Padhuka's

Practical Learning Series

ADVANCED FINANCIAL MANAGEMENT

For CA Final New Syllabus 2023

Applicable for May 2024 and onwards Examination

Highlights of this Book:

- Complete and Exhaustive Coverage of all Topics in the New Syllabus
- "Chapter Overview" to highlight the overall flow of the each Chapter and aid in comprehensive reading
- Theory Discussion presented in a Point–By–Point easily assimilable fashion
- 700+ Illustrations classified into sequential segments to provide overall conceptual clarity and effective presentation
- Updated till the latest CA Main Exams and RTPs
- More Pictures, Diagrams and Charts included in various topics to provide better clarity on concepts and to maintain the interests of Students' towards the subject

1st Edition October 2023

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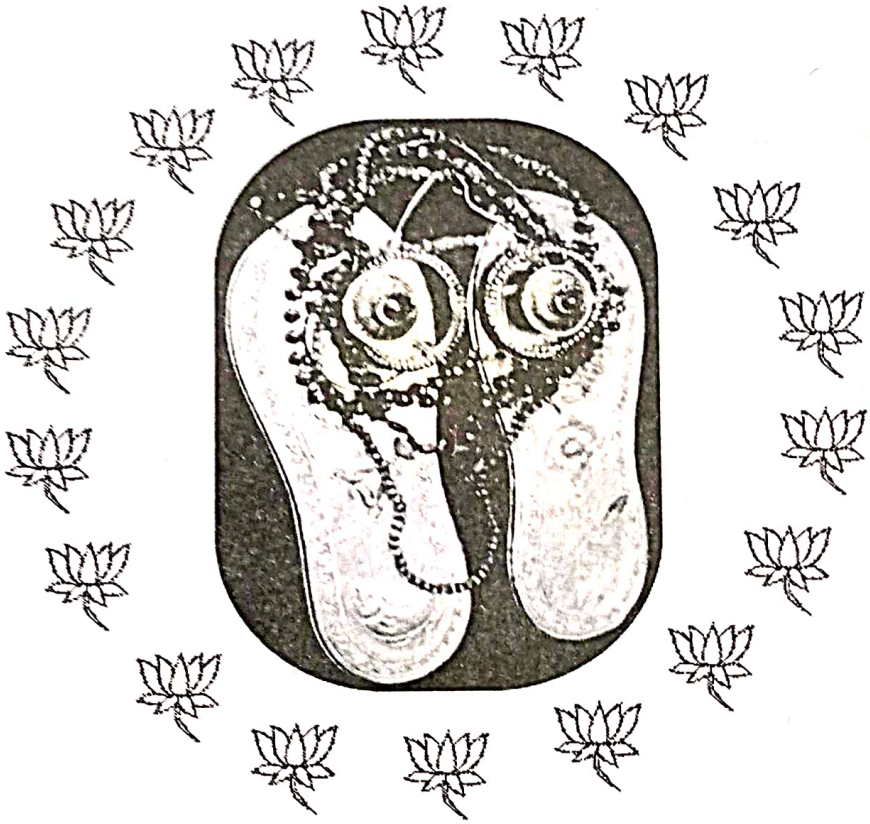
PRANAMS

TO

THE ACHARYAS OF KANCHI



Preface

Advanced Financial Management Subject of the Chartered Accountancy **Final Course New Syllabus** requires a Student to **conceptually thorough** with various Principles and also **operationally enabled** to handle practical situations in various areas, as provided in the Syllabus. Hence, the need is to have good **Theory Background**, and leverage it with adequate **Practice of Practical Illustrations**, to as to be able to face the Professional Exams with confidence.

The New and Updated Edition of this Book comes with the following Special Features –

1. **Complete and Exhaustive Coverage** of all Topics in the **New Syllabus** in a systematic and cohesive manner for proper understanding of concepts and principles.
2. **"Chapter Overview"** for each Chapter to highlight the overall flow of the Chapter and aid in comprehensive reading – re-organized into separate Chapters and Sub-Topics
3. **Theory Discussion** presented in a **Point-By-Point** easily assimilable fashion,
4. Around **700 Illustrations** classified into **sequential segments** to provide overall **conceptual clarity**, with effective presentation as required for Main Exams.
5. **Updated** till the latest CA Main Exams and RTPs including **solutions to May 2023 Exams.**
6. Inclusion of more **Pictures, Diagrams and Charts,** in various topics to provide better clarity on concepts and to maintain the interests of Students' towards the subject.

This Edition is intended to be a complete and self-sufficient support to the students, for making the grade in the CA Final Examinations.

We place on record our thanks to **The Institute of Chartered Accountants of India** for their permission to give references to questions from Past Examinations and Revision Test Papers. We also acknowledge with thanks the suggestions and contributions of Students and Professionals for their feedback in improving upon the previous edition.

The Authors also thank the efforts and co-operation of the various Service Providers in bringing out this Edition including the support of the Publishers, in quickly getting this Book in the current form.

Valuable suggestions and constructive feedback from Users for improvement in content and presentation would be highly appreciated, gratefully acknowledged and suitably incorporated.

Chennai

October 2023

With Best Wishes

G Sekar

Subject Index

FAST TRACK REFERENCER

Strategic Financial Management – Basics

1. Value at Risk

Particulars	Computation	Result
(a) Equivalent Z Score for level of 99%	From Normal Table of Cumulative Area	2.33
(b) Volatility in terms of Rupees **[Note]**	Std. Devn. % of Investment Value	XXX
(c) Maximum Loss for 1 day at 99% Confidence Level	(b) × 2.33	XXX
(d) Expected Maximum Loss for 10 Trading Days	$\sqrt{\text{Days}}$ × (d)	XXX

Note: In case of Portfolio, Standard Deviation of Portfolio should be computed as per Markowitz Matrix Method.

2. Computation of Probability

For calculating Probability of financial difficulty, the area under Normal Curve corresponding to the Z Score obtained shall be calculated from the following equation (how many SD is away from Mean Value of financial difficulty) $z = \frac{x-\mu}{\sigma}$

Security Analysis

1. Efficient Market Theory

Since too few runs in the case would indicate that the movement of prices is not random. Two–tailed is employed to test the randomness of prices. For a sample size n, t distribution will have n–1 degrees of freedom. Using t table –

5% level of significance (t = 2.101)	10% level of significance (t = 1.734)
Lower Limit = $\mu - (t \times \sigma)$ Upper Limit = $\mu + (t \times \sigma)$	Lower Limit = $\mu - (t \times \sigma)$ Upper Limit = $\mu + (t \times \sigma)$
Where $\mu = \frac{2n_1n_2}{n_1+n_2} + 1$ $\sigma = \sqrt{\frac{2n_1n_2(2n_1n_2-n_1-n_2)}{(n_1+n_2)^2(n_1+n_2-1)}}$	**Where** Total Sign of Price Changes = r No. of Positive Changes = n_1 No. of Negative Changes = n_2 = 8

Conclusion: If r lies between these limits, the market exhibits weak form of efficiency.

2. Auto Correlation test, taking time lag of 10 days

	First 10 days	Next 10 days
1. Mean	$\bar{X} = \frac{\Sigma X}{n}$	$\bar{Y} = \frac{\Sigma Y}{n}$
2. Variance	$\sigma_X^2 = \frac{\Sigma D_X^2}{n}$	$\sigma_Y^2 = \frac{\Sigma D_Y^2}{n}$

3. Standard Deviation = Root of Variance
4. Covariance $Cov_{X,Y} = \frac{\Sigma[D_X \times D_Y]}{n}$
5. Correlation $\rho_{X,Y} = \frac{Cov_{X,Y}}{\sigma_X \times \sigma_Y}$

Conclusion: If there is moderate degree of correlation between the returns of two periods it can be concluded that the Market does not show the weak form of efficiency.

3. Computation of Exponential Moving Average (EMA)

EMA at t = (Current Index × Exponent) + [Last EMA × (1 – Exponent)] Where Exponent = $\frac{2}{n+1}$

Mutual Funds

Strategies	1. **Buy and Hold Strategy:** Do nothing policy. Passive strategy 2. **Constant mix strategy:** Do something policy. Active strategy. 3. **Constant Proportion Portfolio Insurance (CPPI) Policy:** Refer Next Point

Constant Mix Strategy	1. Fund Available = (Value of Debt) + (Value of Equity × $\frac{\text{Closing Index}}{\text{Opening Index}}$) 2. Allocate Fund Available to Debt & Equity in the predetermined Ratio. 3. Debt to be bought / sold = Required Value of Debt – Value of Debt
CPPI Policy	1. Floor Value = Investment Value × $\frac{\text{Minimum Index Expected}}{\text{Opening Index}}$ 2. Fund Available = (Value of Debt) + (Value of Equity × $\frac{\text{Closing Index}}{\text{Opening Index}}$) 3. Risky Investment i.e. Equity = (Investment Value – Floor Value) × Multiplier 4. Risk Free Investment i.e. Debt = Fund Available – Risky Investment 5. Debt to be bought / sold = Required Value of Debt – Value of Debt
Evaluation of Mutual Funds	1. Sharpe Ratio or Reward to Variability Ratio= $\frac{R_{MF} - R_F}{\sigma_{MF}}$ 2. Treynors Ratio or Reward to Volatility Ratio= $\frac{R_{MF} - R_F}{\text{Beta}_{MF}}$ 3. Jensons Alpha = Expected Return of Shares or Portfolio or Mutual Fund – CAPM Return **Note:** Rank will be given in the ascending order.
CAPM Return	CAPM Return $R_{MF} = R_F + \text{Beta} \times \text{Risk Premium}$ Where Risk Premium (R_P) = $R_M - R_F$ R_{MF} = Market Return R_F = Risk free Rate of Return
Dividend Equlsn. Reserve	1. At the time of Entry, incoming Unit holders should pay total Earnings per Unit till the time of entry the Mutual Fund. It should be added with Profit. 2. At the time of Exit, Mutual Fund should pay total Earnings per Unit till the time of exit to the outgoi Unit Holders. It should be deducted from Profit. 3. Finally entire profit earned after adjustment of Dividend Equilisation Payment / Receipt should b distributed to all Unit holders at the year end.
Load = Charges	1. Entry Load or Front end load is charged by Mutual Fund at the time of Entry from the incoming Un Holders. It should be added with the Issue Price for computing net issue proceeds. 2. Exit Load or Back end load is charged by Mutual Fund at the time of exit from the outgoing Uni Holders. It should be deducted from the Redemption Price for computing net Cash outflow at the tim of Redemption.
Net Assets Value (NAV)	$\frac{\text{Net Assets of the Scheme}}{\text{Number of Units outstanding}}$ (a) Net Assets of the Scheme = Market Value of Investments + Receivables + Other Accrued Income + Other Assets (–) Accrued Expenses (–) Other Payables (–) Other Liabilities. (b) Unit is the interest of the Unitholders in a Scheme, which consists of each unit representing One Undivided Share in the Assets of that Scheme.
Expense Ratio	Management Expense Ratio (in %) = $\frac{\text{Total Management Expenses}}{\text{Average Value of Portfolio}}$ (or) $\frac{\text{Expenses per Unit}}{\text{Average NAV per Unit}}$

	Normal Fund	**Dividend Reinvestment / Growth / Bonus Plan**
Holding Period Return	$\frac{D_1 + CG_1 + (NAV_1 - NAV_0)}{NAV_0} \times 100$	$\frac{(\text{Opg Units} \times \text{Opg NAV}) + (\text{Clg Units} \times \text{Clg NAV})}{\text{Opg Units} \times \text{Opg NAV}} \times 100$
Effective / Annualised Return	$\frac{D_1 + CG_1 + (NAV_1 - NAV_0)}{NAV_0} \times \frac{12}{HP} \times 100$	$\frac{(\text{Opg Units} \times \text{Opg NAV}) + (\text{Clg Units} \times \text{Clg NAV})}{\text{Opg Units} \times \text{Opg NAV}} \times \frac{12}{HP} \times 100$

Evaluation of MF	1. Sharpe Ratio (S) = $\frac{\text{Return on Portfolio} - \text{Risk Free Return}}{\text{Standard Deviation of Portfolio}} = \frac{R_p - R_f}{\sigma_p}$ 2. Treynor Ratio (T) = $\frac{\text{Return on Portfolio} - \text{Risk Free Return}}{\text{Beta of Portfolio}} = \frac{R_p - R_f}{\beta_p}$ 3. Jensen's Alpha = Actual Return **less** Expected (or CAPM) Return
CAPM Return	Expected Return = Risk Free Return + Beta of Portfolio (Market Return – Risk Free Return) $= R_f + \beta(R_M - R_f)$ $(R_M - R_f)$ can also be called as Risk Premium (Rp).
Tracking Error	$\sqrt{\frac{\sum(d-\bar{d})^2}{n-1}}$ Where d = Differential Return, $\bar{d}$ = Average Differential Return, n = Number of Observation.

Computation of Closing Value if STT & Capital Gain Tax are given

Particulars	
	Sale Proceeds
Less:	Securities Transaction Tax @ 2%
	Net Proceeds
Less:	Capital Gain Tax
	Amount realized
Less:	Initial Investment
	Total Return for Holding Period
Annual Return	$= \frac{\text{Total Return}}{\text{Investment}} \times \frac{1}{\text{Period}}$

Particulars	
	Sale Proceeds
Less:	Securities Transaction Tax @ 2%
	Net Proceeds
Less:	Cost of Short Term Units
	Capital Gains
	Capital Gains Tax = Capital Gains × Tax Rate
Note: Financial Assets held for more than 12 months are Long Term Capital Assets.	

Portfolio Management

Note: $\bar{R}_S = \frac{\text{Aggregate of Security Returns}}{\text{Number of Years}}$ $\bar{R}_M = \frac{\text{Aggregate of Market Returns}}{\text{Number of Years}}$

	Without Probability	With Probability
Variance	$\sigma^2 = \frac{\sum[R_S - \bar{R}_S]^2}{N}$	$\sigma^2 = \sum[R_S - \bar{R}_S]^2 \times \text{Probability}$
Standard Deviation	$\sigma = \sqrt{\text{Variance}}$	$\sigma = \sqrt{\text{Variance}}$
Covariance	$Cov_{SM} = \frac{\sum[R_M - \bar{R}_M] \times [R_S - \bar{R}_S]}{n} = \frac{\sum[D_M \times D_S]}{N}$	$Cov_{SM} = \sum[R_M - \bar{R}_M] \times [R_S - \bar{R}_S] \times \text{Probability}$
Beta	Beta of a Security $(\beta_S) = \frac{Cov_{SM}}{\sigma_M^2} = \frac{\rho_{SM} \times \sigma_S \times \sigma_M}{\sigma_M^2} = \frac{\sigma_S}{\sigma_M} \times \rho_{SM}$ **Note:** If Risk free rate is given, Beta can also be computed as a balancing figure in CAPM formula.	
Correlation Co–efficient	$\rho_{XY} = \frac{Cov_{XY}}{\sigma_X \times \sigma_Y}$ **Note:** Coefficient of Determination = Correlation Coefficient^2	

Range	**Range**	**Returns of these securities**
	$\rho = +1$	Perfectly positively correlated i.e. returns of these securities move up or down together.
	$\rho = -1$	Perfectly negatively correlated i.e. returns of these securities move in exact opposite directions.
	$\rho = 0$	Not correlated i.e. their returns are independent.

Types of Return	1. Holding Period Return = $\frac{D_1 + (MPS_1 - MPS_0)}{MPS_0} \times 100$ where MPS0 = MPS at the time of investment 2. Annualised Return = $\frac{D_1 + (MPS_1 - MPS_0)}{MPS_0} \times \frac{12}{HP} \times 100$ where MPS0 = MPS at the time of investment 3. Return for the particular Year = $\frac{D_1 + (\text{MPS at Year beginning} - \text{MPS at Year end})}{\text{MPS at Year beginning}} \times 100$
Alternative	Total Return = Dividend Yield + Capital Gain Yield Dividend Yield = $\frac{D_1}{MPS_0} \times 100$ Capital Gain Yield = $\frac{MPS_1 - MPS_0}{MPS_0} \times 100$
Return of a Security	1. Market based model: Rs = Rm × Beta 2. CAPM (one Factor Model): Rs = Rf + Beta × Rp **Note:** Rp = Rm – Rf 3. Two Factor Model: Rs = Rf + (Beta $_1$ × Rp_1) + ($Beta_2$ × Rp_2) 4. Multi Factor Model (i.e. Arbitrage Pricing Theory): $R_f + R_1\beta_1 + R_2\beta_2 + R_3\beta_3 + \ldots\ldots R_n\beta_n$

Valuation	**Situation**	**Decision**	**Valuation**
	CAPM Return > Expected Return	Sell	Overvalued
	CAPM Return < Expected Return	Buy / Hold	Undervalued

Note: Required Return / Theoretical Return / Minimum Return = CAPM Return
Actual Return / Expected Return = Average Rate of a Security

Co–efficient of Variation	Co–efficient of Variation = $\frac{\text{Risk}}{\text{Return}} = \frac{\text{Standard Deviation}}{\text{Mean}}$ (Rank in ascending order)

Sharpe Index (Risk of Portfolio)		**Shares**	**Portfolio**
	Systematic Risk (SR)	$\beta_s^2 \times \sigma_M^2$	$B_p^2 \times \sigma_M^2$
	Unsystematic Risk (USR)	Total Risk – Systematic Risk	$Weight^2 \times USR\ of\ Security^2$
	Total Risk	**Variance of Security**	**SR + USR**

Markowitz Matrix (Risk of Portfolio)	1. If Correlation Coefficient = +1 $\sigma_{AB} = (\sigma_A \times W_A) + (\sigma_B \times W_B)$ 2. If Correlation Coefficient = –1 $\sigma_{AB} = (\sigma_A \times W_A) - (\sigma_B \times W_B)$ 3. In any other case $\sigma_{AB} = \sqrt{(\sigma_A^2 \times W_A^2) + (\sigma_B^2 \times W_B^2) + 2(\sigma_A \times W_A \times \sigma_B \times W_B \times \rho AB)}$

Markowitz Matrix (Risk of Portfolio)	**Weights**	**W_P**	**W_Q**	Variance of Portfolio
	W_P	σ_P^2	Cov_{PQ}	$W_P \times W_P \times \sigma_P^2$
	W_Q	Cov_{PQ}	σ_Q^2	$2 \times W_P \times W_Q \times Cov_{PQ}$
				$W_P \times W_R \times \sigma_Q^2$

Line	1. **Characteristic Line:** Rs = Alpha + (Rm × Beta) Where Alpha & Beta should be in numbers 2. **Security Market Line:** Rs = Rf + Beta × Rp Where Rf & Rp should be in numbers
Portfolio	**Return of Portfolio = Weighted Return =** (Weight $_A$ × Return $_A$) + (Weight $_B$ × Return $_B$) **Beta of Portfolio = Weighted Beta =** (Weight $_A$ × Return $_A$) + (Weight $_B$ × Beta $_B$)

1. **Variance & Standard Deviation:** Standard Deviation = Square Root of Variance

	Without Probability (Past Information)	**With Probability (Future Expectations)**
Mean	$\bar{X} = \frac{\Sigma X}{n}$	$\bar{X}$ = Sum of (X × Proability)
Variance	$\sigma_X^2 = \frac{\Sigma D_X^2}{n} = \frac{[\text{Sum of } (X - \bar{X})]^2}{n}$	σ_X^2 = Sum of $(X - \bar{X})^2$ × Proability

2. **Valuation & Decision making:**

Situation	**Inference**	**Action**
CAPM Return < Estimated Return	Undervalued Security.	BUY
CAPM Return = Estimated Return	Correctly Valued Security.	HOLD
CAPM Return > Estimated Return	Overvalued Security.	SELL

3. **Return of Portfolio** = Weighted Return = $(Rx \times Wx) + (Ry \times Wy)$ or $\frac{\text{Sum of (Weight} \times \text{Return)}}{\text{Sum of Weights}}$

4. **Beta of Portfolio** = Weighted Beta = $(\beta x \times Wx) + (\beta y \times Wy)$ or $\frac{\text{Sum of (Weight} \times \text{Beta)}}{\text{Sum of Weights}}$

Where Weights = No. of Shares / Debentures × Opening Market Price

5. **Standard Deviation of Portfolio under Markowitz Model:**

(a) **Formulae (Two Securities):** Risk of Portfolio, i.e. Standard Deviation of Portfolio of X and Y

$$\sigma_{XY} = \sqrt{(\sigma_X^2 \times W_X^2) + (\sigma_Y^2 \times W_Y^2) + 2(\sigma_X \times W_X \times \sigma_Y \times W_Y \times \rho_{XY})}$$

If Correlation Coefficient is +1 (positively correlated), $(\sigma_X \times W_X) + (\sigma_Y \times W_Y)$.

If Correlation Coefficient is −1 (negatively correlated), $(\sigma_X \times W_X) - (\sigma_Y \times W_Y)$.

(b) **Formulae (Three Securities):** Standard Deviation of 3 securities σPQR is given by —

$$\sqrt{(\sigma P^2 \times W_P^2) + (\sigma Q^2 \times W_Q^2) + (\sigma R^2 \times W_R^2) + 2(\sigma P \times W_P \times \sigma Q \times W_Q \times \rho PQ) + 2(\sigma P \times W_P \times \sigma R \times W_R \times \rho PR) + 2(\sigma Q \times W_Q \times \sigma R \times W_R \times \rho QR)}$$

(c) **Matrix Approach:**

Securities		A	B	C
	Weights	W_A	W_B	W_C
A	W_A	σ_A^2	Cov(A,B)	Cov(A,C)
B	W_B	Cov(A,B)	σ_B^2	Cov(B,C)
C	W_C	Cov(A,C)	Cov(B,C)	σ_C^2

	A	B	C
A	$W_A \times W_A \times \sigma_A^2$	$W_A \times W_B \times Cov_{AB}$	$W_A \times W_C \times Cov_{AC}$
B	$W_A \times W_B \times Cov_{AB}$	$W_B \times W_B \times \sigma_B^2$	$W_B \times W_C \times Cov_{BC}$
C	$W_A \times W_C \times Cov_{AC}$	$W_B \times W_C \times Cov_{BC}$	$W_C \times W_C \times \sigma_C^2$
Variance of the Portfolio (σ_{ABC}^2)			**Sum of Above**

Note: Covariance between Securities P and Q = $Cov_{PQ} = \beta_P \times \beta_Q \times \sigma_M^2$ where σ_M^2 = Variance of Market

(d) The Total Risk of the Portfolio can be split as follows (**Variance Approach**)–

Systematic Risk (SR) of the Portfolio = $\beta_{Portfolio}^2 \times \sigma_M^2$

Unsystematic Risk (USR) of the Portfolio = Total Risk of Portfolio (–) Systematic Risk of the Portfolio

6. **Standard Deviation of Portfolio under Sharpe Index Model:**

For Individual Securities	For Portfolio
Total Risk = Variance of Individual Securities SR = Market Variance × β^2 = $(SD)^2 \times \beta^2$ USR or Residual Variance = Total Variance – SR	SR = Market Variance × $(\text{Beta of Portfolio})^2$ USR = (USR of Individual Securities × W^2) **Portfolio Variance or Total Risk** = SR + USR

Note: Random Error = Square Root of USR. Coefficient of Determination = Square Root of Correlation Coefficient.

7. **Revision of Portfolio Beta by Risk Free Investments:** Let the weight of above Portfolio be 'X'

Security	Beta	Proportion (Amt. Invested)	Product
Risky Securities (Above Portfolio)	Portfolio Beta	X	Portfolio Beta x
Risk Free Investments (Always Beta = 0)	0	1 – X	0

By Saving the Equation Portfolio Beta = Required Beta, Weight of Portfolio & Risk free Investments can be computed.

Note: If Weight of the Investment in Securities = Positive 1.40, weight for Risk free Investments will be "Negative 0.40". In such case, 40% of the Net Portfolio will be borrowed, weight for Borrowed Funds will be "Negative 0.40". Weight of the Investment in Securities will be "Positive 1.40", thereby aggregating 1.00. Negative Weights will be applicable in case of Borrowings or Short Sales.

8. **Computation of Weights of Securities in Portfolio (having 2 Securities):**

(a) Proportion of Investment in Security A, $W_A = \frac{\sigma_B^2 - Cov_{AB}}{\sigma_A^2 + \sigma_B^2 - 2Cov_{AB}}$

(b) Proportion of Investment in Security B, $W_B = 1 - W_A$

W_A / W_B is Proportion of Invt in Portfolio A / B,
σ_A / σ_B is Standard Deviation of Portfolio A / B,
Cov_{AB} = Co-variance bet'n Portfolio A and B.

9. In the absence of Market Return, it is assumed that portfolio containing one unit of the four securities listed above would result in a completely diversified portfolio, and therefore represent the Market Portfolio.

Money Market Operations

Interest Rate vs. Discount Rate	1. Effective Interest Rate p.a. $= \frac{FV - IP}{IP} \times \frac{12 \text{ months}}{Term} \times 100$ 2. Discount Rate p.a. $= \frac{FV - IP}{FV} \times \frac{12 \text{ months}}{Term} \times 100$ **Note:** Cost of Funds p.a. = Interest + Brokerage + Rating Charges + Stamp Duty
Dirty Price	Clean Price + Interest Accrued $= 99.42 + 100 \times \frac{12}{100} \times \frac{292}{360} =$ **109.7333**
First Leg vs. Second Leg	1. **First Leg i.e. Start Proceed** = Face Value $\times \frac{\text{Dirty Price}}{100} \times \frac{100 - \text{Initial Margin}}{100}$ 2. **Second Leg (Repayment at Maturity)** = Start Proceed $\times (1 + \text{Repo Rate} \times \frac{\text{No. of days}}{360})$
GDR	1. Issue Size= $\frac{\text{Fund Required}}{100 - \text{Issue expenses in \%}}$ 2. Issue Price of 1 GDR (in USD) $= \frac{(\text{MPS} - \text{Discount}) \times \text{No. of Shares underlying GDR}}{\text{Exchange Rate}}$ 3. Number of GDRs to be Issued $= \frac{\text{Issue Size}}{\text{Issue Price}}$ 4. Net Issue Price = MPS – Discount $= \frac{D_1}{K_e - g}$
Computation of Period of Investment	1. **To earn Pre-Tax Income:** Investment × Rate of Return × $\frac{P}{12}$ (–) Expenses = Required Income 2. **To earn Break even point:** Investment × Rate of Return × $\frac{P}{12}$ (–) Expenses = Nil

Dividend Policy & Share Valuation

Basic Formulas	• Dividend Per Share (**DPS**) $= \frac{\text{Total Equity Dividend}}{\text{Number of Equity Shares}}$ • Dividend Rate (%) $= \frac{\text{Dividend per Share}}{\text{Face Value per Share}}$

	• Dividend Yield (%) = $\frac{\text{Dividend per Share}}{\text{Market Price per Share}}$ • Payout Ratio (%) = $\frac{\text{Dividend per Share}}{\text{Earnings per Share}}$ • Retention Ratio (b) = 100% – Payout Ratio, (or) $\frac{\text{Retained Earnings}}{\text{Residual Earnings}}$
Gordon's Model	$P0 = \frac{D_1}{K_e - g}$ Where g = Retention Ratio (b) × Rate of Return (r)
Walter's Method	Current Market Value / Current Market Price per Share (P_0) = $\frac{D + \frac{r}{K_e}(E - D)}{K_e}$ Where, D = Dividend / Dividend per Share E = Equity Earnings / Earnings per Share r = Rate of Return on Investment by Company (r = EAT ÷ Equity Share Capital) K_e = Cost of Equity (Inverse of PE Ratio)

Optimal Dividend Policy as per Walter's Formula	**Relationship**	**Optimal Dividend Policy**
	Return on Investment (R)>Cost of Equity (K_e)	Zero Payout
	Return on Investment (R) < Cost of Equity (Ke)	100% Payout
	Return on Investment (R) = Cost of Equity (Ke)	Indifferent

Rights Issue	1. Ex–Rights Price (ERP) = $\frac{(P_0 \times N_E) + (P_S \times N_R)}{N_E + N_R}$ 2. Theoretical Value of Right = Ex–Rights Price – Rights Issue Price 3. Theoretical Value of Right per existing shares = $\frac{\text{Theoretical Value of Right}}{\text{Rights Ratio}}$ This should be equal to CRP (Cum Rights Price i.e. MPS before rights) – Ex Rights Price 4. Rights Issue price = Face Value + Premium in % OR $\frac{\text{Funds Required}}{\text{Rights Shares}}$
Impact on Wealth	• Right Issue does **not** increase Shareholder's Wealth, if he renounces / exercises his rights. • However, if a Shareholder ignores the Rights, there will be a **reduction** in Shareholder's Wealth.

Effect of Shareholders' Wealth in different scenarios of Rights

Particulars – If he	Accepts	Renounces	Ignores
(a) Wealth before Rights	No. of Shares × CRP	No. of Shares × CRP	No. of Shares × CRP
(b) Total Shares after Rights	No. of Shares + Rights	No. of Shares	No. of Shares
(c) Ex–Rights Value of Shares	XX	XX	XX
(d) Rights Shares Price	Rights issue price paid	Renouncement Value received	NA
(e) Wealth after rights	(b × c) – d	(b × c) + d	1,000
(f) **Effect (e) – (a)**	**Nil**	**Nil**	**(300)**

Dividend Discount Model / Growth Model

Year	Cash Flow	PVF	Discounted Cash Flow
1 to n	Face Value × Dividend Rate with growth rate	PV Annuity Factor	
n	**If expected to be sold** = No. of Shares × (1+Bonus Ratio) × (MPS_n – Brokerage) **If expected to be held** = $\frac{D_n + g}{K_e - g}$	PV Interest Factor	
Maximum Price that can be paid for 1 Equity Share including Brokerage			**Total**
Maximum Price that can be paid for 1 Equity Share excluding Brokerage			$\frac{\text{Total}}{100 + \text{Brokerage}}$

Bond Valuation

Theoretical Value of Bonds

1. Theoretical Value of Bond = PV of Future Cash Flow i.e. every year, Coupon payment will be received. At the end of the life, FV / Redemption value will be received.
2. Terms to Maturity given = PV of Future Cash Flow i.e. Coupon Payment & Redemption Price.

Year	Cash Flow	PVF	Discounted Cash Flow
1 to Maturity	Face Value × Coupon Rate	PV Annuity Factor	
Maturity	Redemption Price	PV Interest Factor	

3. Terms to Maturity not given = $\frac{\text{Face Value} \times \text{Coupon Rate}}{\text{Present Interest Rate}}$

Note: It is also called as Intrinsic Value / Expected Value of Bonds/ Minimum price to be paid for buying the Bond. If Beta is given, Intrinsic Value of Bond = PV of Future Cash Flow × Beta.

Discount vs Coupon Rate

Generally, Coupon Rate will be fixed by the issuer at the time of Issue and will not change. Yield to Maturity or Interest Rate prevailing on the date of Valuation will be taken as the Discount Rate.

Situation	Bond is quoted at -	Description
Discount Rate < Coupon Rate	Premium	PV of FCF > Face Value
Discount Rate = Coupon Rate	Par	PV of FCF = FV
Discount Rate > Coupon Rate	Discount	PV of FCF < FV

If the Bond is correctly priced / fairly quoted, then Theoretical Value = Actual Market Price of Bond.

ZCB / DDB

Zero Coupon Bond / Deep Discount Bond. No Coupon Payment will be paid. It will be issued at discount and redeemed at par. Difference in Issue price & FV will partake the character of Interest / return.

TheoreticalValue = PV of Future Cash Flow i.e. Redemption Value only

Discounting

If Forward Rate for Year 1, 2, 3 is given

Year	Cash Flow	PVF	Discounted Cash Flow
1		$\frac{1}{1+i1}$	
2		$\frac{\text{PVF for Year 1}}{1+i2}$	
3		$\frac{\text{PVF for Year 2}}{1+i3}$	

If Interest Rate for Bonds having Term 1, 2, 3 is given

Year	Cash Flow	PVF	Discounted Cash Flow
1		$\frac{1}{(1+i)^1}$	
2		$\frac{1}{(1+i)^2}$	
3		$\frac{1}{(1+i)^3}$	

Duration

It is the Weighted Average Maturity of a Bond's Cash Flow Stream, where weights are proportional to the Present Value of Cash Flows. It represents the length of time that elapses before the average rupee of Present Value from the Bond is received.Always Duration will be lower than the term of Bonds.

$\text{Duration} = \frac{\text{Sum of (Disc. Cash Flow} \times \text{Year)}}{\text{Sum of Discounted Cash Flow}}$, $\text{Portfolio Duration} = \frac{\text{Sum of (Duration} \times \text{Cost of Bonds)}}{\text{Sum of Cost of Bonds}}$

Volatility

Interest Rate Sensitivity (Volatility): It represents the extent (in percentage) to which price of a Bond will vary due to change in yield rates.$\text{Volatility} = \frac{\text{Duration}}{1+\text{YTM}}$. If Yield increases by 1%, Theoretical Value of Bond will decrease by Volatility % and vice versa.

Churning out the Portfolio	If discount rate increases, Market Price of Bond will decrease. Especially, the Market price of Long Term Bond will decrease more. Hence, it is appropriate to dispose Long Term Bonds and Invest in Short term Bonds. Similarly, if discount rate decreases, Market Price of Bond will increase. Especially, the Market price of Long Term Bond will increase more. Hence, it is appropriate to dispose Short Term Bonds and Invest in Long term Bonds.
Retirement of Bonds	**Option 1:** Total Cash Outflow (COF) under "Continue with Old Bonds" Option. **Option 2:** Total Cash Outflow (COF) under "Redeem Old Bonds & Issue New Bonds" Option. Option with lower Cash Outflow should be selected.
COF with Old Bonds	Interest Cost = (Face Value × Old Coupon Rate) × (1 – T) × PVAF for remaining period **Less:** Tax Savings on Amortisation = Annual Amortisation of Old Floatation Cost & Discount × Tax Rate × PVAF for remaining period
COF with New Bonds	Interest Cost = (Face Value ×New Coupon Rate) × (1 – T) × PVAF for remaining period **Less:** Tax Savings on Amortisation of Old Cost immediately = Unamortised Portion of Old Floatation Cost & Discount × Tax Rate **Add:** After Tax Call Premium = (Total Redemption Value – Total Face Value) × (1 – T) **Add:** Floatation Cost for New Bonds **Less:** Tax Savings on Amortisation of New Cost = Annual Amortisation of New Floatation Cost × Tax Rate × PVAF for remaining period **Add:** Overlapping Interest for Old Bonds = (Face Value ×New Coupon Rate) × n/12 × (1 – T)
Convexity of Bonds	Duration is a good approximation of the percentage change in price due to percentage change for a small change in Interest Rate. However, the change cannot be estimated so accurately due to convexity effect as duration base estimation assumes a linear relationship. This estimation can be improved by adjustment to the duration formula on account of Convexity.
Immunized	Even after change in Interest rate and corresponding change in Duration of individual Bonds in the Portfolio, the Portfolio is said to be immunised if the Portfolio Duration remains unchanged.
Basic Formulas	1. Conversion Value of Debentures = Market Price of one Equity Share × Conversion Ratio 2. Market Conversion Price = $\frac{\text{Market Price of one Equity Share} \times \text{Conversion Ratio}}{\text{Conversion Ratio}}$ 3. Conversion Premium per Share = Market Conversion Price – Market Price of Equity Share 4. Ratio of Conversion Premium = $\frac{\text{Conversion Premium per Share}}{\text{Market Price of Equity Share}}$ 5. Premium over Straight Value of Debenture = $\frac{\text{Market Price of Convertible Bond}}{\text{Straight Value of Bond}} - 1$ 6. Favourable Income Differential Per Share= $\frac{\text{Debenture Interest } (-) \text{ Conversion Ratio} \times \text{DPS}}{\text{Conversion Ratio}}$ 7. Premium Payback Period = $\frac{\text{Conversion Premium per Share}}{\text{Favourable Income Differential per Share}}$ 8. Interest Coverage Ratio = $\frac{\text{EBIT}}{\text{Interest}}$
Yield to Maturity	1. **Formula Method** = $\frac{(\text{Coupon Return} + \text{Pro-rated Discount})}{\frac{1}{2} \times (\text{Redemption Price} + \text{Purchase Price})}$ Where Pro rata discount = $\frac{\text{Redemption Price} - \text{Purchase Price}}{\text{Life of Bond}}$ 2. **Intrapolation Method:** DCF under R_1 & R_2 is computed as V1 & V2. Required Market price = Vm YTM = $R_2 + \frac{V_2 - V_M}{V_2 - V_1} \times [R_1 - R_2]$ (where V_M = Market Price) 3. **YTM** with half–yearly Coupon = 2 × $\frac{\text{Half Yearly Coupon Return} + \frac{1}{2} \times \text{Pro-Rated Discount}}{(\frac{1}{2} \times \text{Redemption Price} + \text{Purchase Price})]}$

Other Yields	1. **Current Yield** = $\frac{\text{Coupon Payment}}{\text{Current Market Price}}$ 2. **Realised Yield** = $\left[\frac{\text{Total Cash Flows from Bond}}{\text{Purchase Price}}\right]^{\frac{1}{t}} - 1$. It is derived from compound interest rate formula = Purchase Price × $(1+ RY)^{t}$ = Total Cash Inflows from Bond
Effect of YTM on Duration	• Duration is the average time taken by an Investor to collect / recover his / her investment. Increase in YTM (i.e. Discounting Rate) leads to decrease in Present Value of Bond. • If the Investor receives a part of his / her investment over the time on specific intervals before maturity, i.e. by way of Coupon Payments, the Investment Value will be recovered before its maturity, i.e. duration would be lesser than the maturity of the instrument. • Higher the Coupon Rate, lesser would be the Duration of the Bond.
Return for Forex Bonds	1. **Alternative 1:** = $\frac{[(\text{Redemption Value} - \text{Market Price}) + \text{Interest}] + \text{Forex Appreciation}}{\text{Market Price}} \times 100$ 2. **Alternative 2:** = $\frac{[(\text{Redemption Value} + \text{Interest}) + \text{Forex Appreciation}] - \text{Market Price}}{\text{Market Price}} \times 100$
Real vs. Nominal Rate	1. **Real Rate of Return (excluding Inflation effect) (R)** = $\frac{(1+\text{Nominal Interest Rate})}{(1+\text{Inflation Rate})} - 1$ **Real Return in Value** = Purchase Price × Real Rate of Return 2. **Nominal Rate of Return (including Inflation effect) (N)** = [(1 + R) − (1 + Inflation)] − 1 **Nominal Return in Value** = Purchase Price × Nominal Rate of Return
Volatility	For every 1% Percentage increase in the Yield, Price of the Bond will decrease by **Volatility%** For every 1% Percentage decrease in the Yield, Price of the Bond will increase by **Volatility%** (**Note:** Yield & Price are inversely related. So, as Yield decreases, Market Price rises)
Duration Method	**Volatility** = $\frac{\text{Duration}}{(1+\text{Yield})}$ • Expected Market Price = Present Price **Adjust** for Volatility and Convexity of Bonds
Intrinsic Value method	Intrinsic Value of Bonds at YTM 1 Intrinsic Value of Bonds at YTM 2 **Increase / Decrease in Price**
Convexity of Bond	Convexity = $C \times (\Delta Y)^2 \times 100$ Where C = $\frac{V_+ + V_- - 2V_0}{2 \times V_0 \times \Delta^2}$

Derivatives

Condition for Derivative: Derives value from underlying Assets, Future Settlement & Low or no initial investment

Types of Derivatives: Based on the Trading

Over the Counter (OTC) Derivatives **Example:** Forward Contract, Swap, Cap & Floor etc.	**Exchange Traded Derivatives** **Example:** Futures Contract, Options Contract etc.

Types of Derivatives: Based on the Underlying Assets

Commodity Derivatives **Example:** Shares, Rice, Wheat etc.	**Currency Derivatives** **Example:** Foreign Currency

Forward Contracts vs. Futures Contracts

Aspect	Forward Contract	Futures Contract
1. Nature	Forward Contracts are private traded contracts.	Futures contracts are standardized contracts, both in terms of size, contract and expiry dates and hence are exchange traded.
2. Price	Price is not publicly disclosed.	Price is transparent.
3. Liquidity	Forward Contract is exposed to the problem of liquidity.	Due to daily settlement in case of Future Contract, there is very little default risk.
4. Trading	Traded on personal basis, telephone, etc.	Traded on a recognized stock exchange.
5. Contract Size	Individually tailored and have no standardized size.	Have a standard size and value.
6. Exchanges	Traded in an Over-The-Counter Market.	Traded on organized exchanges with a designated physical location.
7. Settlement	Forward Contracts settlement takes place on the date agreed upon between the parties, i.e. at the end of the contract.	Future Contracts settlement is done in accordance with the guidelines of the Clearing House. However, open or loss on the Futures Contract is settled on a daily basis.
8. Delivery date	Delivered on the dates agreed upon and in terms of actual delivery.	Future Contracts' delivery dates are fixed by the Clearing House on cyclical basis.
9. Margins	Margins are not required.	Every Participant should maintain margin as decided by the Exchange authorities.
10. Credit Risk	Credit Risk is borne by each party and hence every party has to recognise the effect of the creditworthiness of the counter-party.	Transaction is a risk-free transaction, as here the parties need not bother about the creditworthiness of each party.

Forward Contracts

TFP for Commodity	1. Without Cost & Returns = $SP \times e^{rt}$ 2. With Cost in % = $SP \times e^{(r+c)t}$ 3. With Cost in amounts = $(SP \times e^{rt}) + PV$ of Costs OR $(SP + PV \text{ of Costs}) \times e^{rt}$ 4. With Returns = $SP \times e^{(r-y)t}$ 5. With Returns in amounts = $(SP \times e^{rt}) - PV$ of Returns OR $(SP - PV \text{ of Returns}) \times e^{rt}$ 6. With Cost & Returns = $SP \times e^{(r+c-y)t}$ If more than Dividend Yields are given, take the Simple Average Dividend Yield.
TFP for Commodity	$FP_X = SP_{Adj} \times e^{rt}$ SP_{Adj} = SP_0 + PV of Storage Cost – PV of Convenience Yield Where r = Risk free Rate of Retun T = Time in Years If e Value is not given, Periodic compounding value can be considered i.e. (1 + rt).
Arbitrage & Hedging	Arbitrage is the process for earning Riskless Profit. However, Hedging is the process of freezing the Future uncertain Cash Flows. Hedging Mechanism = Enter into Forward / Futures / Call / Swaps.
Arbitrage under Commodity Forwards	**If TFP < AFP. Forward is Overvalued. So Sell in Forward. Buy in Spot.** **Now** Borrow Spot Price @ Rf Buy the Commodity in Spot Enter into Forward Sale Contract at AFP **After** Sell the Commodity under Forward Repay Loan with Interest Arbitrage Gain = AFP – Loan with Interest
	If TFP > AFP. Forward is undervalued. So buy in Forward. Sell in Spot. **Now** Sell the Commodity at Spot Price Invest the Spot Price @ Rf Enter into Forward Buy Contract at AFP **After** Buy the Commodity under Forward Realise Maturity proceeds with Interest Arbitrage Gain = Maturity Proceeds – AFP
TFP for Currency	$FP = SP \times e^{rt}$ (HC Rate) $\times$ e^{-rt} (FC Rate) Similar to Interest Rate / Purchasing Power Parity Theory

Arbitrage under Currency Forwards [HC per FC]	**If TFP < AFP, Forward is Overvalued. So Sell in Forward, Buy in Spot.** **Now** Borrow HC required to buy FC @ R_{HC} Buy the FC in Spot Invest the FC @ R_{FC} Enter into Forward Sale Contract at AFP **After** Realise Maturity Proceeds of FC Sell the realized FC under Forward Repay Loan with Interest Arbitrage Gain = Difference	**If TFP > AFP, Forward is undervalued. So buy in Forward, Sell in Spot.** **Now** Borrow FC @ R_{FC} Sell the FC to HC at Spot Rate Invest the HC @ R_{HC} Enter into Forward Buy Contract at AFP **After** Realise Maturity Proceeds of HC Buy the FC with realized HC under Forward Repay Loan with Interest Arbitrage Gain = Difference
Settlement	**Settlement by Delivery:** Irrespective of Future Spot Price, parties has to perform their obligations. **Settlement by Cash / Net Settlement:** Only Profits or Losses will be settled.	
MTM Gain / Loss	**Future Spot Price > Forward Price**	**Future Spot Price < Forward Price**
For Buyer	Profit	Loss
For Seller	Loss	Profit
Cancel Forward Contract	**On Maturity Date:** Take Opposite Position in Spot **Before Maturity Date:** Take Opposite Position in Forward for the remaining term. **Extension** = Cancel Original Forward Contract and enter into New Contract.	

Futures Contracts

Futures	Exchange Traded Forward Contracts are Futures. Enter into Forward Buy Contract = Take Long Position Enter into Forward Sale Contract = Take Short Position		
Daily settlement	Futures Contracts are daily settled i.e. MTM Gain or Loss will be adjusted in the Margin Balance. If the Margin balance goes below Maintenance Margin, Call Money should be paid to make it as Initial Margin. On maturity balance in Margin A/c will be refunded to the parties.		
Delivery	Since Futures Contracts are daily settled, actual Delivery will take place at Future Spot Price only.		
Investment	**Initial Margin** = Average Daily Absolute Change in Value + 3 Times Standard Deviation of such change **Maintenance Margin** = Generally Maintenance Margin = Initial Margin × 75%		
MTM Gain / Loss		**Exit Price > Entry Price**	**Exit Price < Entry Price**
	For Buyer	Profit	Loss
	For Seller	Loss	Profit
	Alternatively: Ending Margin – Initial Margin – Call Money Ending Margin – Initial Margin – Call Money		
Theory of Convergence	Generally on Maturity, Futures Price will be equal to the Future Spot Price. This is called as Theory of Convergence. If both are not equal, MTM Gain / Loss will be computed based on Futures Price. Actual Delivery will take place at Future Spot Price.		
Bull vs Bear	Short Sales = Sold now on the expectation of fall in price (Bearish) Long buy = Bought now on the expectation of rise in price (Bullish)		
Gain from Short Sales	Gain per share on Short Sale = Contracted Price – Futures Price **Less:** Dividend (Income that can be earned without Short Sales) Transaction Costs		
Rate of Return	$\frac{\text{Gain from Short Sales}}{\text{Margin + Commission}} \times 100$		
Position in Futures	**Shares**	**Action in Cash Market**	**Position in Index Futures**
	XX	Buy / Long = Value	Sell / Short = Value × Beta
	YY	Sell / Short = Value	Buy / Long = Value × Beta
Hedge Ratio	$\frac{\text{SD of Change in Spot Price of Asset}}{\text{SD of Change in Future Price of Underlying Asset}} \times$ Corr. between Change in Spot & Futures		

Change Beta through Futures	Complete Hedging = Portfolio Value × $\frac{\text{Hedge Ratio}}{\text{Value of a Futures Contract}} = V_P \times \frac{\text{Hedge Ratio}}{V_F}$ Incomplete Hedging = Portfolio Value × $\frac{[\text{Desired Value of Beta - Beta of the Portfolio}]}{\text{Value of a Futures Contract}}$ +ve Answer = Take Short Position –ve Answer = Take Long Position
Change Beta through Rf	1. Weight of Risky Investments i.e. Existing Portfolio = $\frac{\text{New Beta}}{\text{Existing Beta}}$ 2. Weight of Risk–Free Investments = 1 – Weight of Risky Investments
Portfolio Beta after 2% rise in Nifty	Value of the Portfolio after Nifty Increase (PF Value × 1.026) **Less:** Mark to Margin Loss paid (Nifty × 2% × No. of Contracts) **Revised Value of the Portfolio** % Change in the value of the Portfolio Portfolio Beta = $\frac{\text{Change in Value of the Portfolio}}{\text{Change in Value of Market}}$

Options

Call Option = Right to buy if FSP > Exercise Price Put Option = Right to sell if FSP < Exercise Price

Situation	Call Option		Put Option	
	Position	Action	Position	Action
FSP < EP	Out of Money	Lapse. Buying at EP will not be advantageous. Do not exercise the Option.	In the Money	Exercise. Selling at EP would be advantageous. Exercise the Option.
FSP = EP	At the Money.	Indifference Point.	At the Money.	Indifference Point.
FSP > EP	In the Money	Exercise. Buying at EP would be advantageous. Exercise the Option.	Out of Money	Lapse. Selling at EP will not be advantageous. Do not exercise the Option.

Price Range for Gainful Exercise of the Options

	Call Option	Put Option
Exercise if –	Future Spot Price > Exercise Price	Future Spot Price < Exercise Price
Range of Gain for Option Holder	Maximum Gain = Unrestricted, Maximum Loss = Limited to premium paid.	Maximum Gain = Restricted to Exercise Price, Maximum Loss = Restricted to premium paid.
Break Even Future Spot Price	Exercise Price + Premium	Exercise Price – Premium

The Gain for the Option Holder is the loss for the Option Writer in both cases.

Binomial Tree:

Exp. Value = $[(P_1 \times V_1) + (P_2 \times V_2)]$
Value = PV of Exp. Value

Probability of FP_1 $[P_1]$ → **Value at FP_1 $[V_1]$**: For Call = 0, For Put = EP – FP_1 | Position: Call = Out of Money, Put = In the Money | Action: Call = Lapse, Put = Exercise

Probability of FP_2 $[P_2]$ → **Value at FP_2 $[V_2]$**: For Call = FP_2 – EP, For Put = 0 | Position: Call = In the Money, Put = Out of Money | Action: Call = Exercise, Put = Lapse

Binomial Model Valuation: Value of Call $= \dfrac{C_u\left[\frac{f-d}{u-d}\right] + C_d\left[\frac{u-f}{u-d}\right]}{f}$

Where

Given Factor	Notation
Spot Price	SP_0
Exercise Price	EP
Lower Future Spot Price [FP_1]	FP_1
Higher Future Spot Price [FP_2]	FP_2
r = Risk Free Rate of Return, t = Time in Years	

Computed Factor	Notation
Continuous Comp. Factor = e^{rt}	F
Extent of FP_1 on SP_0 = $\frac{FP_1}{SP_0}$	D
Extent of FP_2 on SP_0 = $\frac{FP_2}{SP_0}$	U

Probability

1. **Under Binomial Model:** Upper Limit = $\frac{f - d}{u - d}$. Lower Limit = 1 – Probability of Upper Limit.
2. **Under Risk Neutral Model:** Average Price = [High Price × P] + [Low Price × (1 – P)]

Delta

$$\frac{C_u - C_d}{FP_2 - FP_1}$$

Black & Scholes Model

$N(D_1) \times SP_0$ **Less** $N(D_2) \times EP \times e^{-rt}$

$$\mathbf{D_1} = \frac{Ln(SP_0/EP) + [(r + 0.50\sigma^2) \times t]}{\sigma\sqrt{t}}$$

$$\mathbf{D_2} = = \frac{Ln(SP_0/EP) + [(r - 0.50\sigma^2) \times t]}{\sigma\sqrt{t}}, \text{ or } = D_1 - \sigma\sqrt{t}$$

"Ln" refers to Natural Logarithm.

Put–Call Parity Theory

C + PV of EP = SP + P

Where,
- C = Price of a Call Option, i.e. Call Option Premium
- EP = Exercise Price
- SP = Current Stock Price
- P = Price of a Put Option, i.e. Put Option Premium

TMP

Theoretical Minimum Price = Current Stock Price – Present Value of Exercise Price

Arbitrage for Call

TMP > Actual Premium

Call is undervalued. Buy Call. Sell Spot.

Now
- Buy Call Option for Actual Premium.
- Sell Stock at Spot Price.
- Invest the Remaining amount @ Rf.

After
- Receive maturity value of Investments
- Buy Stock at Exercise Price
- Net Gain made = Difference

TMP < Actual Premium

Call is Overvalued. Sell Call. Buy Spot.

Now
- Sell Call Option for Actual Premium.
- Borrow (Spot Price – Actual Premium) @
- Buy Stock at Spot Price

After
- Sell Stock at Exercise Price
- Repay Loan with Interest
- Net Gain made = Difference

Arbitrage for Put

TMP > Actual Premium

Put is undervalued. Buy Put. Buy Spot.

Now
- Borrow (Premium + Spot Price) @ Rf
- Buy Put Option for Actual Premium.
- Buy Stock at Spot Price.

After
- Sell Stock at Exercise Price
- Repay Loan with Interest
- Net Gain made = Difference

TMP < Actual Premium

Put is Overvalued. Sell Put. Sell Spot

Now
- Sell Call Option for Actual Premium.
- Sell Stock at Spot Price
- Invest (Spot Price + Actual Premium)

After
- Receive maturity value of Investments
- Buy Stock at Exercise Price
- Net Gain made = Difference

Swaps and Interest Rate Derivatives

Cap vs. Floor

Cap is applicable for Borrower. If the Actual Interest Rate > Cap Rate, excess interest will be reimbu the Cap Dealer. Floor is applicable for Lender. If the Actual Interest Rate < Floor Rate, deficit interes reimbursed by the Floor Dealer.

Cap Premium

$$\text{Cap Premium Payable} = \frac{\text{Premium Rate} \times \text{Underlying Principal}}{\text{PVAF @ Fixed Rate \% for No. of Periods}}$$

Single Loan Swaps	1. **Fixed Loan to Variable Loan:** Fixed Loan Borrower will inter into "**Receive Fixed Pay Floating**" Swap to convert Fixed Loan to Variable Loan. Fixed Loan Lender will inter into "**Pay Fixed Receive Floating**" Swap to convert Fixed Loan to Variable Loan. 2. **Variable Loan to Fixed Loan:** Similar to above
Net Settlement	1. **Fixed Interest payments** = $P \times \frac{n}{360} \times R$ Assuming each month has 30 days. 2. **Floating Rate payments** = $P \times \frac{n_1}{360} \times$ LIBOR. Time elapsed since previous payment **Note:** Net Settlement = Difference between Receive Fixed Pay Floating or vice versa is settled.
Forward Rates	Forward Interest Rate = $\frac{R_2 t_2 - R_1 t_1}{t_2 - t_1}$
3*6 FRA	Forward Rate Agreement in which after 3 months, Money will be deposited / borrowed for 3 months.
FRA Net Settlement	**Payment** = Principal $\times \frac{(\text{Actual Rate} - \text{Forward Rate}) \times \left(\frac{\text{Period}}{12}\right)}{1 + \text{Actual Rate}\left(\frac{\text{Period}}{12}\right)}$

MTM Gain / Loss	**Actual Rate > FRA**	**Actual Rate < FRA**
For Borrower	Profit	Loss
For Lender	Loss	Profit

Double Loan Swaps: Following are the interest rates offered to two different Companies for a loan –

Company	Requirement	Fixed Rates Offered	Floating Rates Offered
ABC Ltd	Fixed Rupee Rate	4.5%	PLR + 2%
DEF Ltd	Floating Rupee Rate	5.0%	PLR + 3%

Step	Description
1	Find the **Interest Rate Differential** for "Fixed" and "Floating" Categories. This will be the Potential Swap Gain.
2	Find the **highest** of Interest Rate difference, and choose the **Least Interest Rate** in **that** category (i.e. "Fixed" or "Floating".
3	The Party to which the Least Interest Rate applies (1st Party), has to borrow in that Category (Fixed / Floating), and the Other Party (2nd Party) has to borrow in the other category (Floating / Fixed, as the case may be).
4	1st Party has to pay Bank at the Lower Interest Rate, and recover the same from the 2nd Party.
5	1st Party will pay the Quoted Rate to 2nd Party. [2nd Party will not receive all the Interest from 1st Party.]
6	2nd Party will receive the entire Swap Gain. So, 2nd Party will transfer the Proportionate Gain to the First Party.

1. Computation of Swap Savings

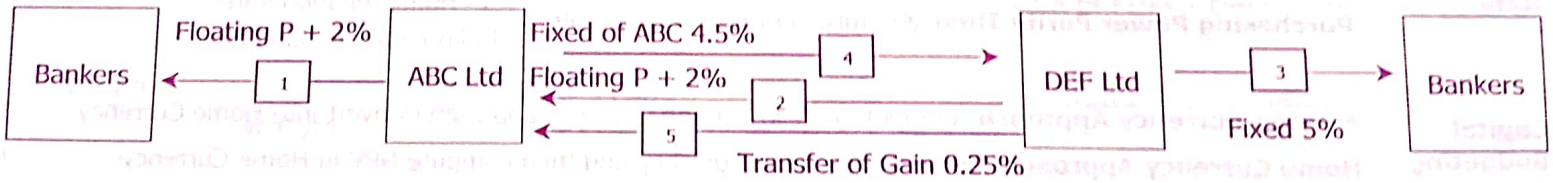
Company	Fixed Rate	Floating Rate
ABC Ltd	4.50%	PLR + 2%
DEF Ltd	5.00%	PLR + 3%
Difference	0.50%	1%
Saving in %	**1.00% – 0.50% = 0.50%**	

2. Computation of Net Benefits

Net Benefits	ABC Ltd	DEF Ltd
Share in Benefit	50%	50%
Individual Benefit	**0.25%**	**0.25%**

Total Benefit will be received by DEF Ltd. So, DEF Ltd has to pay 0.25% to ABC Ltd.

3. Structuring the Swap Arrangement



International Finance – Basics

Bid vs. Ask	Bid Rate = Buying Rate for Dealer = Selling Rate for Customers Ask Rate = Selling Rate for Dealer = Buying Rate for Customers All the answers should be solved from the perspective of Customers only.
Quotes	Direct Quote: Home Currency per Foreign Currency Indirect Quote: Foreign Currency per Home Currency Bid Direct = Inverse of Ask Indirect, Ask Direct = Inverse of Bid Indirect i.e. Ask $\frac{USD}{HKD} = \frac{1}{BidHKD/USD}$
Cross Quotes	Ask $\frac{INR}{HKD}$ = Ask $\frac{INR}{USD}$ × Ask $\frac{USD}{HKD}$ = Ask $\frac{INR}{USD} \times \frac{1}{BidHKD/USD}$
Cover Rate	If the Bank has sold HKD to its customer, to cover itself, the Bank would have to buy HKD in London Market. Therefore, Ask Rate is relevant (the rate at which the Third Party sells the Foreign Currency)
Margin	Added with the Ask Rate & Deducted from the Bid Rate. If Margin is given in "paisa", it should be considered only in case of INR Exchange Rates. It should not be applied for other Foreign Currencies.
Square up	If the dealer has sold USD in the spot market and is required to square off the transaction, he will buy USD, by selling EURO in the spot market.
Types of Quotes	**Type 1:** 1 USD = INR 73 **Type 2:** INR / USD = 73 **Type 3:** New York in Mumbai = 73
Exception	If in the Question it is given as **GBP/USD 1.7645/60** Generally, GBP will have higher value than USD. Hence, it is assumed that the Rate given in the Question GBP/USD 1.7645/60 is taken as 1 GBP = USD 1.7645. Likewise, **every Exchange Rate** should be taken accordingly.
Selection	Bid Rate = Whichever is Higher should be selected Ask Rate = Whichever is Lower should be selected
Swap Points	Increasing – Added with the Spot Rate Decreasing – Deducted with the Spot Rate
Premium	Annual rate of Premium / Discount $= \frac{\text{Forward Rate - Spot Rate}}{\text{Spot Rate}} \times 100 \times \frac{\text{12 Months}}{\text{Forward Period}}$
Arbitrage	Covered Interest Arbitrage = Borrow in one currency and Invest in other currency to earn riskless profit Cross Currency Arbitrage = Convert the Currency into same Currency in the order given to earn riskless profit
Forward Rate	**Interest Rate Parity Theory** Future Spot Rate = Spot Rate × $\frac{1+\text{Home Interest Rate}}{1+\text{Foreign Interest Rate}}$ **Purchasing Power Parity Theory** Future Spot Rate = Spot Rate × $\frac{1+\text{Home Inflation Rate}}{1+\text{Foreign Inflation Rate}}$
Capital Budgeting	**Foreign Currency Approach:** Compute NPV in Foreign Currency and then Convert into Home Currency **Home Currency Approach:** Convert into Home Currency and then compute NPV in Home Currency

Hedging for USD Receivables using INR Currency Futures

(a) **Nature:** Sell USD Futures (or Buy Rupee Futures). Future is available on Rupee. Hence, **Buy Rupee Futures.**

(b) **Value to be hedged:** $\frac{\text{Invoice}}{\text{Contracted Futures Rate}}$ **No. of Contracts =** $\frac{\text{Value to be hedged}}{\text{Lot Size}}$

(c) **Margin Money to be paid for Total Contracts:** Margin Money is not a Cost, as it will be repaid on settlement date. But, Interest on such money will be considered as Cost.

(d) **Cash Flow at T_n:**

	Particulars	Value
	Collection from Customer	$
Add:	MTM Gain on Futures [If Price rises, Profit For Buyer] (Clg Future Price – Contracted Price) × No. of Contracts × Lot Size	$
	Net USD in Hand at T_6 (to be sold at Spot Rate at T_6)	**$**
	₹ Received on Sale of above = $\frac{\text{Total \$ in hand}}{\text{Future Spot Price}}$	₹
Less:	Interest Payable on money borrowed for Initial Margin	(₹)
	Net Proceeds	₹

Money Market Hedge for GBP Liability

Particulars	Amount
Amount payable	GBP
Amount to be invested at GBP Interest Rate% for realizing above GBP = $\frac{\text{GBP}}{1+\text{Interest Rate}}$	GBP
₹ borrowed now = GBP to be invested × Spot Ask Rate	₹
Interest Payable on money ₹ borrowed @ Indian Interest Rate%	₹
Total Amount Payable = Amount borrowed now + Interest	₹

Money Market Hedge for GBP Receivable

Particulars	Amount
Amount Receivable	GBP
Amount to be borrowed at GBP Interest Rate% for above GBP = $\frac{\text{GBP}}{1+\text{Interest Rate}}$	GBP
₹ to be invested = GBP to be borrowed now × Spot Bid Rate	₹
Interest Receivable on money ₹ invested @ Indian Interest Rate%	₹
Total Amount Receivable = Amount invested now + Interest	₹

Corporate Valuation

Approach	Long Term Fund Providers	Shareholders
Owners	Debenture Holders + Shareholders	Shareholders only
Profit	NOPAT = EBIT – Tax Rate	EBIT – Interest – Tax = PAT
Discount Rate used	Overall Cost of Capital i.e. WACC	Cost of Equity
PV of Free Cash Flows	Value of the Firm	Value of Equity
Relationship	**Value of Firm – Debt = Value of Equity**	**Value of Firm – Debt = Value of Equity**

Computation of Cost of Capital

Source	High Growth Phase			Stable Growth Phase		
	Weight	Post Tax Cost	Product	Weight	Post Tax Cost	Product
Equity		$K_e = R_m + \beta (R_m - R_f)$			$K_e = R_m + \beta (R_m - R_f)$	
Debt		After Tax Interest			After Tax Interest	
WACC		Product ÷ Weight			Product ÷ Weight	

2. Computation of Free Cash Flows

(a) Computation of Working Capital Cash Flows

Particulars / Years	1	2	3	4 Onwards
Revenue = PY Revenue + Growth				
orking Capital = Revenue × WC %				
Increase in WC = WC for Yr 2 – WC for Yr 1				

(b) Computation of Cash Flows

Particulars / Years	1	2	3	4 Onwards
EBIT = assuming after Depreciation				
Income after Tax = EBIT – Tax %				
Add: Depreciation				**Note 1**
Less: Capital Expenditure				**Note 1**
Less: Increase in Working Capital				
Net Cash Flows (Note)				**Note 2**
PVF @ WACC during High Growth				
Discounted Cash Flows	**Total Value of the Firm = Sum of Discounted Cash Flows**			

Note 1: From Year 4 onwards, if Capital Expenditure is offset by Depreciation, no Adjustment required. Because, increase in Cash Flow on account of depreciation, will be offset by decrease in Cash Flow due to Capital Expenditure.

Note 2: Terminal Value at the end of Year 3 = $\frac{FCFF_4}{K_O - g}$

Computation of Value of Business (Shareholders' Approach)

Particulars	
Earnings before Tax = PAT ÷ (1 – Tax)	
Less: Extra Ordinary Income – Not to recur in the future	
Add: Extra Ordinary Loss – Not to recur in the future	
Add: Additional Income from New Launch	
Future Expected Earnings Before Tax	
Less: Taxes	
Future Expected Earnings After Tax (Shareholders' Approach)	**Value of Firm** = PAT ÷ Cost of Capital
Less: Preference Dividend	
Equity Earnings (Equity Shareholders' Approach)	**Value of Equity** = PAT ÷ Cost of Equity

Other Important Formulas

Net Assets Value (NAV)	$\frac{\text{Assets - Liabilities}}{\text{No. of Shares}}$
Earnings Capitalisation Value (ECV)	$\frac{\text{PAT}}{\text{Capitalisation Rate}}$
Financial Leverage	$\frac{\text{PBIT}}{\text{PBT}} = \frac{\text{PBIT}}{\text{(PBIT less Interest)}}$
Economic Value Added (EVA)	NOPAT **Less** (WACC × Capital Employed)
Market Value Added (MVA)	Market Value of Equity & Debt – Book Value of Equity & Debt Where Book Value of Equity = Paid up Capital + Reserves & Surplus
Unlevered Beta of the Pureplay Firms	$\beta_\mu = \frac{\beta_L}{\left[1+(1-T)\frac{D}{E}\right]}$
Levered Beta (β_2)	$\beta_L = \beta_U\left[1+(1-T)\frac{D}{E}\right]$

Break Up Value or Fair Value

Particulars	Wholesale	Retail	General
(a) Segment Sale Based Valuation	Segment Sales × Capitalisation Rate		
(b) Segment Asset Based Valuation	Segment Assets × Capitalisation Rate		
(c) Segment Operating Income Based Valuation	Segment Income × Capitalisation Rate		
Book Value = Average of above			

Break Up Value or Fair Value = Average of Book Value and Market Value

Mergers & Acquisitions

Swap Ratio based on Favourable Factors i.e. EPS, MPS, BVPS etc.	$\frac{\text{MPS of Selling Co.}}{\text{MPS of Buying Co.}} = \frac{\text{EPS of Selling Co.}}{\text{EPS of Buying Co.}}$
Swap Ratio based on Adverse Factors i.e. NPA	$\frac{\text{NPA of Buying Co.}}{\text{NPA of Selling Co.}}$
No. of Equity Shares to be issued to the Selling Company	No. of Shares in Selling Co × Swap Ratio
Post Merger EPS if Consideration by Shares	$\frac{\text{PAT of Selling Co + PAT of Buying Co + Synergy Gain if any}}{\text{No. of Shares in Buying Co + Shares issued to Selling Co}}$
Post Merger EPS if Consideration by Cash	$\frac{\text{PAT of both Co + Synergy Gain - Interest or Opp Cost on Cash Consideration}}{\text{No. of Shares in Buying Company}}$
Post Merger MPS	Post Merger EPS × PE Ratio of Buying Company
Post Merger MPS if information about earnings are not given	$\frac{\text{Market Value of Buying Co + Market Value of Selling Co + PV of any Synergy}}{\text{No. of Shares in Buying Co + No. of Shares in Selling Co}}$
Market Capitalization	No. of Shares × Market Price per Share
Free Float Market Capitalization	(No. of Shares – Promoter's Holding) × Market Price per Share

Impact of Mergers

Company	Buying Company	Selling Company
Pre Merger EPS OR MPS	Pre Merger EPS OR MPS	Pre Merger EPS OR MPS
Post Merger EPS OR MPS	Post Merger EPS OR MPS	Post Merger EPS OR MPS × Swap Ratio
Effect on EPS		

CAR & Gross NPA

	Buying Co	Selling Co	Total(after Merger)
Tier I + Tier II Capital	Capital +Reserves	Capital +Reserves	Total Capital
Risk Weighted Assets (RWA)	Capital × CAR	Capital × CAR	Total RWA
Gross NPA	Advances × NPA %	Advances × NPA %	Total NPA

CAR (after Merger) = $\frac{\text{Total Capital}}{\text{Total RWA}}$ **Gross NPA** (after merger) % = $\frac{\text{Total NPA}}{\text{Total Advances}}$

True Cost = Consideration paid in excess of the Value of the Selling Co.

	Particulars	Value
	No. of shares issued to Selling Company	
	Post Merger Market Price of Share	
	Value of Purchase Consideration	
Less:	Existing Market Value of Selling Company	
	True Cost of the Merger from Buyers' View Point	