STRATEGIC FINANCIAL MANAGEMENT

FORMULA TOOL KIT *for* C.A FINAL

Ask-Bid

$S_o \times e^{rt}$

$g=b \times r$

Duration/(1+Yield)

MPS/EPS

$\sigma=\sqrt{\Sigma pd^2}$

$D1/(K_e-g)$

$Rf+\beta X(Rm-Rf)$

DIVIDEND POLICY
Risk
Analysis BOND
Mutual Funds
DERIVATIVES
International
Finance
Portfolio Management
MERGERS
ACQUISITIONS
Leasing

RAJALAKSHMI HARIKRISHNAN

Preface

First and foremost I thank god, because he only made my passion to come true today. I would like to thank my better half CA. S. Harikrishnan who encouraged me a lot & also helpful in doing a quality check. My special thanks to my mentor CA. J.V. Ramanujam for his guidance. My special thanks to my brother CA. S. Balaji Vaidyanathan who taught me the art of writing a book. With the blessings of my parents and in laws and with the support of my child, am presenting this formula kit, which would be useful for quick revision during the examinations. I am also thankful to B. Sarvana Bharathi for the design and layout.

- Mrs. Rajalakshmi

Highlights of the book:

- ❖ Helpful for the reader to refer this formula kit quickly during the examinations
- ❖ Almost all the key concepts are presented in tabular form
- ❖ Covers key concepts in all chapters in Strategic Financial Management syllabus
- ❖ This kit helps only for revision of the concepts and not for the first time preparation. So all are kindly advised to read institute material and reference book to have in depth knowledge of the subject

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Contents

1. DIVIDEND POLICY

1. Expression of Dividend

a) Dividend Dates:

Declaration Date	Dividend is announced
Last-cum-dividend Date	Shares can be bought inclusive of dividend
First Ex-dividend Date	Shares can be bought without being eligible for dividend. On this date stock price will fall by quantum of dividend.
Record Date	Register of members is closed as per Companies Act
Payment Date	Dividend cheque is written

b) Dividend Ratios:

Dividend Rate	(DPS / FV) X 100	FV - Fair value
Dividend Yield	(DPS / MPS) X 100	MPS - Market price per share
Payout Ratio	(DPS / EPS) X 100	EPS - Earnings per share
	DPS - Dividend per share DPS – Investor point of view = Equity Dividend	
	DPS – Company point of view = Dividend + Dividend distribution tax	
Retention Ratio	100 – Payout Ratio (OR)	
	(Retained Earnings / Equity Earning) X 100	
DPS	EPS X Payout Ratio	
MPS	Market Capitalization / No. of shares	
Cost of Capital	Ke = Inverse of P.E.Multiple (i.e 1 / P.E.Ratio)	

2. Growth Rate

Stock Valuation – Dividend Growth Model

P.E.Multiple Approach	MPS = EPS X PE Multiple
Earning Growth Model	MPS = [EPS X (1 + G)] / (Ke - G)

Compare MPS with AP (Actual stock price)

Relationship	Valuation	Decision
AP > MPS	Overvalued	Sell
AP < MPS	Undervalued	Buy
AP = MPS	Correctly Valued	Hold

Future Growth Rate

G = b X r

b = Retention Ratio, r = Return on Investment

Implied Growth Rate

$G = K_e - (D1/P)$

Implied Return on Equity

ROE = Implied growth rate / Earnings retention rate

3. Common Sense Approach (OR) All-Or-Nothing Approach

Nature of Firm	Relationship	Payout
Growth Company	K < r	0%
Declining Company	K > r	100%
Normal Company	K = r	Indifference

K = Cost of Equity (or) Shareholder's expectation
r = Rate of return

4. Dividend Models

a. Walter's Model	Po = (D / Ke) + [(E - D) X (r / Ke)] / Ke
b. Gordon's Model	Po = D1 / (Ke - g)
c. Graham & Dodd Model	Po = m X (D + E/3) m = multiplier
d. Lintner's Model	D1 = Do + [(EPS X Target payout) - Do] X AF (AF = Adjustment Factor)
e. Modigliani-Miller Model	nPo = [(n+m)P1 - I1 + X1] / (1 + Ke)

Steps in MM Model:

1. $P_1 = P_o (1 + K_e) - D_1$
2. Retained Earnings (or) Money Available = PAT - (n X D_1)
3. Money to be raised = Investment in year one (I_1) - Step 2
4. No. of shared to be issued at year end (m) = Step 3 / Step 1
5. LHS = nPo
6. RHS = [(n+m)P_1 - I_1 + X_1] / (1 + K_e)
7. LHS = RHS

Principle: Declaration or Non-declaration of dividend affects the market price P_1 and does not affect the market capitalization nP_o.

5. Pricing of Buy- Back

Buy back Price = (S X P_o) / (S - N)

N = Money available for buy back / Buy back price
S = No of shares outstanding before buy back
Po = Current Market price

Market Capitalization after buy back =Buy back price X (original shares - shares bought back)

6. Alternatives to Dividend

Bonus Issue	Capitalisation of reserves
Stock Split	Reduction in Face value
Reverse Split	Increase in Face value

Post MPS after bonus/ stock split/ reverse split:

Post MPS= Old Market capitalization / Revised number of shares

7. Effect of change in Dividend

Increase in dividend	Decrease in dividend
Shareholder not want to spend extra cash	Shareholder want to maintain his composition
Investment in shares of the company	Sell the shares of the company
Investment in no of shares = Incremental dividend / current MPS	No. of shares to be sold = Difference in dividend / current MPS

8. Post Bonus price

Theoretical post rights price per share

P = (MN + Sr) / (N + r)

Theoretical value of rights

R = [r / (N + r)] X (M - S) OR
Current MPS - Theoritical post rights price per share

S = Subscription per share
M = Market price per share
N = No. of existing shares
r = No. of right shares

No. of Right shares = Existing No. of shares / Ratio of Rights
Ratio of Rights = Ex-rights price per share / Subscription price
Ex-rights price per share = Share capital after Right issue / No. of Right shares
Subscription price = Money to be raised / No. of Right shares

Effect of Right issue

i. Value of shares before Right issue = No. of existing shares X Old MPS
ii. Value of shares after Right issue =No.of existing shares X Theoretical post right price per share (+) Sale proceeds (No. of Right shares X Theoretical value of Rights)
iii. Compare the values of step I & step ii

Effect on wealth of Shareholder
Step I = Step ii – Nil
Step I > Step ii – Loss
Step I < Step ii – Profit

9. Flotation Cost

- Cost associated with issue of new share.
- Hence flotation cost for Existing Equity share & Retained earning = Zero

Flotation Cost %

Po X (1 - f) = D1 / (Ke - g)

10. Corporate Dividend Tax (CDT)

- Company is required to pay CDT on behalf of Equity shareholder.
- Dividend should not be taken after tax.
- Hence while calculated dividend consider CDT
- i.e., Dividend Per Share(DPS) X (1 + CDT)

11. Approaches to Dividend

a) Constant dividend

Fixed amount of dividend is paid each year irrespective of the earnings

b) Constant Payouts

Dividend Payout Ratio is kept constant

c) Constant Dividend plus

Fixed Low DPS is paid constant + Additional DPS paid in years of good profit

d) Residual Approach

Capital Structure altered	Capital Structure un-altered
Dividend = PAT - Upcoming Capital expenditure	Dividend = PAT - Capital expenditure funded by equity

e) Compromise Approach

Finance manager has to consider the following while declaring dividends

i. Projects with positive NPV are not to be cut to pay dividends
ii. Avoid dividend cuts
iii. Avoid the need to raise fresh equity
iv. Maintain a long term Target Debt Equity ratio
v. Maintain a long term Target Dividend Payout ratio

2. MUTUAL FUNDS

A. Net Asset value

NAV per unit = Net Asset value of the fund / No. of units outstanding

Market value of Investment	XXX
Add:	
Receivables	XXX
Accrued income	XXX
Other assets	XXX
Less:	
Accrued expenses	XXX
Payables	XXX
Other liabilities	XXX
Net Asset Value	XXX

Net Asset of the scheme = Total Assets - Total External Liability

B. Valuation Rules - "Mark - To - Market" Basis

Nature of Asset	**Valuation Price**
Liquid asset like cash	Book Value
All Listed & Trade securities other than those held as not for resale	Closing Market price
Debentures & Bonds	Closing Traded price / yield
Liquid shares or debentures	Last known price or Book value whichever is lower
Fixed income securities	Current yield

C. Costs of Mutual fund

Expense Ratio = Total Expenses / Average value of portfolio

Expense per unit = Total Expenses / No. of Units
Average value of portfolio = (Opening NAV + Closing NAV) / 2

R2 = [(1 / 1- Initial Expenses %) X R1] + Recurring Expenses%

R1 = Personal Earnings
R2 = Mutual Fund Earnings

Expenses include management and advisory fees, travel cost, consultancy etc.
Expense exclude brokerage cost for trading

D. Evaluation Models

A. Reward -to-variability / Volatility Ratio = Sharpe Ratio & Treynor Model

I. **Sharpe Ratio** = $(R_p - R_f) / \sigma_p$

R_p = Yield / Opening NAV

II. **Treynor Model** = (R_p - R_f) / β_p

B. Measures of Excess Return

I. **Jensen Alpha** = R_p - [R_f + β (R_m - R_f)]

α = Return on portfolio - Return as per CAPM

Alpha is Positive	Fund is undervalued, outperformed the market
Alpha is Negative	Fund is overvalued, better the performance

II. **Morning Star Index** = Average Return - Average Risk of loss

Risk of loss = Lower of (R_f - Return) or zero

III. **FAMA net selectivity** = (R_p - [R_f+ (σ_j/σ_m)x(R_m-R_f)]

Steps:

1. Risk premium from Portfolio = R_p-R_f
2. Risk premium from Market = R_m-R_f
3. Total Risk premium = β x (R_m-R_f)
4. Total gain = Step 1 - Step 3
5. Appreciation premium for diversification = (σ_j/σ_m)x(R_m-R_f)
6. Net gain = Step 1 - Step 5

Systematic risk = $\sigma_p x \beta_p$
Unsystematic risk = Total risk - Systematic risk

Beta (β) =(σ_i/σ_m)x Correlation
Always β for Market Portfolio = 1

R_p = Return on Portfolio
R_f = Risk free Return
σ_p = Standard deviation on Portfolio
β_p = Beta of stock
R_m = Market return

7. Returns

Holding Period Return = $\frac{\text{[Cash dividend + capital appreciation + capital gains]}}{\text{Opening NAV per unit}}$

Annualized Return = (Total Return / period) X 365

Monthly return = Annual Return / 12

Capital appreciation = Closing NAV per unit - Opening NAV per unit

Return from Mutual fund = [Investor expectation/100 - Issue expenses]+ Annual recurring expenses

Effective Yield in percentage = [Total Yield/Opening NAV] = [365/No. of days holding] X 100

Portfolio Turnover = Lower of (Annual Purchase or Sale) / Average value of portfolio

TWR vs. RWR

Time Weighted Return (TWR)	**Rupee Weighted Return (RWR)**
Ignores intervening inflows & outflows of cash	considers intervening inflows & outflows of cash
(Closing value - Opening value)/opening value x100	Calculate using IRR method

8. Average Rate of Return

Plan A - Dividend Re-investment plan

Date	Dividend % (as given in the problem)	Investment = Cumulative units x Face value x Dividend %	Rate (as given in the problem)	Units (Investment/rate)	Cumulative units

Plan B - Bonus plan

Date	Bonus ratio (as given in the problem)	Units = Cumulative units x Bonus ratio	Cumulative units	NAV / Unit (as given in the problem)

Redemption value = Cumulative units on closing date x rate on closing date

Less

Short term capital gain tax = Units on closing date x Tax % x difference between closing and previous date rate

Security transaction tax = Redemption value x tax rate

Investment

Net return from investment

Plan C - Growth plan

Redemption value = IPO units x rate on closing date

Less

Security transaction tax = Redemption value x tax rate

Investment

Net gain

Note : In growth plan alone, we won't deduct short term capital gain.

Holding period is more than one year, hence short term capital gain wont arise

9. Investment Decision

Slope of Capital Market = [Expected Return - Opportunity cost]/ Standard Deviation
Fund having higher slope is preferable.

10. Entry load vs Exit load

Entry Load	**Exit Load**
Front End Load	Back End Laod
Total amount paid by the investor	Total amount received by the investor
Sale price per unit = NAV X (1 + Entry Load)	Repurchase price / Buyback price = NAV X (1 - Exit Load)

3. LEASING

1. Terms

Particulars	Lessor	Lessee
Asset	Legal owner	User
Lease Rent	Income	Expense
Tax	Taxable	Tax deductible
Depreciation	Yes	No
Decision	Investment/ Capital Budgeting	Financing / Capital structuring/ planning
Appropriate Discount rate	WACC	Opportunity cost

2. Lessor point of view

STEPS:

i. Identify Initial Outflow
ii. Discount In-between cashflows after tax
iii. Discount Terminal flow
iv. Compute NPV
v. NPV is positive - Lease
NPV is negative - Don't Lease
NPV - Net Present Value

NPV - Net Present Value

Year	Cash Flow	Lease Rent	Depreciation	Lease rent - Depreciation	Tax	CFAT = Lease rent - Tax	Discount Factor	Discounted Cash flow after tax

Lease Rental

Received in Advance	Received in Arrears
Received at the beginning of the period	Received at the end of the period

Tax on lease rental will be considered as & when the cash flow in or rent accrues whichever is earlier

Finance or Operating Lease

All lease rental payments are tax deductible, hence the distinction of Finance or operating is irrelevant while evaluating Lease option

3. Lessee Point of view

A. PRESENT VALUE MODEL

Step 1: BORROW & BUY OPTION

Purchase price
Less: Present value of tax saved on depreciation
Less: Present value of Net salvage value
Present value of Buying option

Step 2: LEASE OPTION

Lease Rental
Less: Tax on Lease rent
Lease rent after tax
Present value of Lease option

Step 3: Compare step1 & 2

Select the option with lower PV of outflows

Step 1 < Step 2 = Borrow & Buy
Step 1 > Step 2 = Lease

Net salvage value = Residual value + Tax saving on loss from sale

Tax Savings on depreciation

Year	Opening balance	Depreciation	Closing balance	Tax savings on depreciation	Discount Factor	Discounted Tax savings on depreciation

Implication of Target Debt Ratio

i. Compare Leasing with borrowing
ii. Target Debt ratio is increased - By leasing or borrowing
iii. Target Debt ratio is decreased - By funding the asset by equity rather than leasing or borrowing

B. IRR MODEL

i. Internal Rate of Return = IRR
ii. IRR - Discount rate at which NPV = 0
iii. We discount cash flows under two rates i.e., higher rate & lower rate.
iv. Higher discount rate gives positive NPV
v. Lower discount rate gives negative NPV
vi. Find exact discount rate IRR using the following formula

IRR = Lower Rate + { [Lower rate NPV / (Lower rate NPV - Higher rate NPV)] X Difference in rates }

	Borrow & Buy				Lease option		
Year	Initial cost	Depreciation	Tax saved on depreciation	Salvage value	Lease Rental	Lease after tax	NET

Buying instead of Leasing

NET = Initial cost + Tax saved on depreciation + Salvage value - After tax Lease rental

Leasing instead of Buying

NET = After tax Lease rental - Initial cost - Tax on depreciation - salvage value

Investment decision	Outflow followed by Inflow	IRR < Opportunity cost	Not good to Invest
Financing Decision	Inflow followed by outflow	IRR < Opportunity cost	Good to finance

C. WEINGARTNER'S MODEL or CAPITAL BUDGETING MODEL

Steps:

i. Compute NPV under Lease option
ii. Compute NPV under Purchase option
iii. Select the option that has the higher NPV

D. ADJUSTED PRESENT VALUE METHOD (APV)

Steps:

i. Compute Base case NPV
ii. Compute Present value of tax saved on Interest paid
iii. Compute APV = Step (i+ii)
iv. If APV of Borrow & buy option is positive - BORROW & BUY otherwise Lease.

E. NET ADVANTAGE TO LEASING

1.Initial Outlay	3. Present value of Lease Rental
2. Tax Shield on Lease Rental	4. Present value of Tax benefit on depreciation
	5. Present value of Tax benefit on Interest
	6. Present value of Net Salvage value
A = 1 + 2	**B = 3 + 4 + 5 + 6**
Net Advantage to Leasing (NAL)= A - B	

Relationship	Decision
A > B	Lease
A < B	Borrow & Buy

F. BOWER - HERRINGER - WILLAISMON (BHW) MODEL

Evaluation:

Financing Part	Tax Shield Part
Financial Advantage of Leasing (FAL)	Operating Advantage of Leasing (OAL)
FAL = PV of loan payment - PV of Lease payments	OAL = PV of lease related tax shields - PV of loan related tax shields - PV of Residual value

If (FAL + OAL) is positive - Lease

If (FAL + OAL) is negative- Borrow & Buy

G. BOWER MODEL

i. Same as Present Value Model
ii. Cost of Purchase - COP = PV of Borrow & Buy option
iii. Cost of Lease - COL = PV of Lease option

COL < COP	Lease
COL > COP	Borrow & Buy

4. Break Even Lease Rental (BELR)

Lessee's point of view

Initial Outlay
Less: Present value of Lease Rental
Add: Tax Shield on Lease Rental
Less: Present value of Tax benefit on depreciation
Less: Present value of Tax benefit on Interest
Less: Present value of Net Salvage value
Net Advantage to Leasing (NAL)

Equate NAL = 0 to compute BELR

Lessor's point of view

Cost of Machinery
Less: Present value of Salvage value

Less: Present value of Tax benefit on depreciation
Less: Present value of Tax saving on short term capital gain

Cash Flow

After tax BELR = Cash Flow / Present value Annuity factor
Before tax BELR = After tax BELR - (1 - Tax Rate)

5. Irrelevant Cash flows

While evaluating under Lessee's point of view, the following cash flows are irrelevant
Since these cash flows are COMMON for both buying & leasing options

a) Operating Cost
b) Forecast revenues
c) Training cost
d) Difference between Principle & Interest
e) Inflows from operations
f) Interest (Irrelevant since considered while discounting)

6. Sensitivity of Residual Value

[Present Value of Lease option / Present value of Salvage value] X 100
Up to this % Residual value to lease is Economical

7. Equated Annual Installment

=Loan Amount / Annuity factor

Annual cash inflow =
Cost of asset / Annuity factor at Lessor's expected ROR for the lease period

Appropriate Discount Rate
Monthly Rate - LR & Tax shelter
Yearly Rate - Purchase price & Salvage value of asset

8. Salvage Value

WDV of asset > Net Sale value	Loss on sale	Salvage value + (Loss on sale X Tax rate)
WDV of asset < Net Sale value	Profit on sale	Salvage value - (Profit on sale X Tax rate)

WDV of asset
Less: Net sale value
Terminal flow

9. Treatment of Depreciation

Steps (Common for both SLM & WDV)

i. Compute depreciation amount

Year	Opening WDV	Depreciation	Closing WDV = Opening WDV - depreciation

ii. Tax saving on depreciation

iii. Present value of tax saved on depreciation

Tax saving on Depreciation	Discount Factor	Discounted Tax savings

4. FINANCIAL SERVICES

1. Flat rate

Simple Interest = (Principal X Time X Rate)/100
EMI = Total Repayment amount /No of Installments
Interest = Total repayment amount - amount borrowed
Flat rate = (Interest/ Total borrowing)X 100 X 1/n
Effective Interest rate = [n/(n+1)]X 2F

n = No. of installments

F = Flat rate of interest
F = [Installment amount - (Sale price - downpay)]/ (Sale price - downpay) X 100

2. Annuity factor

Annuity factor = Cost of Asset/Lease rental per year

3. Decision on whether to avail discount

In case of cash sales, there will be discount. In case of credit sales, there will not be any discount.

A. Company having Surplus

After Investment rate > IRR - Not avail discount - Opt for higher purchase/credit purchase

After Investment rate < IRR - Avail discount

B. Company having Deficit

After borrowing rate > Discount rate - Not avail discount - Pay in installments

After borrowing rate < Discount rate - Avail cash discount

4. Loans swap

i. Compute cost of existing loan
ii. Compute cost of new loan
iii. Decide

Cost of existing loan > Cost of new loan - Swap

Cost of existing loan < Cost of new loan - Don't Swap

5. Factoring vs Bank borrowings

a) Savings on factoring

Savings in cost of administering debtors
(+) Reduction in bad debts
(+) Savings in interest on borrowings
(-) Cost of factoring
Net benefit of factoring

Effective rate of interest = (Net cost to the firm/Advance paid) X 100

b) Interest saved on bank borrowings

Existing average debtors
(-) Average new debtors
Reduction in debtors

Cost included in debtors = Amount of borrowings reduced % X Reduction in debtors

Interest saving = Interest % X Cost included in debtors

c) Compare a & b above and decide

6. Cost of fund

Basic Interest cost + Brokerage + Rating charges + Stamp duty = **Final cost**

Basic Interest cost = [(Face value - Issue price)/Issue price] X 12 months

7. Analysis of Receivables - Computation of finance amount

i. Determine eligible outstanding amount

Eligible amount will be considered as collateral only if;
a) Days outstanding is within due date and
b) Average payment period or historic payment date is within due date
If any one of the conditions is not satisfied, then don't consider the receivable as outstanding amount

ii. Computation of amount which can be lend

Invoice amount (-) cash discount or allowance = Net amount considered for bank finance

Eligible bank finance = % on Net amount considered for bank finance

8. Computation of factoring cost

i. Computation of net amount paid to firm

Receivables = Total sales X Collection period/365

Trade receivable period = Trade receivable/ Turnover X 365

Receivables (-) Factor margin money or factoring reserve Amount of finance offered by Factor (-) Factor commission Amount available for advance (-) Interest **Net amount paid to the firm (Advance to be paid)**

ii. Computation of effective cost of factoring

a) Annual cost of factoring Factoring commission + Interest on factored debts (-) b) Savings on account of factoring Cost of credit administration + bad debts avoided **c) Net cost of factoring**

Effective rate of factoring = (Effective cost/ Net amount advanced) X 100

9. Beneficial Usage of Credit Card

i. Deferment of payment per month
ii. Effective deferment or savings per year
iii. Notional interest earnings on such savings = Step ii X Interest Rate
iv. Annual credit card charges
v. Benefit derived due to usage of credit card = Step iii - Step iv.

5. CAPITAL BUDGETING

1. Time Value of Money

Future Value = Present Value X (1 + TVM)^n FV = Today's Investment X FVF
PV = FV / (1 + TVM)^n
Future Value of Annuity = Annuity X FVAF FVAF = (FVF -1) / R
Present value of Annuity = Annuity X PVAF PVAF = (1 - PVF) / R

Future Value of Annuity Immediate = Future value regular X (1 + r)

Present value of Perpetuity = Perpetuity / Time value of money Present value of Growing Perpetuity = Perpetuity / (Time value of money - Inflation rate)

Effective Annual Rate (EAR) = [1 + (Stated Rate / n)]n -1

n - No of times the interest is compounded during the year
FV - Future value
PV - Present value
FVF - Future value factor
TVM - Time value of money
FVAF- Future value Annuity factor
PVAF - Present value annuity factor
R – Rate

2. Investment Decisions

Steps:

i. Identify Initial investment

a. Initial capital expenditure

b. Initial investment in working capital

ii. Identify In-between cash flow

a. Operating cash flows

b. Increase / Decrease in working capital need to be added / subtracted

Working Capital	**Increase**	**Decrease**
Debtors	Overstate	Understate
Creditors	Understate	Overstate

Stock	Overstate	Understate

c. Additional investment in capital assets

d.Include Opportunity cost & ignore Sunk cost

iii. Identify Terminal cash flow

a. Net sale value of asset

b. Re-capture of working capital

iv. Discount the cash flows after tax & compute NPV

Consider the following while computing Cash flow after tax(CFAT)

a. Depreciation is initially deducted while calculating tax, then added back while calculating CFAT

b. If cash flows include inflation then discount rate also include inflation

c. If cash flows exclude inflation then discount rate also exclude inflation

d. Tax shelter = Tax rate X Loss adjusted

e. Capital gain - if Sale value > Written down value of asset

v. Project with positive NPV should be accepted

Evaluation of cash flows

Equity Shareholder's Perspective	**Lender's Perspective**
Equity NPV = NPV of Equity shareholders	Project NPV = NPV of term lenders
IRR of Equity shareholders = Equity IRR	IRR of term lenders = Project IRR
Profit after tax(PAT) computed after deducting the interest cost	The post tax interest cost must be added back in arriving at cash flow
Interest & Principal need to be deducted while arriving cash flows	Interest & Principal are not deducted while arriving cash flows

3. Replacement Analysis

Terms

Abandonment	**Purchase**	**Replacement**
Giving up existing asset	Buying a new asset	Abandoning the existing asset & replacing it with new one

Abandonment Decision

Value of Asset	**Action**	**Status**
Disposal value < Fair Value	Retain	Undervalued in the market
Disposal value > Fair Value	Abandon	Overvalued in the market

STEPS:

i. Opportunity outflow (today's net sale value of existing asset)

ii. Compute future cash flows across balance life of asset
iii. Compute terminal flow
iv. Discount the cash flows to compute NPV
v. NPV is positive - Continue with the asset
NPV is negative - Abandon the asset

Purchase Decision

STEPS:

i. Find Initial outflow of new machine in the market
ii. Cash flows after tax across its useful life
iii. Compute terminal flow
iv. Discount the cash flows at after tax Cost of capital to arrive NPV
v. NPV is positive - Buy the asset
NPV is negative - Don't buy the asset

Replacement Decision

NPV of PO > NPV of CO	Purchase new asset & Discard old
NPV of PO < NPV of CO	Continue with old asset & not buy new one

PO - Purchase Option
CO - Continuing Option

Method 1: Equated Annual Benefit Method

Equated Annual Benefit (EAB)	**Equated Annual Cost (EAC)**
EAB = NPV / PVAF	EAC = PVO / PVAF
Based on NPV	Not based on NPV
Annual cash flow = EAB	Present value of cost = EAC
Project with Higher EAB is selected	Project with Lower EAC is selected

Method 2: Incremental cash flow Method

Steps:
i. Compute incremental initial outflow

Purchase price of new asset
Less: Net sale value of old asset

ii. Compute incremental operational flows

Operational flow from new asset
Less: Operational flow from old asset

iii. Compute incremental terminal flows

Net sale value of new asset
Less: Net sale value of new asset

iv. Consolidate Step i ,ii & iii cash flows & discount at after tax cost of capital

v. Compute NPV

If NPV is positive - Replace the asset
If NPV is negative - Don't Replace the asset

4. Inflation

Money Cash flow	Includes Future Inflation
Money Discount rate	
Real Cash flow	Excludes Future Inflation
Real Discount rate	

(1 + MDR) = (1 + RDR) X (1 + IR)
RCF = MCF / IR

MDR - Money Discount Rate
RDR - Real Discount Rate
IR - Inflation Rate
RCF - Real Cash flow
MCF - Money Cash flow

Present Value

MCF discounted at MDR
RCF discounted at RDR

Conversion

MCF converted into RCF	Discount at IR
RCF converted into MCF	Compound at IR

Types of Inflation Rates(IR)

Symmetrical IR	**Asymmetrical IR**
All items have same level of inflation	All items have different rates of inflation
Convert: i. cash flows into terms in which discount rates are ii. Discount rates into terms in which cash flows are	Convert cash flows into terms in which the discount rate is

Note: Depreciation is a non-cash item considered with Zero inflation while calculating NPV

5. Capital Rationing

Capital Rationing = Money is in short supply

Requirement < Availability	No Short supply
Requirement > Availability	Short supply

Types of Capital Rationing

Single Period	**Multiple Period**
Short supply in one year only	Short supply in more than one year

Nature of Projects

Divisible project	**Indivisible project**
Permit fractional investments	Do not Permit fractional investments
They can be taken up in parts	They have to be taken up in full or dropped

A. Single period, Divisible projects

Steps:

i. Identify projects with positive NPV
ii. Identify that capital rationing exist i.e., Requirement > Availability
iii. Rank the projects in the Profitability Index ratio (NPV / Initial outlay)
iv. Assign money to the projects on the basis of rank.
If money is not adequate to fully cover the project then part of the project would be undertaken
v. Aggregate the NPV of selected projects

B.Single period, Indivisible projects

Steps:

i. Identify projects with positive NPV
ii. Identify that capital rationing exist i.e., Requirement > Availability or Supply < Demand
iii. Rank the projects in the ratio (NPV / Initial outlay)
iv. Identify various feasible combinations using trial & error method.
If money is available but cannot be allotted to any project, it will be dealt with as surplus cash.
v. Compute NPV of feasible combinations & select the one with highest aggregate NPV.
vi.Assume NPV of surplus cash as Zero.

Investing Surplus cash

Investment Rate > Cost of capital	NPV is positive

Investment Rate = Cost of capital	NPV is Zero
Investment Rate < Cost of capital	NPV is negative

Select the rate at which highest NPV is possible

C.Multi period, Divisible & Indivisible projects

Steps:

i. Establish the Maximization NPV equation
ii. Lay down the constraints
iii. Solve the Linear Programming Equation

6. Adjusted NPV

Base case NPV	XXX
Less: Issue Cost	(XXX)
Add: Present value of tax shield on interest	XXX
Adjusted NPV	XXX

Adjusted IRR - Rate at which Adjusted NPV = Zero

(Cash flow / Cost of capital) - Investment + Present value of tax shield on Interest = 0

7. Financial Terms

I. Operating Leverage = Contribution / EBIT

II.Financial Leverage = EBIT / EBT

III.Return on Capital Employed (ROCE) = (EBIT / Capital employed) X 100

IV.Interest Coverage ratio = (EBIT / Interest charges) X 100 or [(PAT + Depreciation + Interest)/Interest]

V.Debt Service Coverage Ratio (DSCR) = [(PAT + Depreciation + Interest) / (Interest + Principle repayment)]

VI.EBIT - Earnings before Interest & Tax

VII.EBT - Earnings before Tax

VIII.PAT - Profit after Tax

6. INTERNATIONAL CAPITAL BUDGETING

1. Computation of NPV

Home Currency Approach	Host Currency Approach
Home country - who makes investment	Host country - country in which investment is made
Investor country	Investee country
Discount at Home country discount rate	Discount at Host country discount rate

Host Currency Approach

Steps:

i. Compute host currency cash flow

ii.Compute host currency discount rates

iii. Compute host currency NPV

iv. Convert at Spot rate to arrive at home country NPV

Home Currency Approach

Steps:

i. Compute host currency cash flow

ii.Convert to home country cash flows, by applying Spot rate on different dates

iii. Identify home currency discount rate

iv. Compute home currency NPV

2. Discount Rate Computation

Risk Free Rate	Risky Rate
Forward rate = $[(1 + R_h) /(1 + R_f)]$ X Spot rate	Risky Rate = (Spot rate / Forward rate) X $(1 + R_h)$

R_h - Rate of 1st currency (Home)

R_f - Rate of 2nd currency (Foreign)

Risk Premium

Time value of money Nominal Rate of return = Real Rate of investment on risk free return + Risk premium	$(1 + R_n) = (1 + R_f)$ X $(1 + R_p)$

Situation	Appropriate Discount rate
i. Home country invests only in Equity	Discount @ K_e Cost of Equity
ii.Home country invests in both Equity & Debt	Discount @ Weighted Average Cost of Capital
iii. Host country invests in Equity	Discount cash flows to the extent repatriable @ Rate of Return desired by Home country investor
iv. Host country invests in debt	Discount rate reflects project's business risk + financial risk arising from gearing. Ascertain discount rate using CAPM & gearing

3. Tax Implication

Methods:

i. Discount the after tax cash flows at after tax discount rate OR

ii. Use Adjusted Present Value Method

Base case NPV	XXX
Less: Issue Cost	(XXX)
Add: Present value of tax shield on interest	XXX
Adjusted NPV	XXX

4. Repatriation Restrictions

When one entity invests in another country there could be restrictions on how much profits can be taken back to the home country. These restrictions are called Repatriation Restrictions

Particulars	**Cash flows**		
Year	**1**	**2**	**3**
a. Project cash flows (Balance held (f) of previous year)			
b. Amount repatriated (remitted)			
c. Opening investment			
d. Additional investment (a - b)			
e. Interest on Opening investment			
f. Balance held(given)	XX	XX	XX
g. cash flows from parent point of view (b)	XX	XX	XX
i.e., Amount Repatriated			
h. Final year cash flow			XX

With Repatriation

Year	Cash flows	Discount factor	Present value
0	value as given in the problem		
1	Amount repatriated (b) as per above table		
2			
3			
3	Final year cash flow (h) as per above table		
NPV			

Without Repatriation

Year	Cash flows	Discount factor	Present value
0	Values as given in the problem		
1			
2			
3			
NPV			

Compare NPV with repatriation & without repatriation restrictions and decide

7. BOND VALUATION

1. Value of Bond

If interest is paid half yearly,

Calculate Interest = Face value X coupon rate X 6/12 months

i) Present Value of Interest =
Interest amount X Present value of (Rate of return X 1/2)% for (Maturity period X 2) years

ii) Present value of Maturity value =
Face value X Present value of (Rate of return X 1/2)% for (Maturity period X 2) years

iii) Bond value = i) + ii)

Fair Market Price (FMP) vs. Actual Market Price (AMP)

Fair Market value = Present value of Interest + Present value of Principal
Quarterly compounding = (Coupon rate & YTM)/4

Relationship	Valuation	Action
AMP < FMP	Under	Buy
AMP > FMP	Over	Sell
AMP = FMP	Correct	Hold

Amount of Investment

Amount required for making payment on maturity date =
Amount to be invested X [1+(Rate of Interest X No of days to maturity/365)]

{(Face Value - Issue price)X 12/m X 100} / Issue Price

m = No of months (Maturity period)

Cost of funds (p.a) = Effective rate of Interest + Brokerage + rating charge + stamp duty

2. Effective Rate of Interest

Actual Interest per annum that an investor earn during his period of holding

{(Face Value - Issue price)X 12/m X 100} / Issue Price

3. Yield to Maturity (YTM)

{(Redemption price - Current price) X 365/ No of days } / Current price

YTM = (Coupon return + Prorated discount)
(Redemption price + purchase price)/2

Coupon return = Face value or Maturity value X Coupon rate

Pro rated discount = Net capital appreciation/No of years to maturity

Net capital appreciation = Redemption price - Issue price

Face value = Issue price/(100- discount rate) , if it is issued at discount

Face value = Issue price/(100+premium rate) , if it is issued at premium

4. Effective Annual Return

Use periodic compounding

EAR = $[1+(\text{Yield/Period})]^{360/\text{days}}$

5. Computation of Issue Price

Issue price = Present value of future cash outflows

Year	Nature	Cash flows	Discount factor	Discounted cash flow
	Interest	Rate of Interest X Face value		
	Maturity proceeds	Face value ± Premium or discount amount		

If current market rate or Yield rate of return are given, then consider only yield rate of return for discount factor

6. Immunization

Duration of assets = Duration of liability

Stock	**Maturity years**	**Coupon rate**	**Duration (D)**	**Weight (W)**	**D X W = Immunized Liability**
				Based on Investment	

7. Duration

$$\frac{1+Y}{Y} \quad (-) \quad \frac{(1+Y)+\text{Period X } (C-Y)}{C[(1+Y)^{\text{period}} - 1]+Y}$$

Y = YTM

C=Coupon rate

Tabular form

Year	Cash flows	Present value factor @ YTM rate	Discounted cash flow	% of Present value	Weighted average time
1	2	3	4= 2X 3	5= 4/(Total of 4 X 100)	6= Weights X 5
					Total of 6 = Duration

Fall by basis points	Rise by basis points
Sell - Less duration bonds	Sell - More duration bonds
Buy - More duration bonds	Buy - Less duration bonds

8. Volatility

Duration /(1+ Yield)

For every % change in yield, price of bond will vary by volatility

9. Holding period Return

Total return earned on bond over a period held by an investor

{(Price gain + Coupon payment)/Purchase price }X 100

Price gain = Redemption price - Issue price

10. Yield with tax & capital gains

i) coupon return
Less tax on coupon return
Net coupon return(Interest)

ii) Redemption price
Less Issue price
Capital gains
Less tax on capital gains
Net capital gains or capital appreciation

iii) Net cash flow on maturity = Redemption price - Tax on capital gains

iv) YTM = $\frac{\text{Net coupon return + (Pro rated discount/period of maturity)}}{\text{(Net cash flow on maturity + Issue price)/2}}$

11. YTM considering the time value of money (IRR)

$$\text{YTM} = R2 + \frac{V_2 - V_M}{V_2 - V_1} \times (R1 - R2)$$

VM = Investment value or Issue price

Year	Cash flow	R1 discount factor	R1 discounted Cash flow	R2 discount factor	R2 discounted Cash flow
1 to n	Coupon return				
nth year	Net maturity proceeds				

Total of R1 discounted cash flow = V1

Total of R2 discounted cash flow = V2

YTM (Annualized) =

$$2 \times \frac{\text{Half yearly coupon return} + [\text{Pro rated discount}/(2 \text{ Period of maturity})]}{(\text{Redemption price} + \text{Purchase price})/2}$$

To compute market price

i) substitute the values in the above formula & equate it to YTM

ii) consider Pro-rated discount = Redemption price + Market price

iii) under denominator, in place of purchase price, put MP & form a equation & solve it to get the value of MP

If purchase is made in a period other than beginning or end of the year

then MP = MP calculated as above as on beginning of the year of purchase + Accrued Interest for the period (Beginning of the year of purchase to date of purchase)

12. Value of Deep Discount Bond

Expected value = Present value of Maturity value for maturity period @ YTM rate

13. Refunding a Bond

Ahead of time because you may awash with money

Steps

i) Current repayment is an outflow

ii) Annual inflows are interest cost saved net of costs

iii) Terminal flow is savings in principal repayment in original terminal year

iv) Appropriate discount rate

v) NPV is positive, refund. Otherwise, retain

Ahead of time & is replaced with new bond offering

Steps

i) Incremental initial flow
ii) Incremental in-between flow
iii) Incremental terminal flow
iv) NPV is positive, refund. Otherwise, retain
v) Cost of bond less than rate of alternative investment, don't refund
Cost of bond > rate of alternative investment, refund

14. Effect of increase or decrease in yield to Current market price

Increase in Yield
CMP - (CMP X Increase in Yield X Volatility)

Decrease in Yield
CMP + (CMP X Decrease in Yield X Volatility)

15. Pricing of bond

Relationship	Price of bond
Coupon rate < Yield	At Discount
Coupon rate = Yield	At Par
Coupon rate > Yield	At Premium

8. RISK ANALYSIS

1. Real options in Capital budgeting

a) Investment Timing Option

An option to wait before making additional Investment

Steps:

i. Compute NPV as of now
ii. Compute NPV after waiting period
iii. If NPV is positive then accept the option
iv. Real option value = Positive NPV after deferment(waiting period)
v. Option premium = Price reduction / Erosion in margin

b) Growth Option

An option to expand or vary the output

Steps:

i. Compute NPV for initial investment
ii. Compute NPV for option to expand the investment
iii. Worth of project with option = NPV for initial investment + Value of option
iv. Compare the worth of project with & without option and select which is having positive NPV

c) Put Option

An option to shrine or abandon an investment

Steps:

i. Compute NPV of project
ii. Abandon at the end of year
iii. Compute the NPV if project is Successful & Unsuccessful
Expected value with option

Event	NPV	Probability	Expected NPV
Successful			
Unsuccessful			

iv. Value of option = NPV of project without option + Expected value of option
v. If value of option is positive then accept the project

2. Z Values

$$Z = (X - \ddot{X}) / \sigma$$

X - Desired NPV
$\ddot{X}$ - Originally estimated NPV
σ - Standard deviation of possible NPVs

Value of Z	Impact
Positive	Z falls in Right Tail
Negative	Z falls in Left Tail

Tail	Requirement	Action Add / deduct to arrive Z value
Left	Greater than	Add to 0.5
Left	Less than	Deduct from 0.5
Right	Greater than	Deduct from 0.5
Right	Less than	Add to 0.5

3. Hiller's Model

Types of Cash flow

Independent Cash flow	Dependent cash flow
Cash flow of succeeding years not depend on earlier years	Cash flow of succeeding years are perfectly correlated to earlier years
Uncorrelated Cash flows	Correlated Cash flows
Less Risk	High Risk

Steps:

A. Independent Cash Flows

i. Compute Expected cash flows

Year	Cash flows	Probability (P)	Expected Cash Flow = Cash flow X P

ii. Compute NPV

Year	Expected cash flow	Discount factor	Discounted cash flow

iii. Compute Variance of cash flows

Year	Cash flows	Deviation (D)	Probability (P)	PD^2

iv. Double discount the variance

Year	Variance	Double discount factor $(1+r)^{2\eta}$	Value

v. Standard Deviation = √ Total value of discounted variance

Steps:

B.Dependent Cash Flows

i. Compute Expected cash flows

Year	Cash flows	Probability (P)	Expected Cash Flow = Cash flow X P

ii. Compute NPV

Year	Expected cash flow	Discount factor	Discounted cash flow

iii. Compute Variance of cash flows

Year	Cash flows	Deviation (D)	Probability (P)	PD^2

iv. Compute Standard Deviation = √ PD^2

v. Discount the Standard Deviation (σ)

Year	σ	Discount Factor	Discounted σ

4. Probability

Probability Distribution - Indicates the range of possible outcomes

Steps:

i. Chance of occurrences is assigned a numerical value

ii. Expected Value = Simple Average of Possible values

iii. ∑ P X R

P = Probability

R = Value

Year	**Cash flow**	**Probability (P)**	**Expected Value = Cash flow X P**

Statistical Formula of Expected value:

[Most Optimistic value + 4 times Realistic value + Most Pessimistic value] / 6

[Expected value of worst case + (4 X Expected value of Most Likely case)+Expected value of Best case] / 6

5. Standard Deviation (σ)

Measure of Risk

$\sigma = \sqrt{\sum PD^2}$

Year	Cash Flow	Probability	Expected Cash flow	Deviation	P X D X D
	CF	P	X	$D = X - \ddot{X}$	PD^2

Higher σ	High Risk
Lower σ	Low Risk

Decision:

Aggressive Investor	Prefer project with Higher Return
Conservative Investor	Prefer project with Lower Risk

Project Selection:

Two projects having-

A. Same Return - Select project with Lower Risk

B. Same Risk - Select project with Higher Return

C. Different levels of Risk & Return - Choice depend on risk preference of investor

6. Risk Adjusted Discount Rate (RADR)

- All projects are not discounted at same rate.
- Cut-off discount rate should be adjusted upward/ downward to take care of additional/lower risk element.

RADR = Cut-off rate + Risk Premium

Cut-off rate = Regular Cost of Capital based on capital structure

Irving Fisher Model

(1 + Base discount rate) X (1 + Risk premium) = (1 + RADR)

RADR Vs CEF

Particulars	CEF	RADR
Adjusting Factor	Cash flows	Discount Rate

Discount Rate	Risk free rate	Risky rate

7. Certainty Equivalent Factor (CEF)

CEF = CCF / UCF CCF = Cash Flow X Certainty Factor UCF = CCF X CEF

CCF - Certain Cash Flow
UCF - Uncertain Cash Flow

Steps:

i. Compute CCF

Year	Cash flow	Certainty Factor	CCF

ii. Compute NPV by discounting certain (assured) cash flows at risk free rate

Year	CCF	Discount Factor	Discounted CCF

iii. NPV is positive - Accept the project

iv. NPV is negative - Reject the project

8. Simulation

Steps:

i. Define the problem & lay down the NPV model

ii. Identify the parameters & exogenous variable
Parameters: a)Initial Investment)Project life & c) Cost of Capital

Exogenous Variable: Revenue & Cost (Cash flows)

iii.Specify Rupee value & Probability

Sl.No	Cash flow	Probability	Cumulative Probability

iv. Generate random number class intervals for exogenous variable

Sl.No	Probability	Cumulative Probability	Random digit allocation

v. Assign random numbers & ascertain value

Random Number	Range	Cash flow

vi. Solve the model & compute NPV

9. Sensitivity Analysis

Measure the % of change in input parameter which lead to reversal of investment decision i.e., NPV turns Zero

Parameter	Direction of change
Size	↑
Cash flows	↓
Life	↓
Discount Rate	↑

Sensitivity % = (Change / Base) X 100

Sales - Sensitivity % = (NPV / PV of sales) X 100
Cost - Sensitivity % = (NPV / PV of Cost) X 100
Initial Outlay - Sensitivity % = (NPV / Initial Outlay) X 100

Project is more sensitive when Sensitivity % is Lower
Project is least sensitive when Sensitivity % is Higher

10. Joint Probability

Steps:

i. Identify the various paths or outcome

ii. Compute Joint probability = eg., Year 1 probability X Year 2 Probability

iii. Compute NPV of each path

Particulars	Path 1	Path2	Path3
Year 1			
PV of Cash flows			
NPV of the year			
Joint Probability			
Expected Outcome = NPV X Joint Probability			

iv. Compute Expected NPV = Sum of Expected outcome

v. If Expected NPV is positive - Accept the project

vi. If Expected NPV is negative - Reject the project

11. Selection of Project

Select the project having-

i. Higher Expected NPV
ii. Lower Standard Deviation
iii. Higher Profitability Index
iv. Lower Risk
v. Lower Pay back period
vi.Higher Accounting Rate of Return

Profitability Index = Present value of Inflow / Present value of Outflow
Present value of Inflow = NPV + Present value of Outflow

Pay Back period

Even Cash flows	**Uneven Cash flows**
Pay Back period = Initial Investment / Annual cash inflows	Completed years + (Remaining Amount / Available Amount)

Accounting Rate of Return (ARR)

Average Annual PAT / Average Investment

Average Investment = (Initial Investment + Salvage value) / 2

12. Risk Analysis

Higher Standard Deviation	**Higher Risk**
Higher Discount Rate	
Lower Certainty Equivalent Factor	
Correlated Cash flows	
Higher Co-efficient of Variation	
Uncorrelated Cash flows	**Lower Risk**

13. Co-efficient of Variation

Standard deviation / Expected NPV i.e., σ / (NPV X Probability)

9. BUSINESS VALUATION

1. Asset based valuation

Value of assets
(-) Value of liabilities
(-) Preference share capital
Net assets available to equity shareholders

Value per equity share = Net assets available to equity shareholders/ No. of equity shares

Basis of valuation

A. Assets

1. Tangible fixed assets - Current cost
2. Intangible fixed assets - Current cost
3. Goodwill - Ignore book value, consider new value
4. Quoted investments - Market price
5. Unquoted investments - Book value after adjusting loss
6. Inventories -Cost or market price
7. Debtors - Realizable value (Adjust bad debts)
8. Development expenses - Under expansion of old project or entering new project
9. Value of capital WIP - Current cost
10. Miscellaneous expenses & Losses - Fictitious assets (hence ignored)

B.Liabilities -All liabilities are considered at redemption amount i.e. considering discount or premium

1. Short term liability (current liability)
2. Long term liability (debenture/loan)
3. Provision for tax
4. Contingent liability
5. Prior period adjustments
6. Preference share capital
7. Arrears and proposed preference dividend
8. Proposed equity dividend (Only in case of computing ex-dividend value of shares)

Proposed equity dividend

Compute value per share on the basis of

Ex dividend	**Cum dividend**
Deduct proposed dividend from the asset value and derive net asset value	Don't deduct proposed dividend from the asset value while deriving net asset value

2. Earnings Yield method

PE ratio model

Steps:

1. Compute FMOP = Future Maintainable Operating Profits (after deducting pref. dividend)
2. Determine NRR/market return expectation %
3. Adjust the industry NRR for the risk factors applicable to the company
4. Capitalized value of FMOP = Step 1 / Step 3
5. Total assets available to equity shareholder = Step 4 + Non trade investments
6. Value per equity share = Step 5 / No of equity shares

Return on capital employed (ROCE)

Steps:

1. Compute current return on capital employed
2. Compute latest capital employed
3. Compute return by multiplying capital employed with return on capital employed
4. Capitalize the value of step 3 at market rate of return to arrive the value of the firm

ROCE is meaningful only if expressed in current cost figures

3. Dividend Yield Method

Steps:

1. Compute Future maintainable dividend rate or dividend rate for the current year = Distributable profits/Paid up value of equity capital
2. Normal rate of dividend/market dividend expectation for the industry as a whole
3. Adjusted for the risk factors - Risk adjusted dividend rate
4. Value per share = Paid up value per share X Company's dividend rate/Step 3

Note: Dividend yield method & earnings capital method will have same NRR When company has 100% dividend payout ratio

Dividend based valuation

1. No growth in dividend

Current share price = D_1/K_e

2. Constant growth in dividends

Current share price = $D_1/(K_e - g)$

3. Stepped up growth

a) compute dividend till the end of the year in which the final change in dividend takes place

b) Assume certain Ke at the beginning of the year in which the final change in dividend takes place
Price at the beginning of the year = $D_n/(K_e - g)$

c) compute the present value of dividend and market price at assumed K_e
If this equals current market price, the assumed K_e is final K_e.

$D_1 = D_o$ X (1+g)

4. Productivity factor method

Steps:

1. Simple average or weighted average of return on capital employed
   Return on capital employed = PBIT/Capital employed
2. Capital employed on valuation date
3. Future Maintainable profit before interest and tax
   = Step 2 X Step 1
4. FMOP = Step 3 - Interest on debt - tax - preference dividend
5. Determine NRR/Market return expectation for the industry as a whole
6. Capitalized value of FMOP = FMOP/Risk adjusted NRR
7. Total asset available to equity share holder = Step 6 + Non trade investments
8. value per share = Step 7/ No of equity shares

5. Price earning multiple method

Steps:

1. Compute present EPS or future maintainable EPS
   EPS = Profits after tax/No of equity shares
2. PE ratio should be ascertained for the representative company in the industry are being valued and not for the company whose shares.
   PE ratio = Market price per share/ Earnings per share
3. Value per share = Step 1 X Step 2

Note:
Productivity factor method & PE multiple method - Variant of earnings capitalized method
i.e. NRR = 1/ PE ratio

6. Discounted cash flow method

Steps:

1. Computation of free cash flows
2. Determination of discount rate
3. Computation of present value

4. Estimation of terminal value
5. Value of firm = Step 3 + Step 4

7. Terminal value

Multiplier approach	Perpetuity approach	Growing perpetuity	Book value
Last year profit X PE multiple	Free cash flow/Discount rate	cash flow X $(1+g)/(K_e-g)$	Forecasted book value of capital X Market to book ratio

8. Valuation

Calculation of Profit After Tax(PAT)	XXX
Profit before interest & tax (PBIT)	XXX
Less: Debenture Interest	XXX
Profit before tax (PBT)	XXX
Less: Tax	XXX
Profit after tax (PAT)	XXX
Less: Preference dividend	XXX
Less Equity dividend	XXX
Retained Earnings	XXX

Interest & Fixed Dividend coverage=(PAT + Debenture interest) /(Debenture interest + Preference dividend)

Capital Gearing Ratio = Fixed Interest bearing funds / Equity shareholders funds

Fixed Interest bearing funds = Preference share capital + Debentures

Equity shareholders funds = Equity share capital + Reserves

Yield on Equity shares % = (Yield on shares / Equity share capital) X 100

Expected Yield on Equity shares
Assume Risk premium as
1% for every one difference for Interest & fixed dividend coverage
2% for every one difference for Capital Gearing ratio

Risk premium =Given Average Ratio - (Calculate ratio X % for difference)
Normal return expected
+ Risk premium for low interest & fixed dividend coverage
+ Risk premium for high Interest gearing ratio

Value of Equity share = (Actual yield / Expected yield) X Paid-up value of share

Ke = (1/PE ratio) X 100

9. CAPM based valuation

CAPM is used to arrive at the initial listing price of share and market price of unlisted firm

Steps:

1. Determination of Beta
2. Return using CAPM

   $R_f + \beta (R_m - R_f)$
3. Compute market price using dividend growth model
4. Assessing the price payable Step 3 X (estimated market price - discount)
5. Value of shares = Price per share X Number of shares

Fair value

It is ascertained under Berliner method

Berliner method = Average of net asset value & EPS capitalization

10. Chop-Shop approach/Break even value approach

- ✓ Identify firm's business segments.
- ✓ Calculate average capitalization ratios.
- ✓ Calculate theoretical market value based on each of average capitalization ratio.
- ✓ Average the theoretical values to determine Chop-shop value.

10. MERGERS & AQUSITION

1. Present EPS & PE Ratio

Particulars	Acquiring company	Target company
No of equity shares		
EAT or PAT		
EPS = EAT/No of equity shares		
Current market price = EPS X PE ratio		
PE ratio = MPS/ EPS		
Market value after Merger = Earning X PE ratio		

EAT - Earning after tax
EPS - Earnings per shares
MPS - Market price per share

2. Shares issued to targeted company

No of shares outstanding in targeted company X Exchange ratio or Swap ratio

3. Equivalent EPS of target company after Merger

= EPS of merged company/Swap ratio

4. Exchange ratio

Based on any one of the following factors

Methodology

Exchange ratio/Swap ratio = Relevant factor of target company/Relevant factor of acquiring company

a) Earnings per share = EPS of Target firm / EPS of Acquiring firm
b) Book value per share = BV per share of Target Co., / BV per share of Acquiring Co.,
c) Market price per share = MPS of Target Co., / MPS of Acquiring Co.,
d) Fair value per share = FV per share of Target Co., / FV per share of Acquiring Co.,
e) any other basis

Book value per share = Total Equity shareholder's fund / Total number of Equity share

Return on Equity (ROE)= (Earnings for Equity shareholder / Total Equity shareholder fund) X 100
EPS = Book value per share X ROE

Compute Exchange ratio = EPS of two companies before merger in the following cases

a) Earnings available to shareholders will not be diminished by the merger

b) Acquiring company's pre merger and post merger EPS are to be same

c) Acquiring company wants to ensure the earnings to the members as before the merger takes place

d) Without dilution of EPS

In the above cases, EPS before merger = EPS after merger

5. Terminal cash flow

Cash flow X (1 + growth)/(k_e - g)

6. Minimum & Maximum exchange ratio

$$\text{Exchange ratio} = \frac{\text{[(Value + gain) of target company] X outstanding shares of acquiring company}}{\text{[(Value + gain) of acquiring company] X outstanding shares in target company}}$$

$$\text{Minimum exchange ratio} = \frac{\text{[(Value + gain) of target company] X outstanding shares of acquiring company}}{\text{[(Value) of acquiring company] X outstanding shares in target company}}$$

$$\text{Maximum exchange ratio} = \frac{\text{[(Value) of target company] X outstanding shares of acquiring company}}{\text{[(Value) of acquiring company] X outstanding shares in target company}}$$

7. Impact of EPS under 2 alternatives

Particulars	Alternative 1	Alternative 2
a) Perspective of shareholders of acquiring company EPS after merger (-) EPS of acquiring company before merger Change in EPS		
Effect for shareholders of acquiring company - No change or increase/decrease		
b) Perspective of shareholders of target company EPS after merger EPS originally held in target company (EPS after merger X exchange ratio) (-) EPS of target company before merger Change in EPS		
Effect for shareholders of target company - No change or increase/decrease		

8. Evaluation from acquiring company's perspective

From the point of view of acquiring company, the method under which preferred lowest shares are issued to target company is

9. Capital budgeting decision

$K_e = (D_1 / P) + g$

K_e - cost of capital, D_1 - expected dividend, P - current market price (MPS), g = growth

$P = D_1/(K_e - g)$

10. Weighted average PE multiple = Combined market capitalization/Combined earnings

Steps:

1. Compute NPV
2. IF NPV is positive, merge two companies. If it is negative, don't merge.

11. Steps in case of cash deal

1. Synergy gain
2. Less true cost of acquisition
3. Net gain to acquiring company

True cost of acquisition = Consideration (-) Market value of target company

12. Steps in case of stock alternative

1. Synergy gain
2. Less true cost of acquisition
3. Net gain to acquiring company

True cost of acquisition = (Theoretical post merger price X shares issued) - Market value of target company

Theoretical post merger price = New EPS of merged entity

$$\text{New EPS of merged entity} = \frac{\text{(Market value of Acquiring Co., + Market value of Target Co., + Synergy Gain)}}{\text{Shares of Acquiring Company + Shares issued to Target Company}}$$

13. Free float capitalization

Total market capitalization of merged entity
Less: Promoter's holding
Free float market capitalization

14. Factors determining acquiring company to be financially stronger or better performing company

If a company has higher

- EPS
- PE ratio
- Return on Equity = Profit after tax/(Share capital + Reserves)
- Book value or intrinsic value = Net worth/No of shares
- Growth rate = Return on equity X Retention ratio
- Retention ratio = 100% - Dividend payout ratio

If all the above are higher, then the company is considered as financially stronger.

Financially stronger companies considered as acquiring company

15. Price offered for cash offer

Price offered for cash offer < price determined under share offer
Cash offer - Less risk
Share offer - More risk

11. PORTFOLIO MANAGEMENT

1. Return

Methods to compute Return

i) Arithmetic mean

$(R_1 + R_2 + R_3 + \ldots..R_{N)\,/\,N}$
R1= Return in Year 1, N =No of years

ii) Holding Period Return (HPR)

$(1+R_{1)}$ X $(1+R_2)$ X …….X $(1+ R_N)$

iii) Annual Simple Return (ASR)

HPR/N

iv) Compounded Annual Rate of Growth (CARG)

IRR (Most accurate representation of return)

Return from Listed securities

R = { (P1 - P0) + D1 } / P0

R - Return from Investment during the period

P_1 - Market price at the end of the period

P_0 - Market price at the beginning of the period

D_1 – Dividend

Note: Capital appreciation = P_1 - P_0
If period is less than 1 year, annualize the result

Expected return

Weighted average return with probability being assigned weights = ∑ P X R

P - Probability, R – Return

Note: Other things remaining the same, Securities with higher return should be preferred.

2. Risk

Standard deviation = $\sqrt{\sum} Pd^2$

$\bar{R}$ - Arithmetic Mean

d = R-$\bar{R}$

σ2=Variance

σ=Std deviation

P=Probability

Note: Other things remaining the same, Securities with lower risk should be preferred.

Probability distribution of possible outcome is;

Symmetrical - Std deviation is an acceptable measure

Not Symmetrical - Std deviation is not an acceptable measure

Risk includes both positive & negative deviation from anticipated levels

Deviation - Positive - Upside Risk	**Deviation - Negative - Downside Risk**
Actual Return > Expected Return	Actual Return < Expected Return

3. Diversification (Defensive strategy)

i) Investing in more than one security; one line of business
ii) Only reduces risk & not enhance returns

4. Dominance

Rules:

i. If return of two security are different but their risk (Standard deviation) are same

Decision: Security with higher return is preferred

ii. If return of two security are same but their risk (Standard deviation) are different

Decision: Security with lower risk is preferred

iii. If risk and return of two security are different

Decision: Security with lower Co-efficient of variation is preferred

A dominates B: A= Dominating / Efficient stock , B = Dominated / Inefficient stock

All dominates stocks will be rejected & only the efficient stocks will form part of the Portfolio

Efficiency frontier

If the efficient stocks are plotted on a graph with Return on Y axis and Risk on X axis are joined by a line, the resultant line is called Efficiency Frontier.

This helps to decide whether a new stock can be selected or rejected

Above the frontier	Below the frontier	On the frontier
Stock dominates some security on previously drawn frontier - Frontier will have to be redrawn	Stock is dominated by some security - Reject the stock	Stock is an efficient stock - Select the new stock

Co-efficient of Variance (%)

CV = σ/R X 100
σ - Std deviation
R - Mean of return

Stock with lower CV will be selected

5. Alpha

i) indicator of the extent to which the actual return of a stock deviates from those predicted by its beta value
ii) A share's alpha value is a measure of its abnormal return & represents the % by which the share's returns are currently above or below the required return given its systematic risk

Alpha = Return mandated by CAPM - Actual return earned
i.e simple average of (Return by CAPM - Actual return)

If CAPM holds good, then Alpha = Zero
Alpha of a well diversified portfolio = Zero

Alpha	Valuation	Action
Positive	Under	Buy
Zero	Correct	Hold
Negative	Over	Sell

Current Return = Expected CAPM return + Alpha value

6. Non Diversifiable Risk

- Diversification helps in reducing specific risk

- Portfolio risk per se, in which behavior of returns of two or more securities bears a dominant factor, cannot be diversified away

Total Risk

Diversifiable Risk	Non-Diversifiable Risk
Unsystematic risk = Total Risk - Systematic Risk	Systematic Risk = β X σ_m

Systematic Risk = σ_j/σ_m X
Cor.jm

σ_i, σ_m - Risk element in stock (σ_i)
Risk element in stock market
(σ_m)
Cor. Jm - Correlation between stock & market

Capital Market Line

Common Sense approach	**Graphical approach**
$[R_f + (\sigma_i/\sigma_m) X (R_m - R_f)]$	$(E_p - R_f)/\sigma p$

$\lambda = (R_m - R_f)/\sigma_m$

λ - Market price of risk

R_m - Return from market

R_f - Risk free ROR
σ_m - Standard deviation of Market

Attitude of market to Risk-Return trade-off = $R_f + (\lambda X \sigma_j)$

7. Beta

β	**Nature**	**Investor**	**Risk**	**Speed**	**Preference**
> 1	High	Aggressive	Higher	Faster	Rising market
= 1	Unity	Copy cat	Same	Same pace	Sideway market
< 1	Low	Conservative	Lower	Slower	Falling market

i) To calculate Beta of single security

$$\beta = \frac{\sum xy - n \ddot{X} \ddot{Y}}{\sum y^2 - n\ddot{Y}^2}$$

X - Return from stock
Y - Return from market
$\ddot{X}$ - Arithmetic mean of ROR of stock
$\ddot{Y}$ - Arithmetic mean of ROR of market
n- no of observations

Observation	**Y**	**x**	**xy**	**y^2**

ii)

β= Covariance j_m/Variance m

= Cov j_m/σ^2_m

$= \frac{\sum dxdy}{\sigma^2_y}$

Observation	Y	x	Deviation d_y	Variance d_y^2	d_y	Cov. ($d_x d_y$)
Total				σy^2		Cov.xy

β= Covariance between stock & market
Variance of market

iii)

β= σ_i/σ_m X Correlation j_m

σ_i - S.D of stock

σ_m - S.D of market

Correlation j_m - Correlation between returns from stock & market

Correlation co-effcient (Cor jm) = Cov $j_m/(\sigma_i$ X $\sigma_m)$

Observation	y	x	d_y	d_x	dy^2	dx^2	$d_x d_y$
Total							

$\sigma_y = \sqrt{\sum d_y^2}$

$\sigma_x = \sqrt{\sum d_x^2}$

Correlation = $\frac{\sum dxdy}{\sigma_x \text{ X } \sigma_y}$

x- Stock, y – Market

Beta of a Portfolio

i) compute value weights

ii) compute weighted Beta

Security	Weighted Investment	Beta	Weight X Beta

Slope (Beta)	Indicate
> 1	Change in risk premium > Rate of change in market
< 1	Change in risk premium < Rate of change in market
= 1	Change in risk premium = Rate of change in market

8. Capital Asset Pricing Model

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

R_j = Expected return

Revised expected return = Expected return (R_j) + [β X Increase or decrease in risk premium]

Risk premium = β X Market risk premium

Security Market Line

If Beta is higher, risk premium to market will be high.

SML shows how expected ROR depends on Beta

Risk free rate

In CAPM, there is only one risk free rate

If there are two rates in the problem,

Aggressive approach	Consider higher rate
Conservative approach	Consider lower rate
Moderate approach	Consider simple average of higher & lower rates

Undervalued & Overvalued stocks

Price relationship	Return relationship	Valuation	Action
AMP < FMP	CAPM < Expected return	Under	Buy
AMP = FMP	CAPM = Expected return	Correct	Hold
AMP > FMP	CAPM > Expected return	Over	Sell

AMP - Actual Market Price, FMP - Fair Market Price

9. Portfolio

i) Return of Portfolio (Weighted average return of the security)

First principle

i) convert securities into portfolio with help of
investment weight & arrive the return

$R = \sum(W \times R)$

ii) Now portfolio resembles single stock,
compute return = $\sum(P \times R)$

No	R_A	R_B	R = Return R_A X W + R_B X W and so on	Probability P	P X R

Formula based

i) compute the expected return by taking into account the probability of occurrence

$R=\sum(W \times R)$

ii) compute return of portfolio = $\sum(W \times R)$

No	Security	Weight W	Return R	W X R

ii) Risk of portfolio

Risk can be measured using two statistical tools

i) covariance

ii) coefficient of correlation

i) Covariance

Measurement of co-movement between 2 variables

Covariance	Return of 2 securities/assets
Positive value	Tend to go together
Negative value	Tend to offset each other
Zero value	No distant relationship between movements in returns

Covariance=$\sum Pd_xd_y$

Security	Probability P	Return X	Return Y	d_x= X-$\ddot{X}$	D_y= Y-$\ddot{Y}$

ii) Correlation coefficient

Measure of closeness of relationship between two random variables

Ranges between -1 & +1

Correlation coefficient	Relationship
0	Returns are unrelated
-1	Perfect negative correlation
+1	Perfect positive correlation

Correlation coefficient= Covariance $_{xy}/(\sigma_x X \sigma_y)$

Measuring risk in portfolio of 2 securities

Two methods

i) First principle

First principle

i) compute return of each outcome using

∑(W X R)

ii) Compute portfolio return

iii) compute S.D = $\sqrt{\sum Pd^2}$

No	R_A	R_B	R = Return R_A X W + R_B X W and so on	Probability P	P X R	Deviation d	Pd^2

ii) Formula based

i) consider S.D of each security

ii) proportion/weight of investment in each security

iii) covariance of pair of securities

$$\sigma = \sqrt{[\sigma x2 \text{ X } Wx2]+[\sigma y2 \text{ X } Wy2]+ [2 \text{ X } \sigma x \text{ X } \sigma y \text{ X } Wx \text{ X} Wy \text{ X Covariance of XY}]}$$

Risk reduction

Actual risk of portfolio is less than the weighted average risk of securities that constitute the portfolio

Relationship between correlation & risk reduction

Value of correlation	Nature of correlation	Movement of return	Risk reduction
+1	Perfect positive	same direction	Not possible
-1	Perfect negative	opposite direction	Can be reduced to zero
0 to +1	Positive	same direction but not in same proportion	Possible but not to zero
0 to -1	Negative	opposite direction but not in same proportion	Possible but not to zero

Determination of portfolio in which risk is lowest

$$W_x = \frac{\sigma_y^2 - \text{Covariance of XY}}{\sigma_x^2 + \sigma_y^2 - 2 \text{ Covariance of XY}}$$

with the given correlation, compute covariance of XY =

σ_X X σ_y X Correlation of XY

$W_y = 100\% - W_x$

Risk in portfolio of N securities

$(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$

S. D = $\sqrt{(a+b+c)^2}$

$a^2 = (W \times \sigma_a)^2$

$b^2 = (W \times \sigma_b)^2$

$c^2 = (W \times \sigma_c)^2$

$2ab = 2 \times W\sigma_a \times W\sigma_b \times$ Correlation of ab

$2bc = 2 \times W\sigma_b \times W\sigma_c \times$ Correlation of bc

$2ca = 2 \times W\sigma_c \times W\sigma_a \times$ Correlation of ca

10. Factor model

Arbitrage pricing theory model

Steps:
i) Identify the macro economic factors
i.e inflation, GNP etc
ii) Assess risk premium for taking on factor risk
iii) re adjust the risk premium to fall in line with sensitivity of selected firm to each of these factors

$R_j = R_f + \beta_1 (R_{m\text{-Interest}} - R_f) + \beta_2 (R_{m\text{-Inflation}} - R_f) + \beta_3 (R_{m\text{-GNP}} - R_f)$

Sensitivity factor (Beta)

Stock	**Forex**	**Interest**	**GNP**
A			
B			
Total			
Beta = Weighted average of total	Beta = Weighted average of total	Beta = Weighted average of total	Beta = Weighted average of total

Market Model

i) R_j = CAPM + Alpha

$R_j = [R_f + \beta(R_m - R_f)] + \alpha$

ii) Situations

If risk adjusted Alpha value is greater than zero or Alpha value is greater than Rf then,

Risk premium =

$$R_j - R_f = \alpha - (R_f \text{ X } (1-\beta)) + (\beta \text{ X } (R_m - R_f)$$

If(R_f X (1-β) = α, then risk premium as per CAPM = Risk premium as per market model

Computation of component of non-diversifiable risk of shares

Steps:

i) Expected return of the company

$R_j = R_f + \lambda (\sigma_{AB} \text{ X } P_{AB,m})$

λ = Market attitude to risk and risk - return trade off

σ_{AB} = Standard deviation of returns of company AB limited

$P_{AB,m}$ = Degree of correlation between AB limited & Market

R_f = Risk free rate

ii) Excess return over risk free rate = $R_j - R_f$

iii) Risk premium = σ_{AB} X $P_{AB,m}$

iv) Return for non-diversifiable risk= Step ii) - iii)

Expected return

CML Priniple

$[R_f + (\sigma_j/\sigma_m) \text{ X } (R_m - R_f)]$

SML equation

$[R_f + (\sigma_j/\sigma_m) \text{ X } (R_m - R_f) \text{ X Correlation of jm}]$

11. Beta of the firm

Unlevered & Levered

Unlevered - Only equity

i) Singe project

$\beta_L = \beta_A = \beta_O$

ii) Many project

$\beta_L = \beta_A = \beta_O$

β_A = β of Weighted average assets

Project	Weight	CAPM return	Weight X Return
A			
B			
C			
Total			XX = β_A

Levered firm - Both equity & debt

i) single project

β_O = β of weighted average liability

$\beta_{WL} = \beta_d$ (D/V) + β_e (E/V)

V (Value of firm) = D (Debt) + E (Equity)

D = after tax debt if tax rate is given

ii) many project

$\beta_O = \beta_{WA} = \beta_{WL}$

β_{WA} = β of weighted average of assets

β_{WL} = β of weighted average of liabilities

Proxy Beta

i) Compute Beta of Un levered company from Beta of 1st levered company
ii) compute Beta of 2nd levered company from Beta of unlevered company

$\beta_u = \beta_g$ X E/(E+D(1-t))

12. Derivatives

Derivative contract
It is a financial instrument whose payoff structure is derived from the value of the underlying asset

Forward contract
It is an agreement entered today under which one party agrees to buy and the other party agrees to sell a specified assest on a specified future date at an agreed price

Futures contract
It is a standardised contract between two parties where one of the parties commits to buy and the other commits to sell, a specified quantity of a specified asset at an agreed price on a given date in the future

Options contract
An option is a contract between two parties under which the buyer of the option buys the right, and not the obligation, to buy or sell a standardised quantity (contract size) of a financial instrument (underlying asset) at or before a pre-determined date (expiry date) at a price decided in advance (exercise price or strike price)

Derivative instruments

Particulars	**Forward**	**Futures**	**Option**
Standardization	No	Yes	Yes
Price Negotiation	Between buyer & seller	Market determined	Option price Is market determined. Strike price is exchange determined
Liquidity	No	Yes	Yes
Contract closure	By delivery	By delivery or by paying the price differential or by taking an offsetting position	By delivery or by paying the price differential or by taking an offsetting position
Margins	None	Yes	Yes
Guarantor	None	Clearing house	Clearing house
Obligation to perform	Both parties	Both parties	Writer
Profit settlement	End of contract	Daily	Option writer collects premium on T +1

1. Options

A) Parties

Holder	**Writer**
Buyer	**Seller**
One who buys the right	One who grants the right
Right to buy & sell	Obligation to buy & sell

B) Types

Call option	**Put option**

Right to sell by the buyer	Right to buy by the buyer
Obligation to buy by the writer	Obligation to sell by the writer

American option	**European option**
Exercised on any date on or before the expiry date	Exercised only on the expiry date

Party	**Increase in price**	**Decrease in price**
Call holder	Favourable	Adverse
Call writer	Adverse	Favourable
Put holder	Adverse	Favourable
Put writer	Favourable	Adverse

Option	**Right to**	**EP < MP**	**EP > MP**
Call	Buy	Exercise	Lapse
Put	Sell	Lapse	Exercise

C) In-At-Out Money relationship

Relationship	**Call option**	**Put option**
EP < MP	Exercise - In the money	Lapse - Out the money
EP = MP	Indifference - At the money	Indifference - At the money
EP > MP	Lapse - Out the money	Exercise - In the money

EP - Exercise Price, MP - Market Price

D) Kinds of Market

Relationship	**Nature of market**	**Suitable option**
Expected MP > EP	Bullish	Call
Expected MP = EP	Neutral	-
Expected MP < EP	Bearish	Put

E) Intrinsic value

Option	**Relationship**	**Intrinsic value(IV)**
Call	MP > EP	IV = MP - EP
Put	MP < EP	IV = EP - MP

IV arise only in case of "in the money"

IV for cases having OTM & ATM = Zero

F) Time Value

Time value = Option premium - Intrinsic value

Option premium< Intrinsic value, Time value = 0

G) Pay-off table

Steps:

1. Projected Market price or expected Market price
2. Exercise price
3. Action - exercise or indifference or lapse (Compare step 1 & 2)
4. Status in/at/out of the money
5. GPO - Gross Pay Off

GPO = Difference between Market price & Exercise price only in case of ITM

GPO for cases having OTM & ATM = Zero

6. Option premium
7. Net Pay Off (NPO) = GPO + Option premium
8. Draw Pay Off graphs based on the NPO values

Relationship	**Buyer**	**Writer**
GPO	Positive	Negative
Option Premium	Negative	Positive

Note: Amount of GPO & Premium will be same for buyer & writer but sign differs

GPO

Call Option, GPO = MP – EP

Put Option, GPO = EP- MP

Party	**Gains**	**Loss**
Call Buyer	Unlimited	Limited
Put Buyer	Limited	Limited
Call writer	Limited	Unlimited
Put writer	Limited	Limited

Status	**Value of Call**	**Value of Put**
EP > MP	Zero	E - S1
EP = MP	Zero	Zero
EP < MP	S1 - E	Zero

H) Breakeven price

BEP = Market price at which option parties makes no profit or loss

Call Option - BEP = Exercise price + Option Premium

Put Option - BEP = Exercise price - Option Premium

	Call	**Put**
Buyer	MP - EP - P = 0	EP - MP - P = 0
Seller	EP - MP + P = 0	MP - EP + P = 0

I) Value of option contract on expiry

Call option (C_1) = Max (0, S_1 - E)

Put option (P_1) = Max (0, E - S_1)

C_1 - Value of call on expiry

P_1 - Value of put on expiry

E - Exercise price

S_1 - Spot price on expiry date

J) Value of option before expiration

Call option - Under valued - Buy in derivative market & sell in spot market
Put option - Over valued - Sell in derivative market

Under valued - If Premium < intrinsic value

Over valued - If Premium > intrinsic value (No time value of money)

2. Strategies of option

Note: Write the exercise price in ascending order, if it is not given in that order

Spread

Option	Exercise price low	Exercise price high
Call	Higher premium	Lower premium
Put	Lower premium	Higher premium

A) Bull Spread

Buying at E1 & Selling at E2

	Call Option		Put option	
Relationship	**E1**	**E2**	**E1**	**E2**
S1 < E1	Lapse = zero	Lapse = zero	Exercise = (-)(S1-E1)	Exercise = (S1-E2)
E1 < S1 < E2	Exercise = (S1-E1)	Lapse = zero	Lapse = zero	Exercise = (S1-E2)
S1 > E2	Exercise = (S1-E1)	Exercise = (-)(S1-E2)	Lapse = zero	Lapse = zero

B) Bear Spread

Selling at E1 & Buying at E2

	Call Option		Put option	
Relationship	**E1**	**E2**	**E1**	**E2**
S1 < E1	Lapse = zero	Lapse = zero	Exercise = (S1-E1)	Exercise = (-)(S1-E2)
E1 < S1 < E2	Exercise = (-) (S1-E1)	Lapse = zero	Lapse = zero	Exercise = (-)(S1-E2)
S1 > E2	Exercise = (-) (S1-E1)	Exercise = (S1-E2)	Lapse = zero	Lapse = zero

Spread	E1	E2	Option	Initial
Bull	Buy	Sell	Call	Cost or debit
Bull	Buy	Sell	Put	Credit
Bear	Sell	Buy	Call	Credit
Bear	Sell	Buy	Put	Debit or cost

C) Butterfly Spread

	Call Option			Put option		
Relationship	**E1**	**E2**	**E3**	**E1**	**E2**	**E3**
S1 < E1	Lapse = zero	Lapse = zero	Lapse = zero	Exercise = (-) (S1-E1)	Exercise = (S1-E2)	Exercise = (-) (S1-E3)
E1 < S1 < E2	Exercise = (S1-E1)	Lapse = zero	Lapse = zero	Lapse = zero	Exercise = (S1-E2)	Exercise = (-) (S1-E3)
E2 < S1 < E3	Exercise = (S1-E1)	Exercise = (-)(S1-E2)	Lapse = zero	Lapse = zero	Lapse = zero	Exercise = (-) (S1-E3)
S1 > E3	Exercise = (S1-E1)	Exercise = (-)(S1-E2)	Exercise = (S1-E3)	Lapse = zero	Lapse = zero	Lapse = zero

Premium of E2 = Premium E1 & E3

D) Straddle

It involves simultaneous purchase or sale of options with same strike price & same expiry date

Straddle	Call	Put
Long	Buy	Buy
Short	Write	Write

Same number, same Exercise price, same expiry date

E) Strips & Straps

When an investor expects huge change in price, he might either set up strip or strap depending on whether a price fall is more imminent or a price rise

Put is more profitable when price decrease occurs
Call is more profitable when price increase occurs

	Call	Put
Strip	Buy	Buy 2
Strap	Buy 2	Buy

Same exercise price, same expiry date

F) Strangle

It involves simultaneous purchase or sale of options with same expiry date but with different exercise price

Strangle	E1	E2
Long	Buy Put	Buy Call
Short	Write Put	Write Call

G) Box Spread

Simulataneous opening of bull spread & bear spread on same underlying asset
Limited profit can be earned if stock moves in either direction

H) Condors

Involves four call options or four put options
Long condor - Buying Calls or Buying Puts
Short condor - Writing Calls or writing Puts
Exercise price are selected in such a way to satisfy both the following 2 equations

E2 - E1 = E4-E3

E3-E1 = 2 X (E2-E1)

Condor	Options		
Long	Call	Buy Call at E1 & E 4	Write Call at E2 & E3
Long	Put	Buy Put at E1 & E 4	Write Put at E2 & E3
Short	Call	Write Call at E1 & E4	Buy Call at E2 & E3
Short	Put	Write Put at E1 & E4	Buy Put at E2 & E3

Condor	Limited profits	Limited loss
Long	Middle zone	Lower & Upper zone
Short	Lower & Upper zone	Middle zone

I) Caps, Floor & Collar

Caps - Setting the upper limit by strike price of call purchased
Floor - Setting the lower limit by strike price of put sold
Collar - Combination of Caps & Floor

3. Setting up Put

a) when puts are traded, Quote the price

P = C + PVEP - S

Present Value of Exercise Price(PVEP) = EP X e^{-rt}

b) when puts are not traded;

i) Want to buy - Buy a call & sell a share

Investment @ PVEP

ii) Want to sell - Write a call & buy a share

Sell Investment @ PVEP

4. Valuation of option

I. Portfolio Replicating Model

a. Stock Equivalent Approach

i) computation of Call option premium

Only ITM
Steps:
i) Compute intrinsic value of Judgement Prices (JP) on expiry date
ii) No of calls bought = Difference in Stock price (JP)/Difference in Intrinsic values of JP
iii) Present Value of Exercise Price(PVEP) = EP X e^{-rt}
iv) Call option premium (Co) = CMP (So) - PVEP
So = (Co X no of calls) + PVEP

Only OTM
Steps:
No one is willing to buy this call
Hence Option premium = Zero

Both ITM & OTM
Steps:
i) Compute intrinsic value of Judgement Prices (JP) on expiry date
ii) No of calls bought = Difference in Stock price (JP)/Difference in Intrinsic values of JP
iii) Present Value of lowest stock price/Judgement Price = Lowest Judgement Price (LJP) X e^{-rt}
iv) Call option premium (Co) = So - PVLJP
So = (Co X no of calls) + PVLJP

ii) computation of Put option premium

Put call parity therory is used to compute put option premium

So + P = Co + PVEP

Note: Same for Stock Equivalent & Option Equivalent approach

b. Option Equivalent Approach

i) computation of Call option premium

Only ITM
i) Compute intrinsic value of Judgement Prices (JP) on expiry date
ii) No of shares bought = Difference in Intrinsic values/Difference in Stock price/JP
iii) Amount of borrowing = PV[(No of shares bought X LJP) (-) Intrinsic value of J1 price]
[(No of shares bought X LJP) (-) IV at J1] X e^{-rt}
iv) Co = (No of shares bought X So) (-) amount of borrowing

Both ITM & OTM
Same procedures as "Only ITM"

Only OTM
No Option premium

II. Risk Neutral Model

Applicable only to Call option premium

To compute put option premium, use put call parity theory

Steps:

i) Compute intrinsic value of JPs

ii) Compute the % of change - by comparing JP & Current Market Price (CMP)

iii) Compute probability

assume upside probability = P

assume downside probability = 1-P

Upside - Increase in % of change

Downside - Decrease in % of change

iv) Solve the equation

(Downside % of change X P) + (Upside % of change X (1-P)) by equating it to the risk free return

v) Substitute the value of P in step iv equation to get expected value of Intrinsic value on expiry date

vi) Fair call = Present Value of Expected IV (Step v value X e^{-rt})

III. Binominal Model

American Call & Put	European Call & Put
i) Draw the sketch of possible movement in stock price	i) Draw the sketch of possible movement in stock price
ii) Compare EP & MP and identify the status and action	ii) Compare EP & MP and identify the status and action
iii) Compare IV	iii) Compare IV
iv) Consider higher of Expected Value at Later exercise and Value at Immediate exercise	iv) From Right to Left in the sketch - compute the probability of IV & get the final expected MP

IV. Black Scholes Model

Co = [So X N (d1)] (-) [PVEP X N(d2)]

$$d1 = \frac{[NL \times (So/EP) + [r + 0.5 \times \sigma^2] \times t]}{\sigma \sqrt{t}}$$

$$d2 = \frac{[NL \times (So/EP) + [r - 0.5 \times \sigma^2] \times t]}{\sigma \sqrt{t}}$$

NL = Natural Log

N(d1) & N(d2) = Z values of d1 & d2 i.e by adding 0.5 to NL values

If dividend is paid, consider only adjusted So.

Adjusted So = So - PV of dividend paid

5. Futures

Long position	Buys or holds an asset
Short position	Sells an asset

Continuous compounding

$A = P \times e^{rt}$

Continuous discounting

$A = P \times e^{-rt}$

Equivalent rates

Normal to continuous - $r_2 = m(e^{r1/m}-1)$

Continuous to normal - $r_2 = m(e^{r1/m}-1)$

$= r_2/m = e^{r1/m}-1$

$= r_2/m + 1 = e^{r1/m}$

$= \log(r_2/m+1)$

$= r_1/m \log e^{e}$

$r_1 = m \log (r_2/m+1)$

Y = Ln X, then $X = e_y$

r1 - normal rate, r2 - continuous compounding rate, m - frequency of compounding, e - exponential value (+X)

Ln = Natural logarithm

Relationship	Valuation	Borrow or Invest	Forward/ Futures	Spot Market
Actual Future price < Fair Future price	Under valued	Invest	Buy	Sell
Actual Future price > Fair Future price	Over valued	Borrow	Sell	Buy

[Future price/(1+ risk free rate)] ^{n} = Spot price + PV of storage cost - PV of convenience yield

Fair Future Price (FFP)

i) Security generating no income - No dividend

FFP = So X e^{rt}

ii) Dividend paid

Adjusted So = So - PV of dividend paid

FFP = Adjusted So X e^{rt}

iii) Yield - Ratios to dividend in companies & stock price

FFP = So X $e^{(r-y) \times t}$

r - Rate of return, y = Yield

iv) Involve storage costs (Carry type)

FFP = Adjusted So X e^{rt}

Whereas Adjusted So = So + PV of storage costs

v) Involve storage costs (Non Carry type)

FFP = Adjusted So X $e^{(r-c) \times t}$

Whereas Adjusted So = So + PV of storage costs

vi) Storage costs expressed as % of FFP

FFP = So X $e^{(r-y) \times t}$

6. Hedging with Futures

a) Hedging ratio

Hedging ratio (Beta) = (σ Market /σ futures) X Correlation

Spot	**Future**	**Price increase/decrease**	**Impact on price increase/decrease**	
			Spot	**Future**
Long (Buy)	**Short (Sell)**	Increase	Gain	Loss
		Decrease	Loss	Gain
Short (Sell)	**Long (Buy)**	Increase	Loss	Gain
		Decrease	Gain	Loss

b) Cross Hedging

Steps:

i) price of Future contract

So X $e^{(r-y) \times t}$

ii) computation of no of contracts entered into

no units per Future contract = Future contract price - Index price

Value of Future contract = No of units X Future contract price

No of contracts to be entered = (Portfolio value X Beta of Portfolio)/Value of Future contracts

iii) computation of gain on short Future position

Contract Future price

Less index position

Gain per unit of index

No of units per contract

Gain per contract = Gain per unit of index X No of units per contract

Total Gain = No of contracts X Gain per contract

c) Hedging with index future

Index value or Future value = Portfolio amount X Hedge ratio or Beta ratio

Trend	**Action in stock market**	**Position in index market**
Rise	Buy/long	Sell/short
Fall	Sell/short	Buy/long

d) Stock Hedging

i) No of future contract to be bought or sold

(β X No of units of spot position requiring hedging) /No of units underlying in Future contracts

ii) Increase or fall in index due to increase or decrease in share price

(Amount fallen or Amount increased)/β

Portfolio (Beta) - Increase in risk		**Portfolio (Beta) - Decrease in risk**	
A) Buy stock	B) Buy Futures	C) Sell stock	D) Sell Futures
Sell Risk free investment	Keep portfolio intact	Buy risk free investment	Keep portfolio intact

Combination of A & C - Case I

Combination of B & D - Case II

<u>Combination of A & C - Case I Steps</u>

i) compute weights = (Price X Qty)/total value of stocks

ii) compute weighted Beta

iii) Assume

Weight of stock in new portfolio = W_1

Weight of risk free investment = 1-W_1

Weighted Beta of new portfolio = [W_1 X (Step ii)] + [(1-W_1) X 0] = Portfolio (Beta) given

iv) solve the above equation and get the values of W_1 & 1 - W_1

v) compute value of portfolio to be sold using

(1-W_1) values X No of index sold X weights (step i)

<u>Combination of B & D - Case II Steps</u>

No of index contract to be sold or bought

= [Portfolio value X (Old Beta - Desired Beta)]/Value of Future contract

7. Arbitrage

Option type	Status	Action on Option	Action on stock
Call	Under valued	Buy	Sell
Call	Over valued	Sell	Buy
Put	Under valued	Buy	Buy
Put	Over valued	Sell	Sell

a) Call option

Theoretical minimum price = Current stock price (S_o) - Present value of exercise price (PVEP)

Cashflows to make profit for the arbitrager

i) sell stock at spot price - S_o
ii) Less buy call option (given)
iii) Invest the remaining proceeds of stock in risk free investment
iv) Receive the maturity value of investment (Investment X e^{rt})
v) Less buy stock at exercise price
vi) net gain made (iv-v)

Theoretical minimum call price < price of call	Call is under priced
Theoretical minimum call price > price of call	Call is over priced

b) Put option

Cashflows to make profit for the arbitrager

i) Borrowed amount - (S_o + value of put option)
ii) Less buy put option (given)
iii) Buy stock at spot price S_o
iv) Exercise the put option
v) Less repay the amount of borrowing (Borrowed amount X e^{rt})
vi) net gain made (iv-v)

Value of put option > Theoretical minimum price	Put is under priced
Value of put option < Theoretical minimum price	Put is over priced

13. Forex Derivatives

1. Forex Futures

Relationship	Arbitrage	Action
Forward Bid rate > Future rate	No	Buy at higher price & sell at lower price
Forward Ask rate > Future rate	Yes	Selling at a price higher than purchase price
		Gain = No of contracts X (Forward Ask rate - Future rate)

2. Forex Options

Cost of buying a call = Forward rate + Option premium + PV of Option premium

3. Forward Interest Rate

i) Zero rate (Implied interest rate at time 0)

1. Capital gain = Redemption price - Current Market price
2. Annual Interest = Capital gain X Interest rate
3. Total Interest = Annual Interest X Period (No of years)
4. Total Income to the bondholders = Capital gain + Total Interest
5. Income per annum = Total Income/ Period of bond
6. Implied Interest rate = Income per annnum/Current Market price

ii) Forward rate

For Year 1 = Implied Interest rate of Year 1

For Year 2 = [(R2 X T2) - (R1 X T1)]/(T2-T1)

R1, R2 - Implied interest rate of Year 1 & Year 2

T1, T2 - Time period of Year 1 & Year 2

Continuous compounding rate = $[(R_n \text{ X } T_n) - (R_{n-1} \text{ X } T_{n-1})]/(T_n - T_{n-1})$

4. Interest Rate Futures

Term	Means	Interest
Buying	Investing	Receive
Selling	Borrowing	Pay

Interest rate expectation	Asset	Liability
Down	Buy	Sell
Up	Sell	Buy

5. Hedging with Interest Rate Futures

Expectation on Interest rate	To go up	To come down
Action	Sell first, close out by buying	Buy first, close out by selling
Effect, if interest rate rises	Gain from futures	Lose in futures
Effect, if interest rate falls	Lose in futures	Gain from futures

6. Interest Rate Swap

Situation	Movement from	Movement to
	Strong	**Weak**
Δ Fixed rate > Δ Floating rate	Fixed	Floating
Δ Floating rate > Δ Fixed rate	Floating	Fixed

From Fixed to Floating

Steps:

i) compute Δ fixed rate

ii) compute Δ floating rate

iii) compute net difference = i) - ii)

iv) Split the difference/gain between the strong & weak companies in an agreed ratio

v) perform sequence of operations

Strong company	Weak company
a) Pay bank the contracted fixed rate	e) pay bank the contracted floating rate
b) Receive from counterparty (a + share of gain)	f) Receive from strong company (c)
c) Pay counterparty the floating rate which the strong company is entitled to in the market	g) Pay the strong company (b)
d) a + b + c	h) e + f + g

From Floating to Fixed

Steps:

i) compute Δ fixed rate

ii) compute Δ floating rate

iii) compute net difference = i) - ii)

iv) Split the difference/gain between the strong & weak companies in an agreed ratio

v) perform sequence of operations

Strong company	Weak company
a) Pay bank the contracted floating rate	e) pay bank the contracted fixed rate
b) Receive from counterparty (a + share of gain)	f) Receive from strong company (c)
c) Pay counterparty the fixed rate which the strong company is entitled to in the market	g) Pay the strong company (b)
d) a + b + c	h) e + f + g

7. Interest Swap Vs Currency Swap

Interest Swap	Currency Swap
Payment streams that are exchanged are denominated in one single, common currency	Payment streams that are exchanged are denominated in two different currencies

8. Interest Rate Options – Collar

Action	Meaning
Buying a cap	Buying a put
Buying a floor	Buying a call

Collar for	Buy	Sell	Buy/Sell
Investment	Cap	Floor	Buy at Put; Sell at Call
Borrowing	Floor	Cap	Buy at Call; Sell at Put

9. Money Market Hedging

Steps:

i) Identify foreign current asset or liability

ii) Settle - Encash the asset & settle the liability i.e. Realise and repay

iii) Invest the money borrowed

Investment = Step 1/Interest rate for the given period

iv) Convert the money borrowed into foreign currency

Step iii) X Ask Spot rate

v) Repay the loan = Step iv)+ Interest amount

14. International Finance - Basics

1. Direct & Indirect Quote

Nature of quotation	Expression	Price 1st currency	Product 2nd currency
Direct quote	HC per unit of FC	HC	FC
Indirect quote	FC per unit of HC	FC	HC

Direct quote = 1/Indirect quote

American Terms - Direct quote in America
European terms - Indirect quote in America

Generally all currencies are expressed only in American terms except currencies like Pound, Euro, New Zealand dollars, South African Rand, AUD dollars

2. Bid, Ask, Spread & Middle Rate

Bid - Banks buying rate
Ask - Banks selling rate
Spread = Ask – Bid
Middle rate = (Ask + Bid)/2

	Spread	
	Narrow	**Wide**
Exchange rate	Stable	Volatile
Market depth (volume of transactions in the market)	Deep	Shallow

	Banks	
	Buy	**Sell**
Bid	Pdt	Price
Ask	Price	Pdt

Bid comes 1st & Ask comes next
Bid never be greater than Ask

3. Cross Rate

Bid (A/B) = Bid (A/C) X Bid (C/B)
Ask (A/B) = Ask (A/C) X Ask (C/B)

Bid(A/B) = 1/(Ask(B/A))
Ask(A/B) = 1/(Bid(B/A))

Numerator – Price; Denominator – Product

4. Forward Rate

Relationship	Price (HC)	Product (FC)
Fwd rate > Spot rate	Depreciate	Appreciate
Fwd rate < Spot rate	Appreciate	Depreciate

Product = (F-S)/S X 100 X 12/m
Price = (S-F)/F X 100 X 12/m

If result is positive - Appreciating
If result is negative - Depreciating

Forward rate = Spot Rate X $(1+r/m)^{n \text{ X } m}$
r - Rate of interest p.a, m- no of compounding in a year, n - no of years

Forward rate = Spot rate X [(1+ home currency rate)/(1+foreign currency rate)]

Forward discount = (Fwd rate - Spot rate)/Spot rate X 100 X 12 months/Fwd period

Appreciate - Trading at Premium
Depreciate - Trading at Discount

Exchange rate on maturity	xxx
Less: Purchase price	xxx
Less: Premium	xxx
Less: Interest cost	xxx
Gain/Loss	**XXX**

5. Swap Points

	Forward	**Spot**	
Bid	p	r	p-r = Swap bid
Ask	q	t	q-t = Swap ask
	q-p	**t-r**	
	Fwd spread	**Spot spread**	

If swap points are in ascending order, Add
If swap points are in descending order, Deduct

i) Ask > Bid

Swap Ask > Swap Bid - Add Swap points
Swap Ask < Swap Bid - Deduct Swap points
i) Ask > Bid
ii) Fwd spread > Spot spread

Net Exposure of each foreign currency in Rs

Foreign currency	Inflow	Outflow	Net Inflow	Spread	Net Exposure
1	2	3	4=2-3	5 = Fwd rate - spot rate	6= 4 X 5

If net inflow & spread are negative, then net exposure will be positive.

6. Interest Rate Parity Theory (IRPT)

$(1 + R_h)/(1+ R_f) = F_1/e_o$

F_1 = Fwd rate, e_o = Spot rate, R_h - Home country interest rate, R_f - Foreign country interest rate

How IRPT works

Steps:

i) Maturity value in the currency of first country

a) Invest the amount at given interest rate

b) Compute maturity value = Amount invested + Interest earned

ii) Maturity value in the currency of second country

a) Buy the currency of second country by applying spot rate

b) Invest the proceeds of step ii) a) at given interest rate

c) compute maturity value = Step ii(a) + Interest earned

iii) Convert the maturity value of Step ii (c) into the currency of first country by using I year forward rate

Step iii) = Step (i) b

7. Arbitrage

Fwd rate reflects IRPT

If Fwd rate did not reflect IRPT, arbitrage opportunities arise.

TYPES OF ARBITRAGE

a) Space

Price of the currency being different in 2 different banks

Bilateral currencies

i) express as currency A per unit of Currency B

ii) Buy from banks having lower ask rate

iii) Sell to banks having higher bid rate

iv) difference may be profit/loss (between ii) - iii))

b) Time

Prices in 2 markets, spot & forward whether in same bank or in different banks

Interest rate = Borrowing rate
Bid rate = Ask rate

Relationship	Arbitrage	Money flow	
		from	to
AFR > TFR	yes	FC	HC
AFR = TFR	No		
AFR < TFR	yes	HC	FC

Theoritical Home Risk Free Rate method

i) compute Theoritical Home Rate (THR) using IRPT

ii) compare Actual Home Rate (AHR) with THR

iii) identify the flow of arbitrage using the following table

Relationship	Arbitrage	Money flow	
		from	to
AHR > THR	yes	FC	HC
AHR = THR	No		
AHR < THR	yes	HC	FC

Theoritical Rh=

$(1 + R_h)/(1+ R_f) = F_1/e_o$

PROOF FOR EXISTENCE OF ARBITRAGE

i) Borrow money in the country from where money is identified to flow out

ii) Convert at spot rate

iii) Invest in the other currency

iv) Take forward cover

v) Realise the investment along with interest thereon

vi) Re-convert at forward rate

vii) Repay the borrowing along with interest thereon

viii) compute arbitrage gain or loss - Step vi) - Step vii)

8. Purchasing Power Parity Theory

PPPT lays down link between exchange rate and inflation rates

High inflation in one country will be set off by depreciation of currency of that country

Law of one price - Price of a commodity shall be same in two markets, else arbitrage opportunity arise.

If PPPT does not hold, then enter arbitrage

Steps in arbitrage

i) compute theoritical home rate using PPPT

ii) compare actual home rate & Theoritical(fair) home rate

iii) identify the flow of arbitrage using the following table

Relationship	Arbitrage	Money flow	
		from	To
Actual I_h > Fair I_h	yes	FC	HC
Actual I_h = Fair I_h	No		
Actual I_h < Fair I_h	yes	HC	FC

$(1+ I_h)/(1+ I_f) = F_1/E_o$

I_h - Inflation in home country

I_f - Inflation in foreign country

F_1 - Forward rate of foreign currency

E_0 or S_o - Spot rate of foreign currency

% change = $[(I_h-I_f)/(1+If)]$ X 100

% change is positive - Depreciation

% change is negative - appreciation

9. International Fischer Effect

Reinforces IRPT & PPPT by highlighting the inflation element in nominal interest rate

Changes in anticipated inflation produce corresponding changes in rate of interest

(1+ Money rate) = (1+ Real rate)X (1 + Inflation rate)

Exchange position/Currency position

Particulars	Purchase	Sales
Opening position over bought	XX	-
Purchased a bill	XX	-
Forward sale TT	-	XX
Forward purchase contract cancelled	-	XX
Remitted by TT	-	XX
Draft cancelled	XX	-
	XXX	XXX
Closing balance over sold	**XXX**	
	XXX	**XXX**

Cash position (Nostro A/c)

Particulars	Credit	Debit
Opening balance in credit (Nostro A/C)	XX	-
Remitted by TT	-	XX
	XXX	XXX
Closing balance		**XXX**

15. International Finance – Risk & Hedging

1. Currency Invoicing

Foreign currency	Invoice under which currency?	
	Importer	**Exporter**
Appreciates	Home currency	Foreign currency
Depreciates	Foreign currency	Home currency

2. Leading & Lagging

Foreign currency	Export	Export	Import
Depreciates	Lead	Lead	Lag
Appreciates	Investment	Borrowing	Surplus cash
Appreciation % < Alternative %	Lead	Lag	Lag
Appreciation % > Alternative %	Lag	Lead	Lead

3. Netting

Outstanding amount are adjusted against dues payable

Its enough to pay net amount

Bilateral (2 parties)

Multilateral (More than 2 parties)

4. Forward Cover

Relationship	Export	Import
Expected Spot rate > Forward rate	No forward cover	Take forward cover
Expected Spot rate < Forward rate	Take forward cover	No forward cover

Expected spot rate (as on date of maturity of forward contract) = Spot rate + (appreciation) - (depreciation)

5. Cancellation of forward contract

Exporter		Importer	
due date	**early**	**due date**	**early**
Buy $ Spot	Buy $ Forward	Sell $ Spot	Sell $ Forward

6. Honour

Exporter		Importer	
due date	**early**	**due date**	**early**
No action	**Cancelling old contract**	**No action**	**Cancelling old contract**
	i) Original position - Sell $ Forward		i) Original position - Buy $ Forward
	ii) Opposite position - Buy $ Forward		ii) Opposite position - Sell $ Forward
	iii) New contract - Sell $ Spot		iii) New contract - Buy $ Spot

7. Roll over

Exporter		Importer	
due date	**early**	**due date**	**early**
i) Buy $ Spot	i) Buy $ Forward	i) Sell $ Spot	i) Sell $ Forward
ii) Sell $ Forward	ii) Sell $ Forward	ii) Buy $ Forward	ii) Buy $ Forward

Summary table

	Honour		Rollover		Cancel	
	Due date	**Early**	**Due date**	**Early**	**Due date**	**Early**
Importer	No act					
	Buy	Spot	Forward	Forward	No act	No act
	Sell	Forward	Spot	Forward	Spot	Forward
Exporter	No act					
	Buy	Forward	Spot	Forward	Spot	Forward
	Sell	Spot	Forward	Forward	No act	No act

Rules:

1. Honour on Due date - No action
2. Honour early

i) Identify original position

ii) Reverse original position - Forward rate is relevant

iii) Create new (Original) position now -Spot rate is relevant

3. Cancel

i) Identify original position

ii) Take opposite position -

Due date - Spot rate is relevant

Early - Forward rate is relevant

4. Rollover

i) Identify original position

ii) Take opposite position -

Due date - Spot rate is relevant

Early - Forward rate is relevant

iii) Create new (Original) position now -Forward rate is relevant

8. Money Market Hedge

Receivables	Payables
Steps:	**Steps:**
i) identify $ receivables asset	i) identify $ liability
ii) Borrow $ (Principal + Interest)	ii) Borrow in Rs.
iii) Convert the borrowed amount in $ to Rs	iii) Convert the borrowed amount in Rs to $
iv) Invest the converted Rs including interest	iv) Invest the converted $
v) Realise the Re - investment	v) Realise the step iv investment along with interest
vi) Settle the $ liability of Step ii) with $ receivable of Step i) along with interest thereon	vi) Settle the $ liability of Step i) with realisation in Step v)
	vii) pay the amount borrowed in step ii) along with interest
Effective rate = Realised amount/$ Receivable	Effective rate = Step vii/Step i
i.e Step v/Step i	

Effective rate > Forward rate - Prefer Money Market Hedge	Effective rate > Forward rate - Don't Prefer Money Market Hedge
Effective rate < Forward rate - Don't prefer Money Market Hedge	Effective rate < Forward rate - Prefer Money Market Hedge

9. Comparison of forward cover with Money Market Hedge

Method	Exporter	Importer
Cashflow	Whichever gives higher domestic currency inflow	Whichever gives lower domestic currency outflow
Effective rate	Whichever gives higher effective rate	Whichever gives lower effective rate

Money Market Hedge for	Possibility exists, if in absolute terms
Importer	Borrowing and lending rates are lower in foreign currency than in domestic currency - Domestic currency depreciating
Exporter	Borrowing and lending rates are higher in foreign currency than in domestic currency - Foreign currency depreciating

“SUCCESS IS THE PROBLEM BUT FAILURE IS THE FORMULA. YOU CAN’T SOLVE THE PROBLEM WITHOUT KNOWING THE FORMULA.

- Roshan Verma ”

“IF YOU FOCUS ON RESULTS, YOU WILL NEVER CHANGE. IF YOU FOCUS ON CHANGE, YOU WILL GET RESULTS.

- Jack Dixon ”

“SUCCESS IS NOT FINAL, FAILURE IS NOT FATAL. IT IS THE COURAGE TO CONTINUE THAT COUNTS.

- Winston Churchill ”