imported 5000 bottles of shampoo at landed cost in Mumbai, of US $ 20 each. The company has the choice for paying for the goods immediately or in 3 months time. It has a clean overdraft limited where 14% p.a. rate of interest is charged.

Calculate which of the following method would be cheaper to Gibralter Limited.

(i)   Pay in 3 months time with interest @ 10% and cover risk forward for 3 months.

(ii)   Settle now at a current spot rate and pay interest of the overdraft for 3 months.

The rates are as follow :

Mumbai ₹/$ spot	:	60.25-60.55
3 months swap	:	35/25

Question No.39 (May 2014)

JKL Ltd., an Indian company has an export exposure of JPY 10,000,000 payable August 31, 2014. Japanese Yen (JPY) is not directly quoted against Indian Rupee.

The current spot rates are:

INR/US $ =   ₹ 62.22

JPY/US$ =   JPY 102.34

It is estimated that Japanese Yen will depreciate to 124 level and Indian Rupee to depreciate against US $ to ₹ 65.

Forward rates for August 2014 are

INR/US $ =   ₹ 66.50

JPY/US$ =   JPY 110.35

Required:

(i)   Calculate the expected loss, if the hedging is not done. How the position will change, if the firm takes forward cover?

(ii)   If the spot rates on August 31, 2014 are:

     INR/US $=   ₹ 66.25

     JPY/US$ =   JPY 110.85

Is the decision to take forward cover justified?   *(5 + 3 = 8 Marks)*

Question No.40 (May 2014)

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)   (8 Marks)

Question No.41 (November 2013)

You, a foreign exchange dealer of your bank, are informed that your bank has sold a T.T. on Copenhagen for Danish Kroner 10,00,000 at the rate of Danish Kroner 1 = ₹ 6.5150. You are required to cover the transaction either in London or New York market. The rates on that date are as under:

Mumbai-London	₹ 74.3000	₹ 74.3200
London-New York	₹ 49.2500	₹ 49.2625
London-Copenhagen	DKK 11.4200	DKK 11.4350
New York-Copenhagen	DKK 07.5670	DKK 07.5840

In which market will you cover the transaction, London or New York, and what will be the exchange profit or loss on the transaction? Ignore brokerages.   (5 Marks)

Question No.42 (November 2013)

An American firm is under obligation to pay interests of Can$ 1010000 and Can$ 705000 on 31ˢᵗ July and 30ᵗʰ September respectively. The Firm is risk averse and its policy is to hedge the risks involved in all foreign currency transactions. The Finance Manager of the firm is thinking of hedging the risk considering two methods i.e. fixed forward or option contracts.

It is now June 30. Following quotations regarding rates of exchange, US$ per Can$, from the firm's bank were obtained:

Spot	1 Month Forward	3 Months Forward
0.9284-0.9288	0.9301	0.9356

Price for a Can$ /US$ option on a U.S. stock exchange (cents per Can$, payable on purchase of the option, contract size Can$ 50000) are as follows:

Strike Price	Calls		Puts	
(US$/Can$)	July	Sept.	July	Sept.
0.93	1.56	2.56	0.88	1.75
0.94	1.02	NA	NA	NA
0.95	0.65	1.64	1.92	2.34

According to the suggestion of finance manager if options are to be used, one month option should be bought at a strike price of 94 cents and three month option at a strike price of 95 cents and for the remainder uncovered by the options the firm would bear the risk itself. For this, it would use forward rate as the best estimate of spot. Transaction costs are ignored.

Recommend, which of the above two methods would be appropriate for the American firm to hedge its foreign exchange risk on the two interest payments.   (8 Marks)

Question No.43 (November 2013, November 2017 RTP)

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	(8 Marks)

At which centre, will be investment be made & what will be the net gain (to the nearest pound) to the bank on the invested funds?

Question No.44 (May 2013)

A Bank sold Hong Kong Dollars 40,00,000 value spot to its customer at ₹ 7.15 and covered itself in London Market on the same day, when the exchange rates were:

    US$ = HK$ 7.9250   7.9290

Local interbank market rates for US$ were

    Spot US$ 1 = ₹ 55.00   55.20

You are required to calculate rate and ascertain the gain or loss in the transaction. Ignore brokerage.

You have to show the calculations for exchange rate up to four decimal points.   (5 Marks)

Question No.45 (May 2013)

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%

You are required to show 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 £. It should be part of working notes.   (5 Marks)

Question No.46 (May 2013)

M/s. Parker & Co. is contemplating to borrow an amount of ₹ 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 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.?

Question No.47 (November 2012)

The US dollar is selling in India at ₹55.50. If the interest rate for a 6 months borrowing in India is 10% per annum and the corresponding rate in USA is 4%.

(i)   Do you expect that US dollar will be at a premium or at discount in the Indian Forex Market?

(ii)   What will be the expected 6-months forward rate for US dollar in India? and

(iii)   What will be the rate of forward premium or discount?   (4 x 5 Marks=20 Marks)

Question No.48 (November 2012)

Z Ltd. importing goods worth USD 2 million, requires 90 days to make the payment. The overseas supplier has offered a 60 days interest free credit period and for additional credit for 30 days an interest of 8% per annum.

The bankers of Z Ltd offer a 30 days loan at 10% per annum and their quote for foreign exchange is as follows:

	₹
Spot 1 USD	56.50
60 days forward for 1 USD	57.10
90 days forward for 1 USD	57.50

You are required to evaluate the following options:

(I)   Pay the supplier in 60 days, or

(II)   Avail the supplier's offer of 90 days credit.   (8 Marks)

Question No.49 (May 2012)

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.   (5 Marks)

Question No.50 (May 2012)

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 ₹ 48.90.

The market rates for ₹ and Dollar are as under:

Spot	₹ 48.50/70
Two months	25/30 points
Three months	40/45 points

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?   (8 Marks)

Question No.51 (May 2017)

A USA 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 US parent at a transfer price of US $200 Lakhs. The unit will remain in existence in India for one year; the software is expected to get developed within this time frame.

The US based company will be subject to corporate tax of 30% and a withholding tax of 10% in India and will not be eligible for tax credit in the US. The software developed will be sold in the US market for US $ 240 lakhs. Other estimates are as follows:

Rent for fully furnished unit with necessary hardware in India	₹ 20,00,000
Man power cost (160 software professional will be working for 10 hours each day)	₹ 600 per man hour
Administrative and other costs	₹ 24,00,000

Advise the US Company on the financial viability of the project. The rupee-dollar rate is ₹ 67/$. Assume 1 year = 360 days. (5 Marks)

Question No.52 (May 2017)

An importer requested his bank to extend for Forward contract of US $ 25,000 which is due for maturity on 31-10-2015 for a further periods of six month. The other details are as under:

Contract rate US $ 1 = ₹ 61.00

The US $ quoted on 31-10-2015

Spot : ₹ 60.3200/60.6300

Six month premium : 0.86 %/0.98%

Margin money for buying and selling rate are 0.086% and 0.15% respectively

Compute

(1) Cost to importer in respect to extension of forward contract.

(2) New Forward contract rate. (6 Marks)

Question No.53 (November 2017 RTP)

India Imports co., purchased USD 100,000 worth of machines from a firm in New York, USA. The value of the rupee in terms of the Dollar has been decreasing. The firm in New York offers 2/10, net 90 terms. The spot rate for the USD is ₹ 55; the 90 days forward rate is ₹ 56.

i. Compute the Rupee cost of paying the account within the 10 days.

ii. Compute the Rupee cost of buying a forward contract to liquidate the account in 10 days.

iii. The difference between part a and part b is the result of the time value of money (the discount for prepayment) and protection from currency value fluctuation. Determine the magnitude of each of these components.

Chapter 13: Mergers and Acquisitions

Question No.1 (May 2017 RTP)

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	₹
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.

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

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

Determine the incremental value due to adoption of the strategy.

Question No.2 (November 2016 RTP)

XYZ, a large business house is planning to acquire ABC another business entity in similar line of business. XYZ has expressed its interest in making a bid for ABC. XYZ expects that after acquisition the annual earning of ABC will increase by 10%.

Following information, ignoring any potential synergistic benefits arising out of possible acquisitions, are available:

	XYZ	ABC	Proxy entity for XYZ & ABC in the same line of business
Paid up Capital (₹ Crore) Face Value of Share is ₹10	1025	106	--
Current share price	₹ 129.60	₹ 55	--
Debt : Equity (at market values)	1 : 2	1 : 3	1 : 4
Equity Beta	--	--	1.1

Assume Beta of debt to be zero and corporate tax rate as 30%, determine the Beta of combined entity.

Question No.3 (May 2016 RTP)

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

Question No.4 (November 2015 RTP)

XY Ltd. has two major operating divisions, furniture manufacturing and real estate, with revenues of ₹ 2600 crore and ₹ 6200 crore respectively. Following financial information is available.

Balance Sheet as on 31-3-2015

Liabilities	Amount (₹ Crore)	Assets	Amount (₹ Crore)
Ordinary Shares (₹10 Per Share)	500	Land and Buildings	800
Reserves	1300	Plant and Machinery	1400
Secured Term Loans	600	Current Assets	2500
13% Debenture (₹100 par)	500		
Current Liabilities	1800		
	4700		4700

Summarised cash flow data for XY Ltd. is as follows:

	Amount (₹ Crore)
Sales	8800
Operating expenses	8030
Head Office Expenses	80

Interest	110
Taxation	140
Dividends	150

The company's current share price is ₹ 118.40, and each debenture is trading in market at ₹ 131.

Projected financial data (in ₹ Crore) in real terms (excluding depreciation) of the two divisions is as follows:

Year	1	2	3	4	5	6 Onwards
Furniture Manufacturing						
Operating Profit before Tax	450	480	500	520	570	600
Allocated HO Overheads*	40	40	40	40	40	40
Depreciation	100	80	70	80	80	80
Real Estate						
Operating Profit before Tax	320	400	420	440	460	500
Allocated HO Overheads*	40	30	30	30	30	30
Depreciation	50	50	50	50	50	50

* Allocated HO Overheads reflect actual cash flows.

Other Information:

- Applicable Corporate tax rate is of 30%, payable in the year, the relevant cash flow arises.

- Inflation is expected to remain at approximately 3% per year.

- The risk free rate is 5.5% and the market return 14%.

- XY Ltd.'s equity beta is 1.15.

- The average equity betas in the Furniture Manufacturing and Realty Sectors are 1.3 and 0.9 respectively and the gearing levels in Furniture Manufacturing and Realty sectors by market values are 70% equity 30% debt and 80% equity 20% debt respectively.

- The current cost of the debentures and long term loan are almost identical.

- The debentures are redeemable at par in 15 years' time.

The company is considering a demerger whereby the two divisions shall be floated separately on the stock market.

Terms of Demerger

(1) The debentures would be serviced by the real estate division and the long term loans by the furniture manufacturing division.

(2) The existing equity would be split evenly between the divisions, although new ordinary shares would be issued to replace existing shares.

(3) If a demerger occurs allocated overhead would rise to ₹ 60 crore per year for each company.

(4) Demerger would involve single one time after tax cost of ₹ 160 crore in the first year which would be shared equally by the two companies. There would be no other significant impact on expected cash flows.

Required

Using real cash flows and time horizon of 15 year time and infinite period, evaluates whether or not it is expected to be financially advantageous to the original shareholders of XY Ltd. for the company to separately float the two divisions on the stock market.

Note: In any gearing estimates the Furniture Manufacturing division may be assumed to comprise 55% of the market value of equity of XY Ltd, and Real Estate division 45%.

Year	1	2	3	4	5	6 -15
PVAF@10%	0.909	0.821	0.751	0.683	0.621	3.815
PVAF@8.5%	0.922	0.849	0.783	0.722	0.665	4.364

Question No.5 (November 2015 RTP)

Two companies Bull Ltd. and Bear Ltd. recently have been merged. The merger initiative has been taken by Bull Ltd. to achieve a lower risk profile for the combined firm in spite of fact that both companies belong to different industries and disclose a little co-movement in their profit earning streams. Though there is likely to synergy benefits to the tune of ₹ 7 crore from proposed merger. Further both companies are equity financed and other details are as follows:

	Market Capitalization	Beta
Bull Ltd.	₹1000 crore	1.50
Bear Ltd.	₹500 crore	0.60

Expected Market Return and Risk Free Rate of Return are 13% and 8% respectively. Shares of merged entity have been distributed in the ratio of 2:1 i.e. market capitalization just before merger. You are required to:

(a) Calculate return on shares of both companies before merger and after merger.

(b) Calculate the impact of merger on Mr. X, a shareholder holding 4% shares in Bull Ltd. and 2% share of Bear Ltd.

Question No.6 (May 2015 RTP)

M plc and C plc operating in same industry are not experiencing any rapid growth but providing a steady stream of earnings. M plc's management is interested in acquisition of C plc due to its excess plant capacity. Share of C plc is trading in market at £4 each. Other date relating to C plc is as follows:

Particulars	M plc	C plc	Combined Entity
Profit after tax	£4,800,000	£3,000,000	£9,200,000
Residual Net Cash Flow per year	£6,000,000	£4,000,000	£12,000,000
Required return on Equity	12.5%	11.25%	12.00%

Balance Sheet of C plc

Assets	Amount (£)	Liabilities	Amount (£)
Current Assets	27,300,000	Current Liabilities	13,450,000
Other Assets	5,500,000	Long Term Liabilities	11,100,000
Property Plants & Equipments	21,500,000	Reserve & Surplus	24,750,000
		Share Capital (5 million common shares @ £1 each)	5,000,000
	54,300,000		54,300,000

You are required to compute:

(i) Minimum price per share C plc should accept from M plc.

(ii) Maximum price per share M plc shall be willing to offer to C plc.

(iii) Floor Value of per share of C plc. Whether it shall play any role in decision for its acquisition by M plc.

Question No.7 (May 2015 RTP)

Hanky Ltd. and Shanky Ltd. operate in the same field, manufacturing newly born babies's clothes. Although Shanky Ltd. also has interests in communication equipments, Hanky Ltd. is planning to take over Shanky Ltd. and the shareholders of Shanky Ltd. do not regard it as a hostile bid.

The following information is available about the two companies.

	Hanky Ltd.	Shanky Ltd.
Current earnings	₹ 6,50,00,000	₹ 2,40,00,000
Number of shares	50,00,000	15,00,000
Percentage of retained earnings	20%	80%
Return on new investment	15%	15%
Return required by equity shareholders	21%	24%

Dividends have just been paid and the retained earnings have already been reinvested in new projects. Hanky Ltd. plans to adopt a policy of retaining 35% of earnings after the takeover and expects to achieve a 17% return on new investment.

Saving due to economies of scale are expected to be ₹ 85,00,000 per annum.

Required return to equity shareholders will fall to 20% due to portfolio effects.

Requirements

(a) Calculate the existing share prices of Hanky Ltd. and Shanky Ltd.

(b) Find the value of Hanky Ltd. after the takeover

(c) Advise Hanky Ltd. on the maximum amount it should pay for Shanky Ltd.

Question No.8 (May 2015 RTP)

. A Ltd. (Acquirer company's) equity capital is ₹ 2,00,00,000. Both A Ltd. and T Ltd. (Target Company) have arrived at an understanding to maintain debt equity ratio at 0.30 : 1 of the merged company. Pre-merger debt outstanding of A Ltd. stood at ₹ 20,00,000 and T Ltd at ₹ 10,00,000 and marketable securities of both companies stood at ₹ 40,00,000.

You are required to determine whether liquidity of merged company shall remain comfortable if A Ltd. acquires T Ltd. against cash payment at mutually agreed price of ₹ 65,00,000.

Question No.9 (November 2014 RTP)

A valuation done of an established company by a well-known analyst has estimated a value of ₹ 525 lakhs, based on the current year's free cash flow of ₹ 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.

Question No.10 (November 2014 RTP)

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.

Question No.11 (November 2014 RTP)

The following is the Balance-sheet of Grape Fruit Company Ltd as at March 31st, 2011.

Liabilities	(₹ in lakhs)	Assets	(₹ in lakhs)
Equity shares of ₹ 100 each	600	Land and Building	200
14% preference shares of ₹ 100/- each	200	Plant and Machinery	300
		Furniture and Fixtures	50
13% Debentures	200	Inventory	150
Debenture interest accrued and payable	26	Sundry debtors	70
		Cash at bank	130
Loan from bank	74	Preliminary expenses	10
Trade creditors	340	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:

(i)   Equity shares are to be reduced to ₹ 25/- per share, fully paid up;

(ii)   Preference shares are to be reduced (with coupon rate of 10%) to equal number of shares of ₹ 50 each, fully paid up.

(iii)   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.

(iv)   Trade creditors will forego 25 percent of the amount due to them.

(v)   The company issues 6 lakh of equity shares at ₹ 25 each and the entire sum was to be paid on application. The entire amount was fully subscribed by promoters.

(vi)   Land and Building was to be revalued at ₹ 450 lakhs, Plant and Machinery was to be written down by ₹ 120 lakhs and a provision of ₹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.

Question No.12 (May 2014 RTP)

Personal Computer Division of Distress Ltd., a computer hardware manufacturing company has started facing financial difficulties for the last 2 to 3 years. The management of the division headed by Mr. Smith is interested in a buyout on 1 April 2013. However, to make this buy-out successful there is an urgent need to attract substantial funds from venture capitalists.

Ven Cap, a European venture capitalist firm has shown its interest to finance the proposed buy-out. Distress Ltd. is interested to sell the division for ₹ 180 crore and Mr. Smith is of opinion that an additional amount of ₹ 85 crore shall be required to make this division viable. The expected financing pattern shall be as follows:

Source	Mode	Amount (₹ Crore)
Management	Equity Shares of ₹ 10 each	60.00
VenCap VC	Equity Shares of ₹ 10 each	22.50
	9% Debentures with attached warrant of ₹ 100 each	22.50
	8% Loan	160.00
Total		265.00

The warrants can be exercised any time after 4 years from now for 10 equity shares @ ₹ 120 per share.

The loan is repayable in one go at the end of 8th year. The debentures are repayable in equal annual installment consisting of both principal and interest amount over a period of 6 years.

Mr. Smith is of view that the proposed dividend shall not be kept more than 12.5% of distributable profit for the first 4 years. The forecasted EBIT after the proposed buyout is as follows:

Year	2013-14	2014-15	2015-16	2016-17
EBIT (₹ crore)	48	57	68	82

Applicable tax rate is 35% and it is expected that it shall remain unchanged at least for 5-6 years. In order to attract VenCap, Mr. Smith stated that book value of equity shall increase by 20% during above 4 years. Although, VenCap has shown their interest in investment but are doubtful about the projections of growth in the value as per projections of Mr. Smith. Further VenCap also demanded that warrants should be convertible in 18 shares instead of 10 as proposed by Mr. Smith.

You are required to determine whether or not the book value of equity is expected to grow by 20% per year. Further if you have been appointed by Mr. Smith as advisor then whether you would suggest to accept the demand of VenCap of 18 shares instead of 10 or not.

Question No.13 (May 2014 RTP)

A valuation done of an established company by a well-known analyst has estimated a value of ₹ 500 lakhs, based on the expected free cash flow for next year of ₹ 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.

Question No.14 (May 2014 RTP)

Following information is provided relating to the acquiring company Mani Ltd. and the target company Ratnam Ltd:

	Mani Ltd.	Ratnam Ltd.
Earnings after tax (₹ 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?

(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.

Question No.15 (November 2013 RTP)

Hanky Ltd. and Shanky Ltd. operate in the same field, manufacturing newly born babies's clothes. Although Shanky Ltd. also has interest in communication equipments, Hanky Ltd. is planning to take over Shanky Ltd. and the shareholders of Shanky Ltd. do not regard it as a hostile bid.

The following information is available about the two companies.

	Hanky Ltd.	Shanky Ltd.
Current earnings	₹ 6,50,00,000	₹ 2,40,00,000
Number of shares	50,00,000	15,00,000
Percentage of retained earnings	20%	80%
Return on new investment	15%	15%
Return required by equity shareholders	21%	24%

Dividends have just been paid and the retained earnings have already been reinvested in new projects. Hanky Ltd. plans to adopt a policy of retaining 35% of earnings after the takeover and expects to achieve a 17% return on new investment.

Saving due to economies of scale are expected to be ₹ 85,00,000 per annum.

Required return to equity shareholders will fall to 20% due to portfolio effects.

Requirements

(a) Calculate the existing share prices of Hanky Ltd. and Shanky Ltd.

(b) Find the value of Hanky Ltd. after the takeover

(c) Advise Hanky Ltd. on the maximum amount it should pay for Shanky Ltd.

Question No.16 (November 2013 RTP)

A Ltd.'s (Acquirer company) equity capital is ₹ 2,00,00,000. Both A Ltd. and T Ltd. (Target Company) have arrived at an understanding to maintain debt equity ratio at 0.30 : 1 of the merged company. Pre-merger debt outstanding of A Ltd. stood at ₹ 20,00,000 and T Ltd at ₹ 10,00,000 and marketable securities of both companies stood at ₹ 40,00,000.

You are required to calculate total fund requirements of A Ltd. to acquire T Ltd. against cash payment at mutually agreed price of ₹ 65,00,000.

Question No.17 (May 2013 RTP)

. 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 |

The current debt of Dimple Ltd. is ₹ 65 lacs and of Simple Ltd. is ₹ 460 lacs.

Calculate the expected value of debt and equity separately for the merged entity.

Question No.18 (November 2012 RTP)

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

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 capital expenditures 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 annuam after 8 years.

With above information you are require to determine the:

(i) Value of Firm

(ii) Value of Equity

Question No.19 (November 2012 RTP)

. 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

Required:

(i) What is the market value of each Company before merger?

(ii) Assume that the management of RIL estimates that the shareholders of SIL will accept an offer of one share of RIL for four shares of SIL. If there are no synergic effects and PE ratio of RIL shall remain unchanged even after merger, what is the market value of the Post-merger RIL? What is the new price per share? Are the shareholders of RIL better or worse off than they were before the merger?

(iii) Due to synergic effects, the management of RIL estimates that the earnings will increase by 20%. What are the new post-merger EPS and Price per share? Will the shareholders be better off or worse off than before the merger?

Note: It may be assumed that Price Earning Ratio of RIL shall remain unchanged even after merger.

Question No.20 (November 2016)

XN Ltd. reported a profit of ₹ 100.32 lakhs after 34% tax for the financial Year 2015-2016. An analysis of the accounts reveals that the income included extraordinary items of ₹ 14 lakhs and an extraordinary loss of ₹ 5 lakhs. The existing operations, except for the extraordinary items, are expected to continue in future. Further, a new product is launched and the expectations are as under:

Particulars	Amount ₹ in lakhs
Sales	70
Material Costs	20
Labour Costs	16
Fixed Costs	10

The company has 50,00,000 Equity Shares of ₹ 10 each and 80,000, 9% Preference Shares of ₹ 100 each with P/E Ratio being 6 times.

You are required to:

(i) *compute the value of the business. Assume cost of capital to be 12% (after tax) and*

(ii) *determine the market price per equity share.*   (8 Marks)

Question No.21 (May 2016)

Kanpur Shoe Ltd. is having sluggish sales during the last few years resulting in drastic fall in market share and profit. The marketing consultant has drawn out a new marketing strategy that will be valid for next four years. If the new strategy is adopted, it is expected that sales will grow @ 20% per year over the previous year for the coming two years and @ 30% from the third year. Other parameters like gross profit margin, asset turnover ratio, the capital structure and the rate of Income tax @ 30% will remain unchanged. Depreciation would be 10% of the net fixed assets at the beginning of the year. The targeted return of the company is 15%.

The financials of the company for the just concluded financial year 2015-16 are given below:

Income Statement	Amount (₹)
Turnover	2,00,000
Gross margin (20%)	40,000
Admin, selling & distribution exp (10%)	20,000
PBT	20,000
Tax (30%)	6,000
PAT	14,000

Balance Sheet Information	
Fixed Assets	80,000
Current Assets	40,000
Equity share capital	1,20,000

You are required to assess the incremental value that will accrue subsequent to the adoption of the new marketing strategy and advise the Board accordingly.

Pv @ 15% for 1, 2 & 3 years are: 0.870, 0.756, 0.658 respectively.   (8 Marks)

Question No.22 (May 2016)

The CEO of a company thinks that shareholders always look for EPS. Therefore he considers maximization of EPS as his company's objective. His company's current Net Profits are ₹ 80.00 lakhs and P/E multiple is 10.5. He wants to buy another firm which has current income of ₹ 15.75 lakhs & P/E multiple of 10.

What is the maximum exchange ratio which the CEO should offer so that he could keep EPS at the current level, given that the current market price of both the acquirer and the target company are ₹ 42 and ₹ 105 respectively?

If the CEO borrows funds at 15% and buys out Target Company by paying cash, how much should he offer to maintain his EPS? Assume tax rate of 30%.   (8 Marks)

Question No.23 (November 2015)

The following information is provided relating to the acquiring company E Ltd., and the target company H Ltd:

Particulars	E Ltd. (₹)	H Ltd. (₹)
Number of shares (Face value ₹10 each)	20 Lakhs	15 Lakhs
Market Capitalization	1000 Lakhs	1500 Lakhs
P/E Ratio (times)	10.00	5.00
Reserves and surplus in ₹	600.00 Lakhs	330.00 Lakhs
Promoter's Holding (No. of shares)	9.50 Lakhs	10.00 Lakhs

The Board of Directors of both the companies have decided to give a fair deal to the shareholders. Accordingly, the weights are decided as 40%, 25% and 35% respectively for earnings, book value and market price of share of each company for swap ratio.

Calculate the following:

(i)   Market price per share, earnings per share and Book Value per share;

(ii)   Swap ratio;

(iii)   Promoter's holding percentage after acquisition;

(iv)   EPS of E Ltd. after acquisitions of H Ltd;

(v)   Expected market price per share and market capitalization of E Ltd.; after acquisition, assuming P/E ratio of E Ltd. remains unchanged; and

(vi)   Free float market capitalization of the merged firm.   (10 Marks)

Question No.24 (November 2015)

XYZ Ltd. wants to purchase ABC Ltd. by exchanging 0.7 of its share for each share of ABC Ltd. Relevant financial data are as follows:

Equity shares outstanding	10,00,000	4,00,000
EPS (₹)	40	28
Market price per share (₹)	250	160

(i)   Illustrate the impact of merger on EPS of both the companies.

(ii)   The management of ABC Ltd. has quoted a share exchange ratio of 1:1 for the merger. Assuming that P/E ratio of XYZ Ltd. will remain unchanged after the merger, what will be the gain from merger for ABC Ltd.?

(iii)   What will be the gain/loss to shareholders of XYZ Ltd.?

(iv)   Determine the maximum exchange ratio acceptable to shareholders of XYZ Ltd.

Question No.25 (May 2015)

R Ltd. and S Ltd. are companies that operate in the same industry. The financial statements of both the companies for the current financial year are as follows:

Balance Sheet

Particulars	R. Ltd. (₹)	S. Ltd (₹)
Equity & Liabilities		
Shareholders Fund		
Equity Capital (₹ 10 each)	20,00,000	16,00,000
Retained earnings	4,00,000	-
Non-current Liabilities		
16% Long term Debt	10,00,000	6,00,000

Current Liabilities	14,00,000	8,00,000
Total	**48,00,000**	**30,00,000**
Assets		
Non-current Assets	20,00,000	10,00,000
Current Assets	28,00,000	20,00,000
Total	**48,00,000**	**30,00,000**

Income Statement

	Particulars	R. Ltd. (₹)	S. Ltd. (₹)
A.	Net Sales	69,00,000	34,00,000
B.	Cost of Goods sold	55,20,000	27,20,000
C.	**Gross Profit (A-B)**	13,80,000	6,80,00
D.	Operating Expenses	4,00,000	2,00,000
E.	Interest	1,60,000	96,000
F.	**Earnings before taxes [C-(D+E)]**	8,20,000	3,84,000
G.	Taxes @ 35%	2,87,000	1,34,400
H.	Earnings After Tax (EAT)	5,33,000	2,49,600

Additional Information:

No. of equity shares	2,00,000	1,60,000
Dividend payment Ratio (D/P)	20%	30%
Market price per share	₹ 50	₹ 20

Assume that both companies are in the process of negotiating a merger through exchange of Equity shares:

You are required to:

(i) Decompose the share price of both the companies into EPS & P/E components. Also segregate their EPS figures into Return On Equity (ROE) and Book Value/Intrinsic Value per share components.

(ii) Estimate future EPS growth rates for both the companies.

(iii) Based on expected operating synergies, R Ltd. estimated that the intrinsic value of S Ltd. Equity share would be ₹ 25 per share on its acquisition. You are required to develop a range of justifiable Equity Share Exchange ratios that can be offered by R Ltd. to the shareholders of S Ltd. Based on your analysis on parts (i) and (ii), would you expect the negotiated terms to be closer to the upper or the lower exchange ratio limits and why? **(8 Marks)**

Question No.26 (May 2015, May 2017)

Bank 'R' was established in 2005 and doing banking in India. The bank is facing DO OR DIE situation. There are problems of Gross NPA (Non Performing Assets) at 40% & CAR/CRAR (Capital Adequacy Ratio/ Capital Risk Weight Asset Ratio) at 4%. The net worth of the bank is not good. Shares are not traded regularly. Last week, it was traded @ ₹ 8 per share.

RBI Audit suggested that bank has either to liquidate or to merge with other bank.

Bank 'P' is professionally managed bank with low gross NPA of 5%.It has Net NPA as 0% and CAR at 16%. Its share is quoted in the market @ ₹ 128 per share. The board of directors of bank 'P' has submitted a proposal to RBI for take over of bank 'R' on the basis of share exchange ratio.

The Balance Sheet details of both the banks are as follows:

	Bank 'R' Amt. in ₹ lacs	Bank 'P' Amt. In ₹lacs
Paid up share capital	140	500
Reserves & Surplus	70	5,500
Deposits	4,000	40,000
Other liabilities	890	2,500
Total Liabilities	**5,100**	**48,500**
Cash in hand & with RBI	400	2,500
Balance with other banks	-	2,000
Investments	1,100	15,000
Advances	3,500	27,000
Other Assets	100	2,000
Total Assets	**5,100**	**48,500**

It was decided to issue shares at Book Value of Bank 'P' to the shareholders of Bank 'R'. All assets and liabilities are to be taken over at Book Value.

For the swap ratio, weights assigned to different parameters are as follows:

Gross NPA	30%

CAR	20%
Market price	40%
Book value	10%

(a)   What is the swap ratio based on above weights?

(b)   How many shares are to be issued?

(c)   Prepare Balance Sheet after merger.

(d)   Calculate CAR & Gross NPA % of Bank 'P' after merger.   **(11 Marks)**

Question No.27 (November 2014)

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 ₹ 200 lakhs. The exchange ratio agreed to is 0.5.

What is the true cost of the merger from the point of view of Elrond Limited?

Question No.28 (November 2014)

The valuation of Hansel Limited has been done by an investment analyst. Based on an expected free cash flow of ₹ 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 ₹ 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? (6 Marks)

Question No.29 (November 2014)

Cauliflower Limited is contemplating acquisition of Cabbage Limited. Cauliflower Limited has 5 lakh shares having market value of ₹ 40 per share while Cabbage Limited has 3 lakh shares having market value of ₹ 25 per share. The EPS for Cabbage Limited and Cauliflower Limited are ₹ 3 per share and ₹ 5 per share respectively. The managements of both the companies are discussing two alternatives for exchange of shares as follows:

(i)   In proportion to relative earnings per share of the two companies.

(ii)   1 share of Cauliflower Limited for two shares of Cabbage Limited.

Required:

(i)   Calculate the EPS after merger under both the alternatives.

(ii)   Show the impact on EPS for the shareholders of the two companies under both the alternatives. (10 Marks)

Question No.30 (May 2014)

The equity shares of XYZ Ltd. are currently being traded at ₹ 24 per share in the market. XYZ Ltd. has total 10,00,000 equity shares outstanding in number, and promoters' equity holding in the company is 40%.

PQR Ltd. wishes to acquire XYZ Ltd. because of likely synergies. The estimated present value of these synergies is ₹ 80,00,000.

Further PQR feels that management of XYZ Ltd. has been over paid. With better motivation, lower salaries and fewer perks for the top management, will lead to savings of ₹ 4,00,000 p.a. Top management with their families are promoters of XYZ Ltd. Present value of these savings would add ₹ 30,00,000 in value to the acquisition.

Following additional information is available regarding PQR Ltd.:

Earnings per share   : ₹ 4

Total number of equity shares outstanding   : 15,00,000

Market price of equity share   : ₹ 40

Required:

(i). What is the maximum price per equity share which PQR Ltd. can offer to pay for XYZ Ltd.?

(ii) What is the minimum price per equity share at which the management of XYZ Ltd. will be willing to offer their controlling interest?   (4 + 2 = 6 Marks)

Question No.31 (May 2014)

Following information is given in respect of WXY Ltd., which is expected to grow at a rate of 20% p.a. for the next three years, after which the growth rate will stabilize at 8% p.a. normal level, in perpetuity.

	For the year ended March 31, 2014
Revenues	₹ 7,500 Crores
Cost of Goods Sold (COGS)	₹ 3,000 Crores
Operating Expenses	₹ 2,250 Crores
Capital Expenditure	₹ 750 Crores
Depreciation (included in COGS & Operating Expenses)	₹ 600 Crores

During high growth period, revenues & Earnings before Interest & Tax (EBIT) will grow at 20% p.a. and capital expenditure net of depreciation will grow at 15% p.a. From year 4 onwards, i.e. normal growth period revenues and EBIT will grow at 8% p.a. and incremental capital expenditure will be offset by the depreciation. During both high growth & normal growth period, net working capital requirement will be 25% of revenues.

The Weighted Average Cost of Capital (WACC) of WXY Ltd. is 15%.

Corporate Income Tax rate will be 30%.

Required:

Estimate the value of WXY Ltd. using Free Cash Flows to Firm (FCFF) & WACC methodology.

The PVIF @ 15 % for the three years are as below:

Year	t_1	t_2	t_3
PVIF	0.8696	0.7561	0.6575

(8 Marks)

Question No.32 (November 2013)

Trupti Co. Ltd. promoted by a Multinational group "INTERNATIONAL INC" is listed on stock exchange holding 84% i.e. 63 lakhs shares.

Profit after Tax is ₹ 4.80 crores.

Free Float Market Capitalisation is ₹ 19.20 crores.

As per the SEBI guidelines promoters have to restrict their holding to 75% to avoid delisting from the stock exchange. Board of Directors has decided not to delist the share but to comply with the SEBI guidelines by issuing Bonus shares to minority shareholders while maintaining the same P/E ratio.

Calculate

(i) P/E Ratio

(ii) Bonus Ratio

(iii) Market price of share before and after the issue of bonus shares

(iv) Free Float Market capitalization of the company after the bonus shares. *(8 Marks)*

Question No.33 (November 2013)

M/s Tiger Ltd. wants to acquire M/s. Leopard Ltd. The balance sheet of Leopard Ltd. as on 31st March, 2012 is as follows:

Liabilities	₹	Assets	₹
Equity Capital(70,000 shares)		Cash	50,000
Retained earnings	3,00,000	Debtors	70,000
12% Debentures	3,00,000	Inventories	2,00,000
Creditors and other liabilities	3,20,000	Plants & Eqpt.	13,00,000
	16,20,000		16,20,000

Additional Information:

(i) Shareholders of Leopard Ltd. will get one share in Tiger Ltd. for every two shares. External liabilities are expected to be settled at ₹ 5,00,000. Shares of Tiger Ltd. would be issued at its current price of ₹ 15 per share. Debentureholders will get 13% convertible debentures in the purchasing company for the same amount. Debtors and inventories are expected to realize ₹ 2,00,000.

(ii) Tiger Ltd. has decided to operate the business of Leopard Ltd. as a separate division. The division is likely to give cash flows (after tax) to the extent of ₹ 5,00,000 per year for 6 years. Tiger Ltd. has planned that, after 6 years, this division would be demerged and disposed of for ₹ 2,00,000.

(iii) The company's cost of capital is 16%.

Make a report to the Board of the company advising them about the financial feasibility of this acquisition.

Net present values for 16% for ₹ 1 are as follows:

Years	1	2	3	4	5	6
PV	.862	.743	.641	.552	.476	.410

Question No.34 (May 2013)

ABC Limited is considering acquisition of DEF Ltd., which has 3.10 crore shares issued and outstanding. The market price per share is ₹ 440.00 at present. ABC Ltd.'s average cost of capital is 12%. The cash inflows of DEF Ltd. for the next three years are as under:

Year	₹ in crores
1	460.00
2	600.00
3	740.00

You are required to calculate the range of valuation that ABC Ltd. has to consider.

Take P.V.F. (12%, 3) = 0.893, 0.797, 0.712   (5 Marks)

Question No.35 (May 2013)

Longitude Limited is in the process of acquiring Latitude Limited on a share exchange basis. Following relevant data are available:

		Longitude Limited	Latitude Limited
Profit after Tax (PAT)	₹ in Lakhs	140	60
Number of Shares	Lakhs	15	16
Earning per Share (EPS)	₹	8	5
Price Earnings Ratio (P/E Ratio)		15	10
(Ignore Synergy)			

You are required to determine:

(i)   Pre-merger Market Value per Share, and

(ii)   The maximum exchange ratio Longitude Limited can offer without the dilution of

     (1)   EPS and

     (2)   Market Value per Share

Calculate Ratio/s up to four decimal points and amounts and number of shares up to two decimal points.   *(8 Marks)*

Question No.36 (November 2012)

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)		
Liabilities:	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**
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 ₹ 300 crores and ₹ 10 crores respectively.*

(2)   *Both the companies envisage a capitalization rate of 8%.*

(3)   *H Ltd. has a contingent liability of ₹ 300 crores as on 31ˢᵗ March, 2012.*

(4)   *H Ltd. to issue shares of ₹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.)*   *(12 Marks)*

Question No.37 (November 2012)

Eagle Ltd. reported a profit of ₹ 77 lakhs after 30% tax for the financial year 2011-12. An analysis of the accounts revealed that the income included extraordinary items of ₹ 8 lakhs and an extraordinary loss of ₹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:

(i) Calculate the value of the business, given that the capitalization rate is 14%.

(ii) Determine the market price per equity share, with Eagle Ltd.'s share capital being comprised of 1,00,000 13% preference shares of ₹100 each and 50,00,000 equity shares of ₹10 each and the P/E ratio being 10 times. (8 Marks)

Question No.38 (November 2012)

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. (8 Marks)

Question No.39 (May 2012)

LMN Ltd is considering merger with XYZ Ltd. LMN Ltd's shares are currently traded at ₹ 30.00 per share. It has 3,00,000 shares outstanding. Its earnings after taxes (EAT) amount to ₹ 6,00,000. XYZ Ltd has 1,60,000 shares outstanding and its current market price is ₹ 15.00 per share and its earnings after taxes (EAT) amount to ₹ 1,60,000. The merger is decided to be effected by means of a stock swap (exchange). XYZ Ltd has agreed to a proposal by which LMN Ltd will offer the current market value of XYZ Ltd's shares.

Find out:

(i)   The pre-merger earnings per share (EPS) and price/earnings (P/E) ratios of both the companies.

(ii)   If XYZ Ltd's P/E Ratio is 9.6, what is its current Market Price? What is the Exchange Ratio? What will LMN Ltd's post-merger EPS be?

(iii)   What should be the exchange ratio, if LMN Ltd's pre-merger and post- merger EPS are to be the same?   (8 Marks)

Question No.40 (May 2017)

The following is the Balance Sheet of XYZ Ltd. as at 31st March, 2016 :

Liabilities	₹ in lakhs	Assets	₹ in lakhs
Equity Shares of ₹10 each	500	Land and Buildings	150
11 % Preference Shares of		Plant and Machinery	200
₹10 each	100	Furniture and Fixtures	60
12% Debentures	100	Inventory	60
Debenture Interest accrued		Sundry Debtors	50
and Payable	12	Cash at Bank	50

Loan from Bank	60	Preliminary Expenses	15
Trade Creditors	300	Cost of Issue of Debentures	7
		Profit and Loss Account	480
	1,072		1,072

The Company's performance is not good and has suffered sizable losses during the last few years. The Company can be nursed back to health with proper financial restructuring. As such, the following scheme is prepared:

(i)   Equity Shares are to be reduced to ₹2 per Share, fully paid-up.

(ii)   Preference Shares are to be reduced (with coupon Rate of 9%) to equal number of Shares of ₹5 each, fully paid-up.

(iii)   Debenture holders have agreed to forgo the accrued interest due to them and for the future the rate of interest on Debentures to be 10%.

(iv)   Trade Creditors will forgo 20% of the amount due to them.

(v)   *The Company to issue 50 Lakh Shares at ₹ 2 each to be paid fully on Application. The entire amount is fully subscribed by Promoters.*

(vi) *Land and Building to be revalued at ₹ 350 Lakhs, Plant and Machinery value to be taken at ₹ 150 Lakhs and a provision of ₹ 5 Lakhs to be made for Bad and Doubtful Debts.*

You are required to:

(1)   show the impact of Financial Restructuring on the Company's activities.

(2)   prepare the fresh Balance Sheet after the reconstruction is completed on the basis of above proposals.   (8 Marks)

Question No.41 (November 2017 RTP)

T Ltd. Recently made a profit of ₹ 50 crore and paid out ₹ 40 crore (slightly higher than the average paid in the industry to which it pertains). The average PE ratio of this industry is 9. As per Balance Sheet of T Ltd., the shareholder's fund is ₹ 225 crore and number of shares is 10 crore. In case company is liquidated, building would fetch ₹ 100 crore more than book value and stock would realize ₹ 25 crore less.

The other data for the industry is as follows:

Projected Dividend Growth	4%
Risk Free Rate of Return	6%
Market Rate of Return	11%
Average Dividend Yield	6%

The estimated beta of T Ltd. is 1.2. You are required to calculate valuation of T Ltd. using

(i)   P/E Ratio

(ii)   Dividend Yield

(iii) Valuation as per:

    (a)   Dividend Growth Model

    (b)   Book Value

    (c)   Net Realizable Value

Question No.42 (November 2017 RTP)

Teer Ltd. is considering acquisition of Nishana Ltd. CFO of Teer Ltd. is of opinion that Nishana Ltd. will be able to generate operating cash flows (after deducting necessary capital expenditure) of ₹ 10 crore per annum for 5 years.

The following additional information was not considered in the above estimations.

(i)   Office premises of Nishana Ltd. can be disposed of and its staff can be relocated in Teer Ltd.'s office not impacting the operating cash flows of either businesses. However, this action will generate an immediate capital gain of ₹ 20 crore.

(ii)   Synergy Gain of ₹ 2 crore per annum is expected to be accrued from the proposed acquisition.

(iii)   Nishana Ltd. has outstanding Debentures having a market value of ₹ 15 crore. It has no other debts.

(iv)   It is also estimated that after 5 years if necessary, Nishana Ltd. can also be disposed of for an amount equal to five times its operating annual cash flow.

Calculate the maximum price to be paid for Nishana Ltd. if cost of capital of Teer Ltd. is 20%. Ignore any type of taxation.

Question No.43 (November 2017 RTP)

.   AB Ltd., is planning to acquire and absorb the running business of XY Ltd. The valuation is to be based on the recommendation of merchant bankers and the consideration is to be discharged in the form of equity shares to be issued by AB Ltd. As on 31.3.2006, the paid up capital of AB Ltd. consists of 80 lakhs shares of ₹10 each. The highest and the lowest market quotation during the last 6 months were ₹570 and ₹430. For the purpose of the exchange, the price per share is to be reckoned as the average of the highest and lowest market price during the last 6 months ended on 31.3.06.

XY Ltd.'s Balance Sheet as at 31.3.2006 is summarised below:

	₹ lakhs
Sources	
Share Capital	
20 lakhs equity shares of ₹10 each fully paid	200
10 lakhs equity shares of ₹10 each, ₹5 paid	50
Loans	100
Total	350
Uses	
Fixed Assets (Net)	150
Net Current Assets	200
	350

An independent firm of merchant bankers engaged for the negotiation, have produced the following estimates of cash flows from the business of XY Ltd.:

Year ended	By way of	₹ lakhs
31.3.07	after tax earnings for equity	105
31.3.08	do	120
31.3.09	Do	125
31.3.10	Do	120

| 31.3.11 | Do | 100 |
| | terminal value estimate | 200 |

It is the recommendation of the merchant banker that the business of XY Ltd. may be valued on the basis of the average of (i) Aggregate of discounted cash flows at 8% and (ii) Net assets value. Present value factors at 8% for years

1-5:   0.93   0.86   0.79   0.74   0.68

You are required to:

(i)   Calculate the total value of the business of XY Ltd.

(ii)   The number of shares to be issued by AB Ltd.; and

(iii) The basis of allocation of the shares among the shareholders of XY Ltd.

Formulae and key points

Present value = Future value * Present value factor
Future value = Present value * Future value factor
Present value of annuity = Annuity amount * Present value annuity factor
Future value of annuity = Annuity amount * Future value annuity factor
Present value of Perpetuity = Perpetuity amount / TVM
Present value of Growing Perpetuity = Perpetuity amount / TVM – Growth rate
Payback= Base year + (Unrecovered cash flow of base year / Cash flow of nest year) **Note:** Base year refer to the last year in which cumulative cash flow is negative
ARR = ARR = Average PAT / (Initial or average investment) Initial investment = Initial outflow; Average investment = Average of initial outflow and salvage value
Discounted payback = Base year + (Unrecovered discounted cash flow of base year / Discounted cash flow of nest year) **Note:** Base year refer to the last year in which cumulative cash flow is negative
NPV = PV of cash inflows – PV of cash outflows
IRR = L1 + (NPV at L1) * .(L2-L1) / (NPV at L1 – NPV at L2) L1 = Lower rate with + NPV; L2 = Higher rate with - NPV
Profitability index or Benefit cost ratio = PV of cash inflows / PV of cash outflows
Reward exclusion principle states that the reward paid to the providers of money is to be ignored. Hence we should ignore dividends and interest while considering long term fund principle. However only dividends is to be ignored if we do the analysis from shareholders point of view
Discount rate refers to the rate of return which providers of money expect. **The appropriate discount rate to be used is cost of capital (WACC post tax). Discount rate will be taken as cost of equity if the evaluation is done from the point of view of equity shareholders**
Discount rate can be an uniform one or there can be a **step up increase in discount rate (PVF for year 2 will be PVF of year 1 divide by new (1+r) and PVF for year 3 will be PVF of year 2 divide by new (1+r)**

Calculation of NSV

Particulars	Amount
Sale Value	XXX
Less: Book value	(XXX)
Gain / Loss on sale	**XXX**
Tax Paid / Tax Saved	XXX
Net salvage value (Sale value + Tax saved – Tax Paid)	**XXX**

EAB = NPV / PVAF (r, life)
EAC = Present value of outflow / PVAF (r, life)
If cash flow includes inflation they are said to be in money terms and if it excludes inflation they are said to be in real terms. If discount rate include inflation it is said to be in money term and if it exclude inflation then it is said to be in real terms
(1 + MDR) = (1 + RDR) * (1 + Inflation rate)
Expected Value = ∑P * R P = Probability of occurrence ; R = Return

$SD = \sqrt{(p \underline{d}^{2})}$ $d = X - \overline{X}$
CV = Standard Deviation / Expected value
RADR = Normal cost of capital + Risk Premium
Certain Cash Flows = Uncertain Cash Flows * Certainty Equivalent Factor
Sensitivity % = $\dfrac{\text{Change}}{\text{Base}}$ * 100
Sensitivity % for uneven cash flows = $\dfrac{\textbf{NPV}}{\text{PV of uneven cash flows}}$ * 100
Value of an option = NPV with option – NPV without option
Dependent cash flow will have a higher standard deviation then independent cash flows as the dependent cash flows are more risky
Z-value = $\dfrac{\text{Target value – Expected value}}{\text{SD}}$
Joint probability = Probability of one event * Probability of other event
Adjusted NPV = Base case NPV – issue cost + PV of tax shield on interest

Ratio	Meaning	Formula
Dividend Rate	DPS as a percentage of Face Value	$\dfrac{\text{DPS} * 100}{\text{FV}}$
Dividend Yield	DPS as a percentage of MPS	$\dfrac{\text{DPS} * 100}{\text{MPS}}$
Payout Ratio	DPS as a percentage of EPS	$\dfrac{\text{DPS} * 100}{\text{EPS}}$

All or nothing approach:

Nature of Firm	Equation	Payout
Growth	K<R	0%
Decline	K>R	100%
Normal	K = R	Indifferent

Walter's model:

$$P_0 = \dfrac{(D)}{K_e} + \dfrac{\dfrac{r * (E-D)}{K_e}}{K_e}$$

Where:

P_0 = Current Market Price;   D = Dividend per share

E = Earnings per share;   r = Rate of return   ; K_e = Cost of equity

Gordon's model:

$$P_0 = \dfrac{D_1}{Ke - G}$$

Where

P_0 = Current Market Price; D_1 = Dividend of next year

K_e = Cost of equity;   G = Growth rate in dividend

Growth rate = Retention ratio * Return on equity

Graham & Dodd Model:

$$P = M * (D + \frac{E}{3})$$

Where P = FMP ; D = DPS; E = EPS ; M = Multiplier

Lintner's model:

$$D_1 = D_0 + [(EPS * \text{Target Payout}) - D_0] * AF$$

MM Model:

$$nP_0 = \frac{(n + m) * P_1 - I_1 + X_1}{1+ K_e}$$

Where:

P_0 = CMP; n = Present no. of shares; P_1 = Year end MP

m = Additional shares issues at year end market price to finance capex

I_1 = Investment made at year end; X_1 = Earnings of year 1

K_e = Cost of equity

$P_1 = P_0 * (1 + K_e) - D_1$

e^X values can be arrived using the following formula $1 + (X/1!) + (X^2/2!) + (X^3/3!) + (X^n/n!)$

Non-dividend paying futures:

Fair futures price = Spot rate * e^X

Where X = r * t; r = rate per annum; t = time in years

Dividend paying stock:

Fair futures price = Adjusted Spot rate * e^X

Where Adjusted spot rate = Spot rate – PV of dividend income

Known Yield:

Fair futures price = Adjusted Spot rate * $e^{(r-y)t}$

Where r = risk free rate; y = known yield ; t = time in years

Storage costs:

FFP = Spot price * $e^{(r+S)t}$

Convenience yield: Fair Futures Price = Spot Price + Cost to Carry – Convenience yield

Hedging with futures:

Value of futures position = Spot position * Protection needed (%)

Hedging through index futures:

No. of contracts = $\frac{\text{Beta * Value of units requiring hedging}}{\text{Value of one futures contract}}$

Hedge ratio (Beta)

Beta = $\frac{\text{Change in spot prices * Co-relation coefficient}}{\text{Change in future prices}}$

Beta in a portfolio can be altered either through introduction of a risk free asset or through index futures

Beta change through index futures = $\frac{\textbf{Portfolio value * [Desired Beta – Existing Beta]}}{\textbf{Value of one futures contract}}$

Note: If the result is (-) it means sell and if the result is (+) it means buy

The initial margin for futures trading to be maintained is equal to average daily absolute change + 3 (Standard deviation)

Open interest is the total number of open or outstanding (not closed or delivered) options and/or futures contract that exist on a given day

Basics of options contract:

Term	Meaning
Holder	Buyer of the "Right to buy" or "Right to sell"
Writer	Person who sells the "Right to buy" or "Right to sell"
Exercise price / strike price	Price at which the underlying asset will be bought or sold
Expiry date	The date by which the option has to be exercised
Call option	This gives the buyer the right to buy
Put option	This gives the buyer the right to sell
Underlying asset	Asset against which the derivative instrument option is traded
American option	Right can be exercised at any time before the expiry date
European option	Right can be exercised only at the expiry date

A bullish market is one where the expected MP is greater than the exercise price. A bearish market is one where the expected MP is lesser than the exercise price

Intrinsic value is the extent to which the option is in the money if it ITM. Time value is the difference between option premium and intrinsic value

Bull spread strategy can be created in one of the following ways:

	E1	E2
Call	Buy	Write
Put	Buy	Write

Bear spread strategy can be created in one of the following ways:

	E1	E2
Call	Write	Buy
Put	Write	Buy

A butterfly spread involves dealing in 4 transactions and 3 exercise prices. You deal with either calls or puts

Way	Option	E1	E2	E3
1	Call	Buy	2 Write	Buy
2	Call	Write	2 Buy	Write
3	Put	Buy	2 Write	Buy
4	Put	Write	2 Buy	Write

Combination strategy will involve both calls and puts

Particulars	Strip	Strap	Strangle	Straddle
No of calls	1	2	1	1
No of puts	2	1	1	1
Exercise price	Same	Same	Different Call will have higher EP & Put will have lower EP	Same

If the person buys calls and puts then it is called long strategy and in case he sells calls and puts then it is called short strategy

Put call parity theory:

Share + Put = Call + Present value of exercise price

Portfolio replication model: The value of the option can either be computed based on stock equivalent approach/option equivalent approach

Risk neutral model:

$$\text{Upside Probability} = \underline{e^{rt} - d}$$

u-d

Where

r = rate of interest per annum; t = time period in years

d = JP 1 / Current Price ; u = JP 2 / Current Price

Binomial model: We need to draw a decision tree and then value the various nodes backwards

Black scholes model

$$C_0 = [\ \{S_0 * N(d_1)\ \} - \{PV_{EP} * N(d_2)\ \}]$$

Where $d_1 = \dfrac{[\text{Naturallog}\ [S_0/E]] + [\{r+0.5SD^2\}t]}{SD\sqrt{t}}$

Where $d_2 = \dfrac{[\text{Naturallog}\ [S_0/E]] + [\{r-0.5SD^2\}t]}{SD\sqrt{t}}$

Or $d_2 = d_1 - SD\sqrt{t}$

S_0=CMP; r =risk free rate per year; t =time in years and E =Exercise Price

Delta = <u>Change in option Price</u>
Change in stock price

Delta of call option = N(D₁) of Black Scholes Model

Delta of put option = Call delta -1

Delta values with dividend:

Call delta = N (d1) * e^-yt

Put delta = Call delta - 1

Where y = Annualized dividend yield in %; Also additionally r is to be replaced with r-y while calculating d1

Theoretical ex-rights price = **<u>(Existing shares * Existing Price) + (New shares * Rights Price)</u>**

(Existing shares + New Shares)

Value of one right = Theoretical ex-rights price – Rights Issue price

Valuation as per step growth model:

This refer to a scenario where growth happen in multiple stages

Step 1: Calculate dividends till the end of second stage

Step 2: Calculate market price at the end of second stage using Gordon's formula

Step 3: Discount the above cash flow at investor's required rate of return (K_e) to get the current market price

Free cash flow approach:

$$P_0 = \dfrac{FCF_1}{K_e - G}$$

FCF = PAT – Equity funding for net capex

Net capex = Capital expenditure – depreciation

Convertible instrument:

Term	Explanation
Meaning	Convertible instrument refer to those instruments which have an option of converting them into specified number of equity shares within specified period

Conversion value	Value of the instrument post conversion of them into equity shares. This will be valued based on the current market price of equity shares
Conversion premium	Difference between conversion value and the current market price of the convertible instrument. This can be expressed either as a **percentage of conversion value** or per equity share or per convertible instrument
Straight value	Straight value refer to the present value of future cash flows of convertible instrument discounted at investor's required rate of return
Downside risk	Possible fall in the value of the convertible instrument. A convertible bond trades at higher value than its intrinsic value due to option of conversion. However in case the conversion is not going to happen then the bond value will fall to its intrinsic value (straight value) Downside risk = Current Market Price – Intrinsic value
Conversion parity price or market conversion price	Price of an equity share at which the holder of the instrument will have no loss on conversion. **CPP = Current market price of convertible instrument / conversion ratio**
Favorable income differential	A convertible instrument before conversion would give interest income and post conversion would give dividend income. Favorable income differential refers to additional income generated out of convertible instrument
Premium payback period	Conversion premium can be recovered through favourable income differential. This refers to the number of years taken to recover the conversion premium **Premium payback period = Conversion Premium / Favorable income differential**

EVA = {EBIT * (1-Tax rate)} – {Invested capital * WACC}	

Calculation of YTM:

Method 1	Calculate IRR of the bond considering the future cash flows

Method 2 (Short-cut method)	$$\frac{\textbf{Post tax interest income + Average other income}}{\textbf{Average funds employed}}$$ Post tax interest income = Interest income * (1 – Tax rate)
	Average other income = (Redemption value – Net investment)
	                                        Life of instrument
	Average funds employed = (Redemption value + Net investment)
	                                        2

Duration:
- ❖ Step 1: Compute cash flows of bond till maturity
- ❖ Step 2: Determine PVF using YTM
- ❖ Step 3: Market price is sum of present value of cash flow discounted at PVF of step 2
- ❖ Step 4: Divide each year's cash flow by market to get weights
- ❖ Step 5: Sum of (time * weights) is duration

Duration of a normal bond = $\dfrac{1 + y}{y} - \dfrac{(1+y) + t(c-y)}{c[(1+y)^t - 1] + y}$

Where y = Required yield (YTM); c = Coupon Rate for the period

t = time to maturity
Duration of perpetual bond = $(1 + y) / y$
Duration of zero-coupon bond = Life of bond

$$\textbf{Volatility} = \frac{\textbf{Duration * Change in interest rates}}{\textbf{1+YTM}}$$

Return is a function of dividend and capital appreciation. The one year holding period return is calculated as under:

$$\frac{D_1 + (P_1 - P_0)}{P_0} * 100$$

Standard deviation = $\sqrt{P\ d^2}$

The return of a portfolio is the weighted average return of securities which constitute the portfolio

$$SD = \sqrt{(W_1 SD_1)^2 + (W_2 SD_2)^2 + (2 W_1 W_2 SD_1 SD_2 COR_{12})}$$
$$COR_{12} = CO\text{-}VARIANCE_{12} / SD_1\ SD_2$$

Optimum weights with 2 securities:

Weight of security 1 = $\dfrac{\textbf{Variance of security 2 – Co-variance of 1 \& 2}}{\textbf{Variance of security 1 + variance of Security 2 – (2*co-variance of 1 \& 2)}}$

Weight of security 2 = 1 – weight of security 1

Optimum weight with more than 2 securities (Sharpe's optimal portfolio):
- ❖ **Step 1:** Calculate excess return (expected return – risk free return) to Beta for all securities
- ❖ **Step 2:** Arrange the securities in the descending order of the variable computed in step 1
- ❖ **Step 3:** Calculate [(Excess return * Beta) / $\sigma^2 ci$] for all securities
- ❖ **Step 4:** Calculate cumulative values for the variable identified in step 3
- ❖ **Step 5:** Calculate [$Beta^2$ / $\sigma^2 ci$] for all securities
- ❖ **Step 6:** Calculate cumulative values for the variable identified in step 5
- ❖ **Step 7:** Calculate cut-off point for all securities.

Cut-off point = [Market variance * Step 4 Value]/[1 + (Market variance * Step 6 value)]
- ❖ **Step 8:** Identify the maximum cut-off point. Securities till the maximum cut-off point will form part of optimum portfolio
- ❖ **Step 9:** Calculate Z-value for securities which have been selected to form part of optimum portfolio

Z-Value = [Beta/ $\sigma^2 ci$ * (Excess return to Beta – Maximum cut-off point)]
- ❖ **Step 10:** Identify the proportion of securities in the final portfolio. The weights of the securities would be in the same proportion as their z-value

How to calculate correlation co-efficient:
- ❖ **Step 1:** Compute the deviation of each security for each observation from their respective mean
- ❖ **Step 2:** Multiply the product of these deviations with the probability of occurrence
- ❖ **Step 3:** The sum of the values of step 2 is the co-variance$_{AB.}$ Co-variance between two securities can also be calculated as Beta of Security 1 * Beta of Security 2 * Variance of market.
- ❖ **Step 4: Correlation co-efficient = Co-variance$_{AB}$ / $SD_A SD_B$**

Utility = Expected return of portfolio – (0.5*aversion factor*variance of portfolio)

Systematic risk and non-systematic risk:

Particulars	Components	Standard deviation approach	Variance approach
Systematic risk	Interest rate risk, Purchasing Power risk and Market risk	SD of security * Co-relation co-efficient Or (Beta of security * SD of market)	(SD of security * Co-relation co-efficient)^2 Or (Beta of security * SD of market)^2
Non-systematic risk ($\sigma^2\epsilon i$)	Business risk and financial risk	Total risk – Systematic risk	Total risk – Systematic risk

Co-efficient of determination gives the percentage of the variation in the security's return that is explained by the variation of the market return. Variation on account of index is called systematic risk and balance is called unsystematic risk.

Co-efficient of determination = Systematic risk / Total Risk

Total risk of portfolio as per Sharpe Index Model = Systematic risk of portfolio + Unsystematic risk of portfolio
- o Systematic risk of portfolio = (Beta of portfolio * SD of market)^2
- o Unsystematic risk = (W_1^2 * Unsystematic risk) + (W_2^2 * Unsystematic risk) + (W_n^2 * Unsystematic risk)

Formula 1: Beta = $\dfrac{\sum XY - [n* \text{Mean of }(X) * \text{Mean of }(Y)]}{\sum Y^2 - [n(\text{Mean of }(Y)^2]}$

N = No. of observations ; X = Rate of return of stock; Y = Rate of return of market

Formula 2: Beta = $\dfrac{\text{Standard deviation of Security * Co-relation co-efficient}}{\text{Standard deviation of market}}$

Formula 3: Beta = $\dfrac{\text{Co-variance of security and market}}{\text{Variance of market}}$

Overall Beta = Debt Beta (**Value of Debt**) + Equity Beta * (**Value of Equity**)
                          Value of Firm   **Value of Firm**

Note:
1. In cases taxes are involved then value of debt is replaced with debt * (1- tax rate) and
2. Value of Firm = Value of Debt + Value of equity

Return as per Security market line = $R_f + \beta * (R_m - R_f)$

Characteristic line = $\alpha + \beta * (R_m)$

Where α = Alpha = Security return – (Beta * Market Return)

β = Beta and R_m = Market Return

Return as per Capital market line = R_f + (SD of security/SD of Market) * ($R_m - R_f$)

Critical line is calculated to get the weights of the individual securities in the minimum variance portfolio
Weight of security 1 = a + b (weight of security 2)
Form two equations and get values of a and b
The critical line will then be written as Weight of security 1 = a + b (weight of security 2)

Expected return under APT model is calculated as under:
Expected return = Risk free return + (Factor 1 * Risk premium of factor 1) + (Factor 2 * Risk premium of factor 2) + (Factor 3 * Risk premium of factor 3) + (Factor 4 * Risk premium of

factor 4)

Computation of cost of factoring:

Step 1: Compute the amount lent by factor:

Particulars	Calculation	Amount
Credit Sales		XXX
Credit Period		XXX
Average receivables	**Credit sales * credit period / 365**	**XXX**
Less: Reserve	XX % of receivables	(XXX)
Less: Commission	XX % of receivables	(XXX)
Amount eligible to be lent		**XXX**
Less: Interest	Eligible amount * Interest rate (%) * Credit period/365	(XXX)
Amount actually lent		**XXX**

Step 2: Calculation of effective cost of factoring:

Particulars	Calculation	Amount
Costs of factoring:		
Commission	Commission expense as per WN 1 * 365/Credit period	XXX
Interest	Interest expense as per WN 1 * 365/Credit period	XXX
Total costs (A)		**XXX**
Benefits of factoring:		
Savings in administration charges		XXX
Savings in bad debt		XXX
Total Savings (B)		**XXX**
Net Cost of factoring (A-B)		**XXX**
Amount lent by factor	WN 1	XXX
Effective cost of factoring	**Net cost / Amount actually lent**	**XXX**

NAV per unit = (Value of assets – value of liabilities) / Number of units

Holding Period Return = $\dfrac{\text{Income} + (\text{End of Period Value} – \text{Initial Value})}{\text{Initial Value}}$

Evaluation of MF Performance:

Measure	Description
Sharpe Index [Reward to Variability]	❖ Measures the risk premium per unit of total risk ❖ Sharpe Index = [Return from MF – Risk free return]/SD of MF ❖ Suitable for undiversified portfolio
Treynor Index [Reward to Volatility]	❖ Measures the risk premium per unit of non-diversifiable risk ❖ Treynor Index = [Return from MF – Risk free return]/Beta of MF ❖ Suitable for diversified portfolio
Jensen's Alpha	❖ Return in excess of what has been mandated by CAPM ❖ Jensen's Alpha = Return from MF – Required return as per CAPM

Dirty Price = Clean Price + Accrued Interest

❖ Direct quote expresses the exchange rate as home currency per unit of foreign

currency. Rs.65 per dollar is the direct quote in India.
❖ Indirect quote expresses the exchange rate as foreign currency per unit of home currency. Rs.65/dollar is the indirect quote in USA.

Indirect quote = 1/direct quote

Term	Meaning
1. Bid rate	The rate at which the bank buys the product
2. Ask rate	The rate at which the bank sells the product
3. Spread rate	The difference between bid and ask rate
4. Middle rate	Simple average of bid and ask rate. This is used primarily for statistical purpose
5. Spread %	Spread is calculated as a percentage of offer rate when the same is expressed in percentage

Three rules of cross multiplication

$$\text{Bid}\left(\frac{A}{C}\right) = \text{Bid}\left(\frac{A}{B}\right) * \text{Bid}\left(\frac{B}{C}\right)$$

$$\text{Ask}\left(\frac{A}{C}\right) = \text{Ask}\left(\frac{A}{B}\right) * \text{Ask}\left(\frac{B}{C}\right)$$

$$\text{Bid}(A/B) = 1 / \text{Ask}(B/A) \text{ ; Ask}(A/B) = 1 / \text{Bid}(B/A)$$

❖ The forward rate can be either expressed either as
  o Outright forward rate
  o Swap rate

The forward differential is called as the swap rate

Swap points can be converted into an outright rate by
  o If **ascending order**, Add the swap points to the spot rate
  o If **descending order,** deduct the swap points from the spot rate

Calculation of % of appreciation/depreciation:

❖ For the product the formula is $\dfrac{(\text{Forward} - \text{spot rate}) * 12 * 100}{\text{Spot rate} \quad\quad m}$

❖ For the price the formula is $\dfrac{(\text{Spot} - \text{forward rate}) * 12 * 100}{\text{Forward rate} \quad\quad m}$

Interest rate parity theory:

❖ Formula: $\dfrac{1 + R_h}{1 + R_f} = \dfrac{F_1}{e_0}$

  o Where R_h = Risk free rate in home country
  o R_f = Risk free rate in foreign country
  o F_1 = Forward rate of foreign currency
  o e_0 = Spot rate of foreign currency

Purchasing Power Parity Theory:

❖ Formula: The purchasing power parity formula is as below:

$$\dfrac{1 + I_h}{1 + I_f} = \dfrac{F_1}{e_0}$$

  o Where I_h = Inflation rate in home country
  o I_f = Inflation rate in foreign country
  o F_1 = Forward rate of foreign currency

o e_0 = Spot rate of foreign currency

Extension of contract when customer doesn't appear on due date:

Cancellation Rate	Spot rate + margin on the date on which customer appears for cancellation
Amount payable by the customer	Difference between customer's original customer rate and cancellation rate as calculated above
Swap loss	It is an amount paid by bank due to cancellation by customer to another bank in the interbank channel. Bank generally does a swap by taking 1 transaction in spot and taking cover by a reverse position in the immediate forward rate. All this is done on due date
Interest on outlay of funds	Bank will charge interest to the customer on the cancellation charges paid by bank by cancelling contract on due date. It is calculated on banks original covered rate and the reverse rate on the maturity date. Interest is calculated for the period of disappearance of the customer from the due date
Total cost to customer	Cancellation charges + Swap loss + Interest on outlay of funds

Money market hedge: Money market hedge involves creating a matching dollar liability for a dollar asset for an exporter and vice versa for an importer.

Nostro, Vostro and Loro account:

Type of account	Meaning	Example
Nostro account	A bank's foreign currency account maintained by the bank in a foreign country and in the home currency of that country	ICICI Bank having a $ account with CITI Bank USA
Vostro account	Local currency account maintained by a foreign bank/branch	CITI Bank USA having an INR account with ICICI Bank, India
Loro account	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	

Exchange position versus cash position:
- ❖ Exchange position refers to the extent of overbought/oversold position of a foreign currency by a bank
- ❖ Cash position refers to the actual foreign currency balance maintained in a Nostro account by a bank

Discount rate for international capital budgeting:
(1+ Risky rate) = (1 + Risk free rate) * (1 + Risk Premium)

Interest rate options:

Interest rate caps	❖ Buyer of an interest rate cap pays the seller a premium for the right to receive the difference in the interest cost on some notional principal amount if the market interest rate goes above a stipulated "cap" rate ❖ Cap resembles an option that it represents a right rather than an obligation to the buyer
Interest rate floors	❖ A derivative instrument which protects the buyer of the floor from losses arising from decrease in interest rates ❖ The seller of the floor compensates the buyer with a payoff when the interest rate falls below the strike rate of the floor

Interest rate collars	❖ Buyer of an interest rate collar purchases an interest rate cap while selling a floor indexed to the same interest rate
	❖ Collar = Cap + Floor. This enables the borrower to restrict the maximum interest outflow. However the buyer cannot benefit from significant fall in interest rates as the minimum floor rate is to be paid
	❖ **Collar versus Cap:** Cap and collar both restrict the maximum interest outflow. However the minimum interest outflow is restricted in case of collar. However investor may prefer buying a collar due to lower premium outflow as compared to a cap

Note: Option Premium for every reset period is calculated using the below formula:
(Rate of Premium / PVAF (Fixed rate of interest, Number of periods)) * Notional amount

Forward rate agreement:
  ❖ 3 X 9 FRA means a customer has entered into an agreement that he would borrow/lend money after 3 months for month 4 to month 9 (6 months)

  ❖ The net settlement of FRA is calculated using the below formula:
  Notional Principal * (Actual rate – FRA rate) * (Days/360 or 365) * 100
  (1 + Actual rate)

Interest rate futures:
  ❖ No. of contracts = Amount of borrowing * Duration of loan
                        Contract Size   Duration of futures

Conventions for calculation of interest:
Interest on a money market instrument is paid on March 31 and September 30. Interest for the period April 1 to June 20 is to be calculated under the following conventions.

Conventions	Numerator days	Denominator days
30/360 basis	April and May will be taken as 30 days irrespective of the number of days. Hence the numerator will be taken as 79 days (19 clean days in June)	Denominator will be taken as 180 (360/2)
Actual days/ 360	April = 30 days ; May = 31 days; June = 19 days Denominator = 80 days	Denominator will be taken as 180 (360/2)
Actual days/ reference period	April = 30 days; May = 31 days; June = 19 days. Denominator = 80 days	April = 30 days; May = 31 days; June = 30 days; July = 31 days; August = 31 days; September = 30 days Denominator = 183 days

How to compute swap ratio?
  ❖ Write the base values (based on which exchange ratio is computed)
  ❖ Switch it around. Example: EPS of A and T are 10 & 5. The exchange ratio is 5:10

Extent of gain:
  ❖ When stock deal takes place the percentage gain to the acquiring company is the change in market price (pre-merger & post-merger)
  ❖ To compute the percentage gain of the target company we must compare the pre-merger price of the target company with the adjusted MP of the merged company
  ❖ Adjusted MP = New MP * Exchange ratio

Exchange ratio and EPS:
  ❖ If there is no increase in earnings and if the EPS of the acquiring company is to be maintained then the ratio should be in the EPS