Paper 12: Financial Management and International Finance

1.

(a) For each of the questions given below, one out of four answers is correct. Indicate the correct answer and give your workings/ reasons briefly.

i. Eureka Ltd. has a debt-equity mix of 30/70. If Eureka Ltd.'s debt beta for its activity (or projects) is 1.21, what is the beta for its equity?

- **A. 1.65**
- **B. 1.60**
- **C. 1.52**
- **D. None of the above**

ii. Nigam Ltd.'s share price at present is ₹ 120. After 6 months, the price will be either ₹ 150 with a probability of 0.8 or ₹ 110 with a probability of 0.2. A European call option exists with an exercise price of ₹ 130. The expected value of the call option at maturity date will be :

- **A. ₹ 16**
- **B. ₹ 20**
- **C. ₹ 10**
- **D. Zero**

iii. Swarup purchased a second hand machine for ₹ 8,000 on April, 2008 and spent ₹ 3,500 on overhauling and installation. Depreciation is written-off 10% p.a. on original cost. On June 30, 2011, the machine was found to be unsuitable and sold for ₹ 6,500. What is the loss to be written –off?

- **A. ₹ 1,265.80**
- **B. ₹ 1,262.50**
- **C. ₹ 1,309.80**
- **D. ₹ 1,350.05**

iv. Surya Ltd. has obtained quotes from two different manufacturers for an equipment. The details are as follows :

Product	Cost (₹ Million)	Estimated life (years)
Make A	4.50	10
Make B	6.00	15

Ignoring operation and maintenance cost, which one would be cheaper? The company's cost of capital is 10%.
[Given: PVIFA (10%, 10 years) =6.1446 and PVIFA (10%, 15 years) = 7.6061]

- **A. Make A will be cheaper**
- **B. Make B will be cheaper**
- **C. Cost will be the same**
- **D. None of the above.**

v. An investor has ₹ 5,00,000 to invest. What will be his expected risk premium in investing in equity versus risk-free securities in the following conditions :

Investment	Probability	Expected return
Equity	0.6	₹ 2,00,000
	0.4	(-) ₹ 1,50,000
Risk-free security	1.0	₹ 25,000

A. ₹ 35,000
B. ₹ 45,000
C. ₹ 60,000
D. ₹ 85,000

vi. The value of a share of MN Ltd. after right issue was found to be ₹ 75/-. The theoretical value of the right is ₹ 5. The number of existing shares required for a rights share is 2. The subscription price at which were issued were:
A. ₹ 22.50
B. ₹ 40.00
C. ₹ 65.00
D. ₹ 82.00

vii. HP Leasing Company expects a minimum yield of 10% on its investment in the leasing business. It proposes to lease a machine costing ₹ 5,00,000 for ten years. If yearly lease payments are received in advance , the lease rental to be charged by the company for lease will be :
A. ₹ 81372
B. ₹ 73975
C. ₹ 72,370
D. None of (A), (B), (C).

viii. The aim of foreign exchange risk management is :
A. To maximize profits.
B. To know with certainty the quantum of future cash flows.
C. To minimize losses.
D. To earn a minimum level of profit.

ix. The average daily sales of a company are ₹ 5 lac. The company normally keeps a cash balance of ₹ 80000.If the weighted operating cycle of the company is 45 days, its working capital will be
A. ₹112.9 lac.
B. ₹ 113.3 lac
C. ₹ 5.8 lac
D. ₹ 225.8 lac.

x. The following various currency quotes are available from a leading bank:
₹ /£ 75.31/75 .33
£ / $ 0.6391/0.6398
$ /¥ 0.01048/0.01052
The rate at which yen (¥) can be purchased with rupees will be
A. Re. 0.5070
B. ₹ 1.5030
C. ₹ 1.7230
D. None of the above.

Answer 1. (a)

i. **(B) - 1.60**

$\beta_A = \beta_d(D/V) + \beta_e (E/V)$

$1.21 = (0.30 \times 0.3) + (\beta_e \times 0.7)$

$1.21 = 0.09 + 0.7\ \beta_e$

$\beta_e = 1.12/0.7 = 1.60$

ii. **(A) - ₹ 16**

Expected value of call option

Expected share price (₹)	Exercise price (₹)	Call value (₹)	Probability	Call option value (₹)
150	130	20	0.8	16
110	130	0	0.2	0
				16

iii. **(B) ₹ - 1,262.50**

Particulars	₹
Cost of machine (8,000 + 3,500)	11,500.00
Less : Depreciation @ 10% (1-4-2010 to 31-3-2013) (₹ 11,500 x 10/100 x 3 years)	3,450.00
Book value as on 1-4-2013	8,050.00
Less : Depreciation @ 10% (1-4-2013 to 30-6-2013) (₹ 11,500 x 10/100 x 3/12)	287.50
Book value as on 30-6-2013	7,762.50
Sale value	6,500.00
Loss on sale of machine	1,262.50

iv. **(A) - Make A will be cheaper**

Make A

Purchase cost = ₹ 4.50 million

Equivalent annual cost = 4.50/6.1446 = ₹ 0.73235 million

Make B

Purchase cost = ₹ 6.00 million

Equivalent annual cost = 6.00/7.6061 = 0.78884 million

Therefore, equivalent annual cost of make A is lower than make B, make A is suggested to purchase.

v. **(A) - ₹ 35,000**

Expected premium = (0.6 x ₹ 2,00,000) + [0.4 x (-) ₹ 1,50,000] – ₹ 25,000

= ₹ 1,20,000 – ₹ 60,000 – ₹ 25,000

= ₹ 35,000

vi. **(C) - Rs 65.**

Theoretical value of a right (V_t) = (P-S)/N+1=₹ 5 where N=2

or, P-S=5(2+1)

or, P=15+S ----------(i)

Value of share after right (V_0) =NP +S where V_0= ₹ 75

or, 75 = (2P + S)/3

or, 2P+S =3*75

or, 2P+S = 225 ----------(ii)

Putting value of P in equation (ii), we get

2 P + S = 225

or, 2(15+S)+S = 225

or, 30+3S =225

or, S =(225-30)/3

or, S =65.

vii. **(B) - ₹ 73975**

Let , lease rental per annum be , x

₹ 500000 = x + x / (1+0.1) + x / $(1+0.1)^2$ + ... + x / $(1+0.1)^9$
= x + 5.759 x = 6.759 x
or, x = ₹ 500000/ 6.759 = ₹ 73975.

viii. **(B) - To know with certainty the quantum of future cash flows.**

ix. **(D) - ₹ 225.8 lac.**

The working capital requirement is for 45 days of the weighted operating cycle plus normal
Cash balance = Sales per day × weighted operating cycle+ cash balance requirement
= ₹ 5 lac × 45 + ₹ 0.80 lac = ₹ 225.80 lac.

x. **(A) - Re. 0.5070**

To purchase (¥) we need to have a quote of (¥) in terms of ₹ we need only the ASK quote.

ASK (₹ / ¥) = ASK (₹ / £) * ASK (£ /$) * ASK ($/ ¥)
= 75.33*0.6398 * 0. 01052
= ₹ 0.5070 (approx.)

1.

(b) Choose the most appropriate one from the stated options and write it down [only indicate A, B, C, D as you think correct]:

i. Which of the following is a correct sequence of life cycle of a project?

- **A. Planning, selection, scheduling, termination**
- **B. Planning, implementation, control, evaluation**
- **C. Selection, scheduling, implementation, evaluation, control**
- **D. Planning, implementation, control, evaluation**

ii. Which one of the following would describe commercial paper most appropriately?

- **A. Unsecured long – term notes as loan**
- **B. Unsecured short – term loan notes**
- **C. Secured short – term loan notes**
- **D. Secured long – term loan notes**

iii. Short –term portfolio investments are recorded in which head of Balance of Payment (BOP) account?

- **A. Investment Income**
- **B. Current Accounts**
- **C. Capital Account**
- **D. Reserves**

iv. The internal rate of return can be said to be based on the assumption that the intermediate cash flows are

- **A. Re-invested at a rate equal to the internal rate of return of the firm.**
- **B. Re-invested at the cost of capital of the firm.**
- **C. Perfectly certain**

D. **Highly variable**

v. **The traditional view of financial management looks at:**
   A. **Arrangement of short-term and long-term funds from financial institutions.**
   B. **Mobilisation of funds through financial instruments**
   C. **Orientation of Finance function with accounting function**
   D. **All of the above**

vi. **Which of the following institutions has international monetary co-operation as its primary concern?**
   A. **World Bank**
   B. **Bank of international settlement**
   C. **IMF**
   D. **IDA**

vii. **Exchange rate system where the central bank intervenes to smoothen out exchange rate fluctuations is known as :**
   A. **Free float**
   B. **Managed float**
   C. **Fixed rate system**
   D. **Floating rate system**

viii. **Variable rate investors are the typical users of:**
   A. **Internal rate floors**
   B. **Interest rate caps**
   C. **Interest rate collars**
   D. **Both (B) and (C)**

ix. **In using debt-equity ratio in capital structure decisions, there is an optimal capital structure where :**
   A. **The WACC is minimum**
   B. **The cost of debt is lowest**
   C. **The cost savings are highest**
   D. **The marginal tax benefit is equal to marginal cost of financial distress**

x. **Buying and selling call and put option with different strike prices and different expiration dates are called :**
   A. **Butterfly spread**
   B. **Diagonal spread**
   C. **Vertical spread**
   D. **Short hedge**

Answer: 1. (b)

i. (C)
ii. (B)
iii. (C)
iv. (A)
v. (D)
vi. (C)
vii. (B)
viii. (A)

ix. (D)
x. (B)

1.

(c) Mention whether the following statements are True (T) or False (F):

(i) The key issue of the theory of capital structure is to examine whether a business can change its value and cost of capital by changing its capital structure.

(ii) Leading and netting are internal hedging techniques whereas swap is an external technique for hedging

(iii) TRIPS is an international agreement on intellectual property rights.

(iv) GDR may be converted into underlying shares and vice-versa.

(v) Portfolio Balance Approach assumes that the Purchasing Power Parity (PPP) holds good.

Answer: 1. (c)

(i) True
(ii) True
(iii) True
(iv) True
(v) False

2. Write short notes on :

i. Marking to Market
ii. Financial Engineering
iii. Scenario Analysis
iv. Seed capital assistance
v. Embedded Derivatives
vi. Butterfly Spread

Answer 2.

i. **Marking to market** – Marking to market is a characteristic feature of future contracts. Future contracts are standardized contracts that trade on organized future markets.
Under a future contract the seller agrees to deliver to the buyer a specified quantity of security, commodity or foreign exchange at a fixed time in future at a price agreed to at the time of entering into the contract. To ensure that default risk is reduced to minimum, both parties are required to deposit some margin money with the organized clearing house, which is known as the initial margin. Further, with the fluctuation in the price of the underlying asset, the balance in the margin account may fall below specified minimum level or even become negative so that it may not happen like this, at the end of each trading session, all outstanding contracts are appraised at the settlement price of that session. This is known as Marking to Market.
This would mean that some participants would make a loss while others would stand to gain. The exchange adjusts this by debiting the margin accounts of those members who made a loss and crediting the accounts of those members who have gained. A member making a loss must make good loss and the counter party will receive his profit.
Thus the value of the future contracts is set to zero at the end of each trading day.

ii. **'Financial Engineering'** involves the design, development and implementation of innovative financial instruments and processes and the formulation of creative solutions

to problems in finance. Financial Engineering lies in innovation and creativity to promote market efficiency. It involves construction of innovative asset-liability structures using a combination of basic instruments so as to obtain hybrid instruments which may either provide a risk-return configuration otherwise unviable or result in gain by heading efficiently, possibly by creating an arbitrage opportunity. It is of great help in corporate finance, investment management, money management, trading activities and risk management.

In recent years, the rapidity with which corporate finance and investment finance have changed in practice has given birth to a new area of study known as financial engineering. It involves use of complex mathematical modeling and high speed computer solutions. It has been practiced by commercial banks in offering new and tailor-made products to different types of customers. Financial Engineering has been used in schemes of mergers and acquisitions.

The term financial engineering is often used to refer to risk management also because it involves a strategic approach to risk management.

iii. **Scenario analysis** is an analysis of the NPV or IRR of a project under a series of specific scenarios, based on macro-economics, industry and firm-specific factors.

The steps in a scenario analysis are –

Step	Description of procedure
1	The biggest source of uncertainty for the future success of the project is selected as the factor around which scenarios will be built.
2	The values each of the variables in the investment analysis (revenues, growth, operating margin etc.) will take on under each scenario are estimated
3	THE NPV and IRR under each scenario are estimated
4	A decision is made on the project, based on the NPV under all scenarios, rather than just the base case (i.e. mean NPV)

Limitations:

a) There are no clearly declined scenario in many cases
b) If there are many important variables to consider, there may give rise to a huge number of scenarios for analysis.
c) There is no clear roadmap to indicate how the decision-maker use results of the scenario analysis.

Best case and Worse case analysis- These are variants of the scenario analysis.

a) In a Best case analysis, all the inputs are set at the most optimistic levels
b) In a worst case analysis, inputs are all measured at the most pessimistic levels, for computing NPV and IRR.

iv. **Seed capital assistance** scheme is designed by IDBI for professionally or technically qualified entrepreneurs and /or persons possessing relevant experience, skills and entrepreneurial traits. All the projects eligible for financial assistance from IDBI directly or indirectly through refinance are eligible under the scheme.

The project cost should not exceed Rs. 2 crores. The maximum assistance under the scheme will be – (a) 50% of the required Promoter's Contribution, or (b) RS. 15 lakhs, whichever is lower.

The assistance is initially interest free but carries a service charge of 1% p.a. for the first five years and at increasing rate thereafter. When the financial position and profitability is favourable, IDBI may charge interest at a suitable rate even during the currency of the loan.

The repayment schedule is fixed depending upon the repaying capacity of the unit with an initial moratorium of upto five years.

For projects with a project cost exceeding Rs. 2 crores, seed capital may be obtained from the Risk Capital and Technology Corporation Ltd. (RCTC). For small projects costing upto Rs. 5 lakhs, assistance under the National equity Fund of the SIDBI may be availed.

v. An **embedded derivative** is a derivative instrument that is embedded in a separate host contract. The host contract might be a debt of equity instruments, a lease, an insurance contract or a sale or purchase contract. It is a component of a hybrid (combined) instrument that also includes a non-derivative host contract, with the effect that some of the cash flows of the combined instrument vary in a way similar to a stand-alone derivative.

An embedded derivative can arise from deliberate financial engineering and intentional shifting of certain risks between parties. It causes modification to a contract's cash flow, based on changes in a specified variable.

An embedded derivative should be separated from the host contract and considered as a derivative if:

a) The economic characteristics and risks of the embedded derivative are not closely related to the economic characteristics and risks of the host contract and
b) A separate instrument with the same terms as the embedded derivative can be considered a derivative.

vi. **Butterfly Spread** is an option strategy which combines a Bull Spread and Bear Spread and involves three different strike prices. It is taken up if investors are of the view that the underlying security is not highly volatile and there is not going to be a substantial rise or fall in its prices.

Features:

a) Risk is limited
b) Profits are limited and can be realized if the stock prices closes at expiry date, at the strike price of the written options.
c) Commission costs are high.
d) Strike prices :
   - It involves three strike prices wherein 2 positions are taken in one strike price and 1 transaction each is taken up at a higher strike price and the lower strike price.
   - The lower two strike prices are used in the Bull Spread, and the higher Strike Price is used in the Bear Spread.

The three exercise prices should satisfy the following conditions –

$(EP_1 + EP_3) \div 2 = EP_2$

Where EP_1, EP_2 and EP_3 represent the three exercise prices.

There are two types of Butterfly Spread viz. Long and Short Butterfly Spread.

Basis	Long Butterfly Spread	Short Butterfly Spread
Strategy	It is created by buying one option at each of the outside exercise prices (EP_1 and EP_3) and selling two options at the inside exercise price (EP_2)	It is created by selling one option at each of the outside exercise prices (EP_1 and EP_3) and buying two options at the inside exercise price (EP_2)
Profit	It would lead to profit if the price of the underlying asset remains close to the strike price at which the two calls were sold	The short butterfly strategy would lead to profit if the price of the underlying asset moves far away from the exercise price at which the two calls were bought.

3.

(a) XYZ Ltd is considering a project in US, which will involve an initial investment of US $1,10,00,000. The project will have 5 years of life. Current spot exchange rate is ₹ 48 per US $. The risk free rate in US is 8% and the same in India is 12%. Cash inflows from the project are as follows —

Years	1	2	3	4	5
Cash Inflow (US $)	20,00,000	25,00,000	30,00,000	40,00,000	50,00,000

Calculate the NPV of the project using foreign currency approach. Required rate of return on this project is 14%.

(b) ABC Ltd. is a consumer goods company which earns expected return of 14% on its existing operations subject to standard deviation of 20%. The company is owned by a family and the family has no other investment. New project is under consideration and the new project is expected to give a return of 18% subject to standard deviation of 32%. The new project has a correlation of 0.25 with ABC's existing operations.

The new project is likely to account for 25% of ABC's operations.

ABC is identified a utility function to apprise risky project.

The function is as under:-

Shareholder's utility = 100R - σ^2; Where, R = Expected return (in %); σ^2 = Standard deviation of return (in %)

The project can be accepted only if total utility goes up. Evaluate the project.

Answer: 3. (a)

(i) Computation of Discount Rate

Note: It is assumed that the required rate of return of 14% (Risk Adjusted Rate) is for rupee inflows.

1 + Risk Adjusted Rate = (1 + Risk Free Rate) X (1 + Risk Premium for the project)
1 + 14% = (1 + 12%) x (1 + Risk Premium)
1.14 = 1.12 x (1 + Risk Premium)
1 + Risk Premium = 1.14 ÷ 1.12 = 1.01786
Risk Premium = 0.01786 or 1.786%

Therefore, Risk Adjusted Discount Rate for Dollar Flows is
(1 + Risk Adjusted Discount Rate) = (1 + USD Risk Free Rate) X (1 + Project Risk Premium)
= (1 + 8%) x (1 + 1.786%)
= 1.08 x 1.01786 = 1.09929
Risk Adjusted Discount Rate = 1.09929 - 1 = 0.09929 or **9.93%**

(ii) Computation of Net Present Value **[USD in Lakhs]**

Particulars	Year	PV Factor @9.93%		Cash Flow	Disc. Cash Flow
Annual Cash Inflow	1	$1 \div 1.0993$	= 0.910	20.00	18.20
	2	$1 \div 1.0993^2$	= 0.827	25.00	20.68
	3	$1 \div 1.0993^3$	= 0.753	30.00	22.59

	4 5	$1 \div 1.0993^4$ = 0.685 $1 \div 1.0993^5$ = 0.623	40.00 50.00	27.40 31.15
Present Value of Cash Inflows Less: Initial Investment				120.02 (110.00)
Net Present Value (in USD Lakhs)				10.02
NPV in ₹ Lakhs [USD 10.02 x Spot Rate 48.00 per USD]				480.96

Answer: 3. (b)

We may treat the existing Co and new project as to two securities Portfolio since we are aware that original company has 0.75 share and new project 0.25 finally in overall operation.

1. Expected return = Proportion of Investment x Return

   = (0.75X14%) + (0.25x18%) = 15%

2. Covariance = □AB (Correlation between old and new operations) X $\sigma_{\text{old project}}$ x $\sigma_{\text{new project}}$ = 0.25 x 20 x 32= 160

   $$\sigma\rho = \sqrt{\left(\sigma A^2 \times W_A^{\ 2}\right) + \left(\sigma B^2 \times W_B^{\ 2}\right) + 2\left(\sigma A \times W_A \times \sigma B \times W_B \times \rho AB\right)}$$

   Variance of the company with new project = (0.75^2 x 20^2) + (0.25^2 X 32^2) + (2 x 0.75 x 0.25x160) = 349

   S.D. = σ = $\sqrt{349}$ =18.68%

3. Share holders utility without the project = 100 X 12 - 20^2 = 800 units

4. Shareholders utility with the project = 100 X 13 - $(18.68)^2$ = 951 units

Hence, project will increase the utility.

4.

(a) What are the differences between Security Market Line and capital Market Line?

(b) Somnath Clothing Mills (SCM) is planning to foray into the business of establishing and running malls all around India, as it sees tremendous opportunity in that area. Presently, only one Company (OSS Bazaar Ltd) is in that line, establishing malls of size comparable to SCM proposed malls.

The cost of establishing a single mall, on an average, works out to ₹135 Crores. It has ascertained the estimated operating cash inflows from each of those malls.

SCM's share is quoted at ₹540, its equilibrium price, for a return of ₹81 (for both Dividends and Capital Appreciation). SCM's share has a Beta of 1.50. Its Capital Structure is 40% Equity: 60% Debt, and applies this measure to each of its projects / business. Average Tax rate as applicable to SCM is 35%.

Particulars relating to OSS Bazaar Ltd are — (a) Equity Beta of 1.85; (b) Capital for its projects financed 40% by Debt; (c) Effective Tax Rate - 20% [Government has provided tax sops to companies engaged in establishing malls]

The Company's management is at a loss as to what discount rate should be applied for undertaking a financial feasibility study. Recommend the appropriate discount rate if the Risk Free Rate of Return is 6%, Cost of Debt is 10% (not carrying any risk factor).

Answer: 4. (a)

Aspect	Capital Market Line	Security Market Line
1.Risk Considered	Capital Market Line uses Standard Deviation, i.e. Total Risks across the x-axis.	Security Market Line uses Beta or Systematic Risk across the x-axis. (i.e. that part of Total Risk which is common to the whole of market).
2.Nature of Portfolios	It uses only efficient portfolios, i.e. one which is a perfect replication of the Market Portfolio in terms of risks and rewards.	Security Market Line uses both efficient and non-efficient portfolios.
3.Combination	Every point on the Capital Market Line is a proportional combination between Risk free Rate of Return and Market Return.	It graphs all portfolios and securities which he on and off the Capital Market Line.

Answer: 4. (b)

Flow:

- Calculation of Project Beta based on particulars of OSS Bazaar
- Project Beta of OSS Bazaar = Project Beta of SCM's Mall Business
- Ascertain Equity Beta of Mall Business.
- Ascertain Expected Equity Return of SCM on Mall Business
- Calculated Weighted Average Cost of Capital of Mall Business.

1. Calculation of Project Beta (Beta of Mall Business)

Note: For Computing Project Beta, beta of a comparable project only should be considered. Therefore, Beta of Mall Business of SCM should be ascertained from the figures of OSS Bazaar Ltd and not the particulars of SCM's Clothing Mill Business.

i. Beta of OSS Ltd

Beta of Mall Business β_{MALL} = Beta of OSS Bazaar Ltd (β_{oss})

β_{oss} = Weighted Average Beta of Equity and Debt

$\beta_{oss} = \beta_{oss\ -\ equity}$ X Equity ÷ [Equity + Debt X (1 - Tax Rate)]

$\beta_{oss\ -\ equity}$ = 1.85

Debt = 40% of Value = 0.40

Equity = 1 - Debt = 1 - 0.40 = 0.60

Beta of Debt β_D = 0 (Debt does not carry any Risk).

Tax Rate = 20% = 0.20

1 - Tax = 1 - 0.20 = 0.80

Therefore, β_{oss} = $\beta_{oss - equity}$ X Equity ÷ [Equity + Debt x (1 – Tax Rate)] + 0

= 1.85 x 0.60 ÷ [0.60 + (0.40 x 0.80)]

= 1.11 ÷[0.60 + 0.32]

= 1.11 ÷ 0.92 = 1.207

ii. Beta of Mall Business

$\beta_{MALL} = \beta_{oss}$

Therefore, Beta of Mall Business (β_{MALL}) = 1.207

iii. Calculation of Equity Beta of SCM's Mall Business

β_{MALL} = $\beta_{SCM- EQUITY}$ X Equity ÷ [Equity + Debt x (1 – Tax Rate)] + 0

β_{MALL} = 1.207

Debt = 60% of Value = 0.60

Equity = 40% of Value = 0.40

Tax Rate = 20% = 0.20

1-Tax = 1 - 0.20 - 0.80

1.207 = $\beta_{SCM- EQUITY}$ X 0.40 ÷ [0.40 + (0.60 X 0.80)]

= $\beta_{SCM- EQUITY}$ X 0.40 ÷ [0.40 + 0.48]

= $\beta_{SCM- EQUITY}$ X 0.40 ÷ 0.88

= $\beta_{SCM- EQUITY}$ X 0.455

$\beta_{SCM- EQUITY}$ = 1.207 ÷ 0.455 = 2.65

iv. Calculation of Equity Expected Return [$R_{E-SCM-MALL}$] on SCM's Mall Business (Under CAPM)

i) Calculation of Equity Return of SCM's Cloth Business under CAPM [E($R_{E-SCM-CLOTH}$)]

Particulars	Value
Return on Equity of SCM's Cloth Business	₹81
Market Price of Equity Share of SCM	₹540
Return on Equity Share of SCM [₹81 ÷ ₹540]	15%

Since Market Price is in Equilibrium, Expected Return under CAPM = Actual Return	15%

ii) **Calculation of Market Return [R_M]**

Expected Return under CAPM [$E(R_{E\text{-}SCM\text{-}CLOTH})$] = R_F + [$\beta_{E\text{-}SCM\text{-}CLOTH}$ x (R_M – R_F)

15% = 6% + 1.50 x (R_M - 6%)

15% - 6% = 1.50 x (R_M - 6%)

R_M - 6% = 9% ÷ 1.50

R_M = 6% + 6% = 12%

v. Calculation of Equity Expected Return on SCM's Mall Business [$R_{E\text{-}SCM\text{-}MALL}$]

Expected Return under CAPM [$E(R_{E\text{-}SCM\text{-}MALL})$] = R_F + [$\beta_{E\text{-}SCM\text{-}MALL}$] x ($R_M$ - R_F)]

= $E(R_{E\text{-}SCM\text{-}MALL})$ = 6% + 2.65 x (12% - 6%)

= 6% + 2.65 x 6%

= 21.90%

vi. Calculation of Weighted Average Cost of Capital of SCM's Mall Business

Source of Fund	Weight	Cost [Net of Tax]	Weighted Cost
(1)	**(2)**	**(3)**	**(4) = (2)X(3)**
Debt	0.60	8% [10% x (1- Tax 20%) = 10% x 0.80]	4.80%
Equity	0.40	21.90%	8.76%
	1.00	Weighted Average Cost of Capital	13.56%

Conclusion: Appropriate Discount Rate for evaluating the financial feasibility of the project is the Weighted Average Cost of Capital of 13.56**%.**

5.

(a) Excel Ltd. manufactures a special chemical for sale at ₹ 40 per kg. The variable cost of manufacture is ₹ 25 per kg. Fixed cost excluding depreciation is ₹ 2,50,000. Excel Ltd. is currently operating at 50% capacity. It can produce a maximum of 1,00,000 kgs at full capacity.

The Production Manager suggests that if the existing machines are fully replaced the company can achieve maximum capacity in the next five years gradually increasing the production by 10% per year. The Finance Manager estimates that for each 10% increase in capacity, the additional increase in fixed cost will be ₹ 50,000. The existing machines with a current book value of ₹ 10,00,000 can be disposed of for ₹ 5,00,000. The

Vice-President (finance) is willing to replace the existing machines provided the NPV on replacement is about ₹ 4,53,000 at 15% cost of capital after tax.

(i) You are required to compute the total value of machines necessary for replacement.

For your exercise you may assume the following:

I. The company follows the block assets concept and all the assets are in the same block. Depreciation will be on straight-line basis and the same basis is allowed for tax purposes.

II. There will be no salvage value for the machines newly purchased. The entire cost of the assets will be depreciated over five year period.

III. Tax rate is at 40%.

IV. Cash inflows will arise at the end of the year.

V. Replacement outflow will be at the beginning of the year (year 0).

VI.

Year	0	1	2	3	4	5
Discount Factor at 15%	1	0.87	0.76	0.66	0.57	0.49

(ii) On the basis of data given above, the managing director feels that the replacement, if carried out, would at least yield post tax return of 15% in the three years provided the capacity build up is 60%, 80% and 100% respectively. Do you agree?

(b) Explain the main causes of uncertainty?

Answer: 5. (a)

i) Computation of the total replacement value of machine. (Assuming that existing machines also have valid life for 5 years

Step 1: Incremental Cash Inflows

Year	1	2	3	4	5
Incremental Capacity	10%	20%	30%	40%	50%
Incremental production and sales (Kgs.)	10,000	0,000	30,000	40,000	50,000
	₹	₹	₹	₹	₹
Incremental contribution	1,50,000	3,00,000	4,50,000	6,00,000	7,50,000
Incremental Fixed cost	50,000	1,00,000	1,50,000	2,00,000	2,50,000

Incremental PBTD	1,00,000	2,00,000	3,00,000	4,00,000	5,00,000
Tax at 40%	40,000	80,000	1,20,000	1,60,000	2,00,000
Incremental PAT BD	60,000	1,20,000	1,80,000	2,40,000	3,00,000
Discount factors	0.87	0.76	0.66	0.57	0.49
Discounted value of PAT BD	52,200	91,200	1,18,800	1,36,800	1,47,000
Total for 5 years	5,46,000				

Step 2: Incremental Cash outflow

Let the total cost of replacement	X
Disposal value of existing machines	5,00,000
Incremental cash outflow	(X – 5,00,000)

Step 3: Tax savings on depreciation

= (Incremental block/5) x Tax rate x (Annuity factor of 15% for 5 years)

= [(X – 5,00,000)/5] x 40% x 3.35 = 0.268 x - 1,34,000

Step 4: Total Discounted cash inflows

Total incremental discounted cash inflows: 5,46,000 + .268X – 1,34,000 = 4,12,000 + .268 X

Step 5: Equation

NPV = Sum of discounted cash inflows – Sum of the discounted cash outflows

4,53,000 = (4,12,000 + .268 X) – (X – 5,00,000)

4,53,000 = 4,12,000 + .268 X – X + 5,00,000

4,53,000 - 4,12,000 - 5,00,000 = 0.268 X – X

- 4,59,000 = -0.732 X

Or 0.732 X = 4,59,000

Or X = 4,59,000/0.732 = ₹ 6,27,049

ii) Evaluation whether replacement would yield post tax return of 15% in 3 years

	1	2	3
Incremental capacity	10%	30%	50%

Incremental PBTD	1,00,000	3,00,000	5,00,000
Depreciation (6,27,049 – 5,00,000)/5	25,410	25,410	25,410
Incremental PBT	74,590	2,74,590	4,74,590
Tax at 40%	29,836	1,09,836	1,89,836
Incremental PAT	44,754	1,64,754	2,84,754
PAT + Depreciation	70,164	1,90,164	3,10,164
Discount factors	0.87	0.76	0.66
Discounted cash inflows	61,043	1,44,525	2,04,708
Total discounted cash inflow	4,10,276		
Discounted incremental cash outflow	1,27,049		
NPV	2,83,227		

Conclusion: As the net present value is positive the view of the Managing Director is correct.

Answer: 5. (b)

Uncertainty usually arises because it is impossible to predict the different variables and, consequently, the magnitudes of benefits and costs exactly as they will occur One hundred per cent predictability in project analysis is not feasible for many reasons, the most important being

i) Inflation, by which it is understood that the prices of most items, inputs or outputs, increase with time, causing changes in relative prices The exact magnitude of price increases will always be unknown Prices may change upwards or downwards for other reasons, too,

ii) Changes in technology quantities and qualities of inputs and outputs used for project evaluation are estimated according to the present state of knowledge, yet new technologies might be introduced in the future that would alter these estimates,

iii) The rated capacity used in project evaluation may never be attained This in turn will affect operating costs as well as sales revenue,

iv) It often turns out that the needed investment for both fixed and working capital is underestimated and that the construction and running-in periods are considerably longer than expected This affects the size of investment, operating costs and sales revenue

Some uncertainties are outside the control of planners, others can be influenced by their policies. The extent of risk associated with an investment project may be reduced either by making advance arrangements for dealing with uncertainty or by substituting a less risky alternative for a more risky one.

6.

(a) Jemini Ltd. is in the business of manufacturing bearings. Some more product lines are being planned to be added to the existing system. The machinery required may be bought or may be taken on lease. The cost of machine is ₹ 40,00,000 having a useful life of 5 years with the salvage value of ₹ 8,00,000. The full purchase value of machine can be financed by 20% loan repayable in five equal instalments falling due at the end of each year. Alternatively, the machine can be procured on a 5 years lease, year-end lease rentals being ₹ 12,00,000 per annum. The Company follows the written down value method of depreciation at the rate of 25%. Company's tax rate is 35 per cent and cost of capital is 16 per cent:

i) Advise the company which option it should choose – lease or borrow.

ii) Assess the proposal from the lessor's point of view examining whether leasing the machine is financially viable at 15% cost of capital (Detailed working notes should be given. Calculations can be rounded off to ₹ lakhs).

(b) Define Project Report. Write down the silent features of a project report?

Answer: 6. (a)

(i) P.V. of Cash outflow under lease option (in ₹)

Year	Lease Rental after tax	PVIFA @ 13%	Total P.V.
1 – 5	12,00,000 (I – T)	20% (I – T)	
	= 7,80,000	3.517	27,43,260

Cash Outflow under borrowing option

5 equal instalments

₹ 40,00,000 ÷ 2.991 (PVIFA 20%) = 13,37,345

Tax Savings

Year	Loan Instalments	On Interest	On Depreciation	Net Cash Outflow	PVIF 13%	Total PV
1	13,37,345	2,80,000	3,50,000	7,07,345	0.885	6,26,000
2	13,37,345	2,48,386	2,62,500	8,26,459	0.783	6,47,117
3	13,37,345	1,97,249	1,96,875	9,43,221	0.693	6,53,652
4	13,37,345	1,43,085	1,47,656	10,46,604	0.613	6,41,568
5	13,37,345	78,087	1,10,742	11,48,516	0.543	6,23,644
Tatal PV						31,91,981

Less: PV Salvage value adjusted for Tax savings on loss of sale of machinery (₹ 8,00,000 × .543 = ₹ 4,34,400) + (₹ 28,359) (See Working Note on Depreciation) 9,49,219 – 8,00,000 =1,49,219 ×0 .35 × 0.543 = 28,359	(4,62,759)
Total present value of cash outflow	27,29,222

Decision: PV of cash outflow of lease option is greater than borrow option and hence borrow option is recommended.

Working Notes:

1. Debt and Interest Payments

Year	Loan Instalments	Loan at the beginning of the year	Interest	Principal	Balance at the end of year
1	13,37,345	40,00,000	8,00,000	5,37,345	34,62,655
2	13,37,345	34,62,655	6,92,531	6,44,814	28,17,841
3	13,37,345	28,17,841	5,63,568	7,73,777	20,44,064
4	13,37,345	20,44,064	4,08,813	9,28,532	11,15,532
5	13,37,345	11,15,532	2,23,106	11,14,239	Nil

1. calculation of Depreciation

Year		Depreciation
1	40,00,000 ×0 .25	10,00,000
2	30,00,000 × 0.25	7,50,000
3	22,50,000 × 0.25	5,62,500
4	16,87,500 ×0 .25	4,21,875
5	12,65,625 × 0.25	3,16,406

W.D.V. of machine = 12,65,625 – 3,16,406 = 9,49,219.

(ii) Proposal from the Lessor's point of view

Lessor's Cash Flow

	1	2	3	4	5
Lease Rentals	12,00,000	12,00,000	12,00,000	12,00,000	12,00,000
Less: Dep.	10,00,000	7,50,000	5,62,500	4,21,875	3,16,406
EBT	2,00,000	4,50,000	6,37,500	7,78,125	8,83,594
Less: Tax @ 35%	70,000	1,57,500	2,23,125	2,72,344	3,09,258
EAT	1,30,000	2,92,500	4,14,375	5,05,781	5,74,336
CFAT	11,30,000	10,42,500	9,76,875	9,27,656	8,90,742
PV factor @ 15%	0.8696	0.7561	0.6575	0.5717	0.4972
PV	9,82,648	7,88,234	6,42,295	5,30,341	4,43,144

Total P.V.	= 33, 86,662
Add: Tax saving on sale of asset	= 25,967 (1, 49,219 x 0.35 x 0.4972)
Total PV of cash inflow	34, 12,629
Less: Cost of Machine	40,00,000
NPV	(5,87,371)

Decision: Lease rate is not financially viable. Hence, not recommended.

Answer: 6. (b)

Project Report or Feasibility Report is a written account of various activities to be undertaken by a Firm and their technical, financial, commercial and social viabilities.

Purpose: Project Report states as to what business is intended to be undertaken by the entrepreneur and whether it would be technically possible, financially viable, commercially profitable and socially desirable to do such a business.

Features of a Project Report

i) **Technical Feasibility:**

This includes analysis about the technical requirements of the industry in relation to the project in hand and involves a examination of issues like suitability of plant location, adoption of appropriate technology, selection of machinery and plant etc.

ii) **Economic, Financial and Commercial Viability:**

- Economic Viability is concerned with a thorough analysis of present and future market prospects for the proposed product and involves the study of possible competitors in the market and the firm's relative cost advantages and disadvantages in relation to them.

- Financial Viability includes estimation of capital requirements and its cost, computation of operating costs, forecasting of sales revenue, arrangement of credit, measurement of profit, finding out the break-even points, assessment of fixed and variable costs, cash flow estimates, etc.
- Commercial Viability includes the estimation of the selling problems and profitability of the project. A project must, therefore, be economically, financially and commercially viable.

iii) **Social Viability:**

- Business entities depend heavily on specialized Financial Institutions, funded or approved by Government, for procuring finance, Government or its agencies would extend assistance to a business unit only if the proposed project is socially desirable.
- Social viability becomes necessary for performing the social responsibilities of the Firm. Therefore, at the time of preparing the project report, the social benefits of the project must be analyzed well.

7.

(a) A firm has an investment proposal, requiring an outlay of ₹ 80,000. The investment proposal is expected to have two years economic life with no salvage value. In year 1, there is a 0.4 probability that cash inflow after tax will be ₹ 50,000 and 0.6 probability that cash inflow after tax will be ₹ 60,000. The probability assigned to cash inflow after tax for the year 2 are as follows:

The cash inflow year 1	**₹ 50,000**		**₹ 60,000**	
The cash inflow year 2	**Probability**		**Probability**	
	₹ 24,000	**0.2**	**₹ 40,000**	**0.4**
	₹ 32,000	**0.3**	**₹ 50,000**	**0.5**
	₹ 44,000	**0.5**	**₹ 60,000**	**0.1**

The firm uses an 8% discount rate for this type of investment.

Required:

i) Construct a decision tree for the proposed investment project and calculate the expected net present value (NPV).

ii) What net present value will the project yield, if worst outcome is realized? What is the probability of occurrence of this NPV?

iii) What will be the best outcome and the probability of that occurrence?

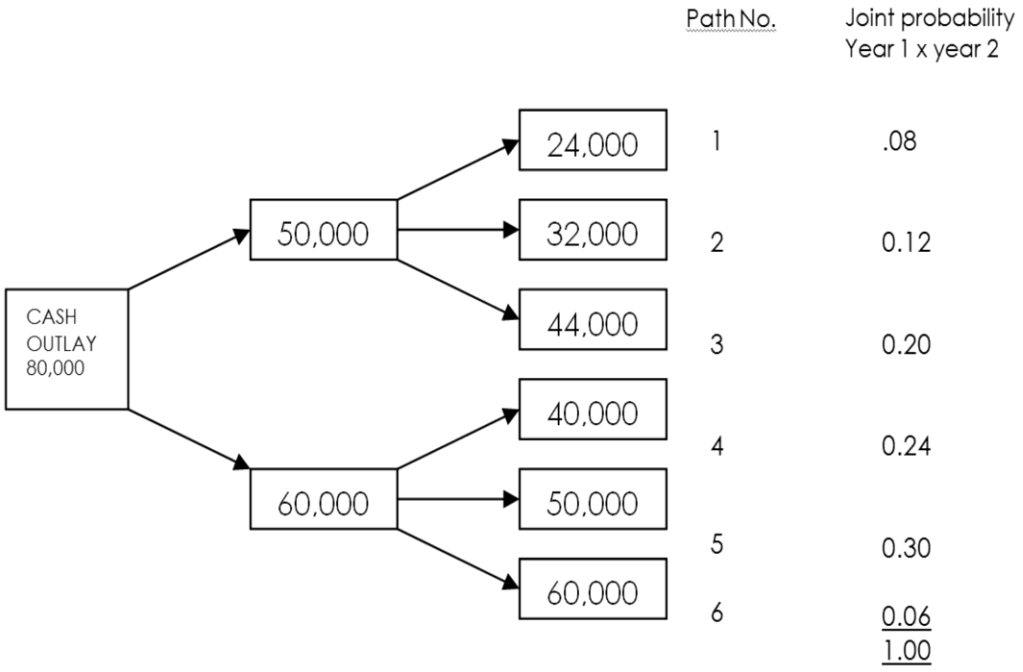
iv) Will the project be accepted?

(Note: 8% discount factor 1 year 0.9259; 2 year 0.8573)

(b) What are the differences between NPV and IRR?

Answer: 7. (a)

i) The decision tree diagram is presented in the chart, identifying various paths and outcomes, and the computation of various paths/outcomes and NPV of each path are presented in the following tables:



The Net Present Value (NPV) of each path at 8% discount rate is given below:

Path	Year 1 Cash Flows (₹)	Year 2 Cash Flows (₹)	Total Cash Inflows (PV) (₹)	Cash Inflows (₹)	NPV (₹)
1	50,000×0.9259= 46,295	24,000×0.8573= 20,575	66,870	80,000	(—) 13,130
2	46,295	32,000×0.8573= 27,434	73,729	80,000	(—) 6,271
3	46,295	44,000×0.8573= 37,721	84,016	80,000	4,016
4	60,000×0.9259= 55,554	40,000×0.8573= 34,292	89,846	80,000	9,846
5	55,554	50,000×0.8573= 42,865	98,419	80,000	18,419
6	55,554	60,000×0.8573= 51,438	1,06,992	80,000	26,992

Statement showing Expected Net Present Value ₹

z	NPV(₹)	Joint Probability	Expected NPV
1	(—) 13,130	0.08	—1,050.40
2	(—) 6,271	0.12	—752.52
3	4,016	0.20	803.20
4	9,846	0.24	2,363.04
5	18,419	0.30	5,525.70
6	26,992	0.06	1,619.52
			8,508.54

Conclusions:

ii) If the worst outcome is realized the project will yield NPV of – ₹ 13,130. The probability of occurrence of this NPV is 8% and a loss of ₹ 1,050.40 (path 1).

iii) The best outcome will be path 5 when the NPV is at ₹ 18,419. The probability of occurrence of this NPV is 30% and a expected profit of ₹ 5,525.70.

iv) The project should be accepted because the expected NPV is positive at ₹ 8,508.54 based on joint probability.

Answer: 7. (b)

Difference between NPV and IRR

A. Causes for Conflict: Higher the NPV, higher will be the IRR. However, NPV and IRR may give conflicting results in the evaluation of different projects, in the following situations –

i) Initial Investment Disparity - i.e. Different Project Sizes,
ii) Project Life Disparity - i.e. Difference in Project Lives,
iii) Outflow Patterns - i.e. when Cash Outflows arise at different points of time during the Project Life, rather than as Initial Investment (Time 0) only.
iv) Cash Flow Disparity - when there is a huge difference between initial CFAT and later years' CFAT. A project with heavy initial CFAT than compared to later years will have higher IRR and vice-versa.

B. Superiority of NPV: In case of conflicting decisions based on NPV and IRR, the NPV method must prevail. Decisions are based on NPV, due to the comparative superiority of NPV, as given from the following points –

i) NPV represents the surplus from the project but IRR represents the point of no surplus-no deficit.
ii) NPV considers Cost of Capital as constant. Under IRR, the Discount Rate is determined by reverse working, by setting NPV = 0.
iii) NPV aids decision-making by itself i.e. projects with positive NPV are accepted.

IRR by itself does not aid decision-making. For example, a project with IRR = 18% will be accepted if K_0 < 18%. However, the project will be rejected if K_O = 21% (say > 18%).

iv) NPV method considers the timing differences in Cash Flows at the appropriate discount rate. IRR is greatly affected by the volatility / variance in Cash Flow patterns.

v) IRR presumes that intermediate cash inflows will be reinvested at that rate (IRR), whereas in the case of NPV method, intermediate cash inflows are presumed to be reinvested at the cut-off rate. The latter presumption viz. Reinvestment at the Cut-Off Rate, is more realistic than reinvestment at IRR.

vi) There may be projects with negative IRR/ Multiple IRR etc. if cash outflows arise at different points of time. This leads to difficulty in interpretation. NPV does not pose such interpretation problems.

8. Write down the steps in financial planning process? Define cross border leasing. Mention the objectives of cross border leasing.

Answer:

a) The financial planning process involves the following steps:

i) **Clearly defined Mission and Goal —** At the outset, the top management should realize and recognize the importance of setting the organizational mission, goal and objectives, which should be clearly defined and communicated.

ii) **Determination of Financial Objectives —** In developing the financial objectives, a firm must consider its purpose, mission, goal and overall objectives of the firm. The financial objectives can again be transformed into strategic planning. The financial objectives can be classified into: (a) long-term objectives, and (b) short-term objective. The long-term financial objectives may relate to earnings in excess over the targeted return on capital employed, increase in EPS and market value of share, increase in market share of its product, achieve targeted growth rate in sales, maximization of value for shareholders *etc*. The short-term financial objectives relate to profitability, liquidity, working capital management, current ratio, operational efficiency etc.

iii) **Formulation of Financial Policies —** The next step in financial planning and decision making process is to formulate the financial policies which provide guides to decision making for attainment of both long-term and short-term financial objectives. For example, the company can frame its financial policies like:

a. Debt-equity ratio and current ratio of the firm may be fixed at 3:2 and 2:1 respectively.

b. A minimum cash balance has to be maintained at ₹1,00,000 always.

c. The minimum and maximum levels are to be fixed for all items of raw material and consumable.

d. The equity to be raised only by issue of equity shares.

e. Profitability centre concept to be implemented for all divisions in the organization.

f. The inter-divisional transfers to be priced at pre-determined transfer prices etc.

iv) **Designing Financial Procedures —** The financial procedures help the Finance manager in day to day functioning, by following the pre-determined procedures. The financial decisions are implemented to achieve the organizational goals and financial objectives. The financial procedures outline the cash flow control system, setting up of standards of performance, continuous evaluation process, capital budgeting procedures, capital expenditure authorization procedures, financial forecasting techniques to be used, preparation standard set of ratios, using of budgetary control system etc.

v) **Search for Opportunities —** This involves a continuous search for opportunities which are compatible with the firm's objectives. The earlier opportunity is identified the greater should be the potential returns before competitors and imitators react.

vi) **Identifying Possible Course of Action —** This requires the development of business strategies from which individual decisions emanate. The available courses of action should be identified keeping in view the marketing, financial and legal restrictions or other forces not within the control of decision maker. For example, the additional funds requirement for expansion of the plant can be met by rising of finances from various sources.

vii) **Screening of Alternatives —** Each course of action is subjected to preliminary screening process in order to assess its feasibility considering the resources required, expected returns and risks involved. Readily available information must be used to ascertain whether the course of action is compatible with existing business and corporate objectives and likely returns can compensate for the risks involved.

viii) **Assembling of Information —** The Finance manager must be able to recognize the information needs and sources of information relevant to the decision. The cost-benefit trade-off must be kept in view in information gathering. To obtain more reliable information, the costs may be heavy in data gathering. The relevant and reliable information ensures the correct decision making and confidence in the decision outcome.

ix) **Evaluation of Alternatives and Reaching a Decision —** This step will involve the evaluation of different alternatives and their possible outcomes. This involves comparing the options by using the relevant data in such a way as to identify the best possible course of action that can enable in achieving the corporate objectives in the light of prevailing circumstances.

x) **Implementation, Monitoring and Control —** After the course of decision is selected, attempts to be made to implement the decision to achieve the desired results. The progress of action should be continuously monitored by comparing the actual results with the desired results. The progress should be monitored with feedback reports, control reports, post audits, performance audits, progress reports etc. Any deviations

from planned course of action should be rectified by making supplementary decisions.

Cross Border Leasing

Cross-border leasing is a leasing arrangement where lessor and lessee are situated in different countries. Cross-border leasing can be considered as an alternative to equipment loans to foreign buyers, the only difference being the documentation, with down payments, payment streams, and lease-end options the same as offered under Equipment Loans. Operating leases may be feasible for exports of large equipment with a long economic life relative to the lease term.

Objectives of Cross Border Leasing:

i) **Overall Cost of Financing:** A major objective of cross-border leases is to reduce the overall cost of financing through utilization by the lessor of tax depreciation allowances to reduce its taxable income. The tax savings are passed through to the lessee as a lower cost of finance. The basic prerequisites are relatively high tax rates in the lessor's country, liberal depreciation rules and either very flexible or very formalistic rules governing tax ownership.

ii) **Security:** The lessor is often able to utilize non-recourse debt to finance a substantial portion of the equipment cost. The debt is secured by among other things, a mortgage on the equipment and by an assignment of the right to receive payments under the lease.

iii) **Accounting Treatment:** Also, depending on the structure, in some countries the lessor can utilize very favourable "Leveraged Lease" Financial Accounting treatment for the overall transaction.

iv) **Repossession:** In some countries, it is easier for a lessor to repossess the leased equipment following a Lessee default because the lessor is an owner and not a mere secured lender.

9. The R & G Co. has following capital structure at 31st March 2013, which is considered to be optimum -

Particulars	Amount (in ₹)
13% Debentures	3,60,000
11% Preference share Capital	1,20,000
Equity Share Capital (2,00,000 Shares)	19,20,000

The Company's Share has a current Market Price of ₹ 27.75 per Share. The expected Dividend per Share in the next year is 50 percent of the 2008 EPS. The EPS of last 10 years is as follows. The past trends are expected to continue -

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
EPS(₹)	1.00	1.120	1.254	1.405	1.574	1.762	1.974	2.211	2.476	2.773

The company can Issue 14 percent New Debenture. The Company's Debenture is currently selling at ₹ 98. The New Preference Issue can be sold at a net price of ₹ 9.80, paying a dividend of ₹1.20 per share. The Company's marginal tax rate is 50%.

i. **Calculate the After Tax Cost (a) of new Debt and new Preference Share Capital, (b) of ordinary Equity, assuming new Equity comes from Retained Earnings.**

ii. **Calculate the Marginal Cost of Capital.**

iii. **How much can be spent for Capital Investment before new ordinary share must be sold? Assuming that retained earnings available for next year's Investment are 50% of 2004 earnings.**

iv. **What will be Marginal Cost of Capital(cost of fund raised in excess of the amount calculated in part (3) if the Company can sell new ordinary shares to net ₹ 20 per share? The cost of Debt and of Preference Capital is constant.**

Answer:

Computation of Cost of Additional Capital (component wise)

1. (a) After Tax Cost of New Debt	$\frac{\text{Interest} \times \text{TaxRate}}{\text{Net Proceeds of issue}} = \frac{14 \times 50\%}{105.54}$	= 6.63% **(Note 1)**
1. (a) After Tax Cost of New =Preference Share Capital	$\frac{\text{Preference Dividend}}{\text{Net Proceeds of issue}} = \frac{₹1.20}{₹9.80}$	= 12.24%
1. (b) After Tax Cost of Ordinary Equity	$(DPS + MPS) + g = \frac{(2.773 \times 50\%)}{27.75} + 12\%$	= 17.00% **(Note 2)**

Note 1: Since Current 13% Debenture is selling at ₹ 98 (₹100 presumed as Par Value), the Company can sell 14% New Debentures at (14%× 98) ÷ 13% = ₹105.54 approximately. Alternatively, K_d can also be computed as (₹14 × 50%) ÷ ₹ 98 = **7.14%.**

Note 2: For computing "**g**" i.e. Growth Rate under Realised Yield Method, the past average Growth Rate is at **12%**, in the following manner-

Year	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
** EPS (₹)	1.00	1.120	1.254	1.405	1.574	1.762	1.974	2.211	2.476	2.773
Additional	—	0.120	0.134	0.151	0.169	0.188	0.212	0.237	0.265	0.297
Increase (%)	—	12.00	11.96	12.04	12.03	11.94	12.03	12.01	11.99	12.00

Note: % Increase in EPS = Additional EPS ÷ Previous Year EPS e.g. 0.120 ÷ 1.00 etc.

Marginal Cost of Capital: Since the present Capital Structure is optimum (*Refer 1st sentence in the)*, the additional funds will be raised in the same ratio in order to maintain the capital structure. Hence, Marginal Cost of Capital is **15.20%,** computed as under:

Component	Amount	%	Individual	WACC
Debt	3,60,000	15%	K_d = 6.63%	0.99%
Preference Capital	1,20,000	5%	K_p = 12.24%	0.61%
Equity Capital	19,20,000	80%	K_e = 17.00%	13.60%
Total	**24,00,000**	**100%**	**WACC = K_0 =**	**15.20%**

Note: When K_d is taken at 7.14%, K_o will be **15.28%.**

Retained Earnings available for further investments = 50% of 2008 EPS
= 50%× ₹ 2.773×2, 00,000 Shares
= **₹ 2, 77,300**

Hence, amount to be spent before selling new ordinary shares = ₹ 2, 77,300.

Since Equity is 80% of the total funds employed, the total capital before issuing fresh equity shares = ₹ 2, 77,300 ÷ 80% = **₹ 3, 46,625.**

Computation of Revised Marginal Cost of Capital if Equity Issue is made at ₹ 20 per share

Revised Cost of Ordinary Equity = (DPS ÷ MPS) +g = $\frac{2.773 \times 50\%}{27.75} + 12\%$ = 18.30%

if MPS (i.e. Issue Price) = ₹ 20

Component	Amount	%	Individual	WACC
Debt	3,60,000	15%	K_d = 6.63%	0.99%
Preference Capital	1,20,000	5%	K_p = 12.24%	0.61%
Equity Capital	19,20,000	80%	K_e = 18.93%	15.15%
Total	**24,00,000**	**100%**	**WACC = K_0**	**16.75%**

Note: When K_d is taken at 7.14%, Revised K_o will be **16.82%.**

10.

(a) What is the influence of corporate taxation on corporate financing? Mention the different methods of structuring a lease rental.

(b) XYZ Ltd. provides you the following information:

Installed capacity	**1,50,000 units**
Actual production and sales	**1,00,000 units**
Selling price per unit	**Re. 1**
Variable cost per unit	**Re. 0.50**
Fixed costs	**₹ 38,000**
Funds required	**₹ 1,00,000**

	Financial plan		
Capital structure	**A**	**B**	**C**
Equity shares of ₹ 100 each to be issued at 25% premium	**60%**	**40%**	**35%**
15% debt	**40%**	**60%**	**50%**
10% preference shares ₹ 100 each	**-**	**-**	**15%**

(Assume Income tax @ 40%)

Required:

i. **To calculate the degree of operating leverage, degree of financial leverage and degree to combined leverage for each financial plan.**
ii. **To calculate earnings per share and market price per share if price earning ratio in Plan A is 10 times and in Plan B and C is 8 times.**
iii. **To suggest which form of financing should be employed if the firm follows the policy of seeking to maximize the price of its shares.**
iv. **To calculate the indifference point between A and B plan.**
v. **To calculate the financial breakeven point for each plan and to suggest which plan has more financial risk.**
vi. **To calculate the cost breakeven point.**

Answer: 10 (a)

a) The influence of corporate taxation on corporate financing can be analysed in the following areas—

1. **Financing Decisions — Cost of Capital:** Debt is cheaper than Equity since interest payable on loan is a charge on profit and will reduce the tax payable by the company. The use of cheaper cost debt funds has a leverage effect and increases the EPS of the company.

2. **Investment Decisions — Capital Budgeting:** For project evaluation, the Cash Flows after Taxes (CFAT) are relevant for discounting purposes. Cash Outflows may also be reduced due 'to various deductions and allowances. The incidence of tax on income and on capital gains affects cash flows and investment decisions.

3. **Dividend Decisions — Retention vs. Payment:** Tax is one of the major considerations in taking decisions on the amount and rate of dividend. Whether the company should retain all its earnings or distribute ail earnings as dividend, also depends on tax incidence on the Company and its shareholders. The levy of taxes on dividends pushes the cost of equity capital of the company.

4. **Evaluation of Cash Flows:** Depreciation is not an outgo in cash but it is deductible in computing the income subject in tax. There will be saving in tax on depreciation, and such savings could be profitably employed. Thus, both interest and depreciation provide tax shield and have a tendency to increase EPS.

5. **Rehabilitation of Sick Units:** Unabsorbed Depreciation can be carried forward for 8 years, and this can be carried for set off in another Company's profit in case of amalgamations in specified circumstances. Such a provision will help in the growth of Companies and rehabilitation of sick units.

6. **Protection of Internal Funds:** Tax implications should be taken care off in choosing the size and nature of industry and incentives are given for backward areas. Tax considerations are relevant for purpose of preserving and protecting internal funds.

Different Methods of Structuring a Lease Rental

Structuring of a Lease Rental refers to the determination of the timing and the amount of lease rentals. Lease rentals are tailor-made to enable the lessee to pay from the funds generated from its operations. Lease rentals can be of the following types

(a) Equal Annual Plan: Here the lease rentals are charged equally throughout the period of the Lease.

(b) Deferred Lease Rentals: Here the rentals are structured in such a manner that there is a moratorium for an agreed initial period, so that the lease rentals can be paid as and when funds are generated from the operations of the lessee.

(c) Stepped up Lease Rentals: Here, there is a constant rate of increase in the amount of Lease Rentals charged throughout the period of lease.

(d) Balloon Lease Rentals: Here the lease rent is generally low throughout the lease, but a payment called as Balloon payment is required to be paid at a future date. This is a lump sum payment which seeks to cover the shortfall in the lease rentals collected each year. Subsequently, normal lease rentals are charged.

Example: If profits from the leased plant start from the third year and go on increasing, then lessee will structure the installments of the plant in such a way that he will pay more amounts n the 4th year and onwards i.e. Ballooned lease rentals.

Answer: 10 (b)

Part (i), (ii) and (iii) Statement showing the calculation of degree of various leverages etc.

Particulars	Financial Plan A ₹	Financial Plan B ₹	Financial Plan C ₹
Sales	1,00,000	1,00,000	1,00,000
Less : Variable cost	50,000	50,000	50,000
Contribution	50,000	50,000	50,000
Less : Fixed Costs	38,000	38,000	38,000
Earnings before Interest & tax (EBIT)	12,000	12,000	12,000
Less : Interest	6,000	9,000	7,500
Earnings before tax (EBIT)	6,000	3,000	4,500
Less : Tax @ 40%	2,400	1,200	1,800
Earnings after tax (EAT)	3,600	1,800	2,700
Less : Pref. Dividend	-	-	1,500
Earnings for equity shareholders	3,600	1,800	1,200
No. of equity shares	480	320	280
Earnings per share (EPS)	7.5	5.625	4.286
Price earning ratio	10	8	8
Market price	75	45	34.286
Operating leverage (Contribution/ EBIT)	4.167	4.167	4.167
Financial leverage	2.000	4.000	6.000

$\text{EBIT/EBT}\left[\frac{\text{EBT}}{\text{EBT}-\frac{\text{Pref Dividend}}{1-t}}\right]$			
Combined leverage (Operating leverage x Financial Leverage)	8.334	16.668	25.002

Recommendation: The market price is highest under Financial Plan A, therefore Financial Plan A is recommended.

(iv) Calculation of Indifference Point between Plan A and Plan B

Particulars	Plan A	Plan B
EBIT	X	X
Less : Interest	6,000	9,000
EBT	X – 6,000	X – 9,000
Less : Tax @ 40%	0.4X – 2,400	0.4X – 3,600
EAT	0.6X – 3,600	0.6X – 5,400
No. of shares	480	320
EPS	$\frac{0.6X-3,600}{480}$	$\frac{0.6X-5,400}{320}$

At different point, EPS under both plans will be equal.

$$\frac{0.6X-3,600}{480} = \frac{0.6X-5,400}{320}$$

$$192X - 11,52,000 = 288X - 25,92,000$$
$$96X = 14,40,000$$
$$X = 15,000$$

The indifference point between Plan A and Plan B is at the EBIT level of ₹ 15,000

(v) Statement showing the calculation of Financial BEP

Particulars	Plan A	Plan B	Plan C
Interest	6,000	9,000	7,500
Preference dividend (after grossing up to tax) $\left[\frac{\text{Preference Dividend}}{1-t}\right]$	-	-	2,500
Financial BEP	6,000	9,000	10,000

Comment: Since financial BEP for Plan C is highest, Plan C has the highest Financial Risk.

(vi) Statement showing the calculation of Cost or operating BEP

Particulars	Plan A	Plan B	Plan C
Fixed cost	38,000	38,000	38,000
P/V Ratio	50%	50%	50%

Cost BEP (in ₹) $\left[\frac{\text{Fixed Cost}}{\text{P/V Ratio}}\right]$	76,000	76,000	76,000
Cost BEP (in units) [BEP /Selling price per unit]	76,000	76,000	76,000

11.

(a) You are analyzing the beta for ABC Computers Ltd. and have dividend the Company into four broad business groups, with market values and betas for each group.

Business Group	Market value of Equity	Unleveraged beta
Main frames	**₹100 billion**	**1.10**
Personal Computers	**₹ 100 billion**	**1.50**
Software	**₹ 50 billion**	**2.00**
Printers	**₹ 150 billion**	**1.00**

ABC Computers Ltd. had ₹ 50 billion in debt outstanding.

Required:

i. Estimate the beta for ABC Computers Ltd. as a Company. Is this beta going to be equal to the beta estimated by regressing past returns on ABC Computers stock against a market index. Why or Why not?

ii. If the treasury bond rate is 7.5% estimate the cost of equity of ABC Computers Ltd. Estimate the cost of equity for each division. Which cost of equity would you use to value the printer division? The average market risk premium is 8.5%.

(b) Venture Capital is considered to be a high risk capital. Do you agree? Enumerate the main features of Venture Capital investment.

Answer: 11 (a)

1. Computation of Company Bets:

Group	Market value	Proportion	Unleveraged beta	Product beta
Mainframe	₹100 billion	25%	1.10	0.275
Presonal Computer	₹100 billion	25%	1.50	0.375
Software	₹ 50 billion	12.5%	2.00	0.250
Printers	₹150 billion	37.5%	1.00	0.375
Total	**₹ 400 billion**	**100%**	**Unleveraged beta of portfolio**	**1.275**

Note: Beta measures the volatility of ABC Computers' stock returns against a broad-

based market portfolio. In the above case, the beta is calculated for four business groups in a computer segment and not a broad-based market portfolio. Hence, beta calculations will not be the same, as such.

Beta of the Leveraged Firm B(L)=Beta of Unleveraged FirmB(U)×[(Equity+ Debt)÷Equity]

= 1.275 × [(400 + 50) ÷ 400]

= **1.434**

Market Index Relationship: This leveraged Beta of **1.434** will be equal to the Beta estimated by regressing returns on ABC Computers stock against a market index. The reasoning is as under-

1. The Beta of a security is a measure of return for the systematic risk of that security, relative to the market i.e. its Systematic Risk.
2. A portfolio generally consists of a well - diversified set of securities.
3. The Systematic Risk cannot be diversified away, and hence, the Beta of a portfolio is the **value - weighted beta** of the securities constituting the portfolio.
4. The Beta of a portfolio depicts the systematic Risk (i.e. Non-Diversifiable Risk) of the portfolio itself.
5. Cost of **Equity for ABC Computers** =Return of Risk Free Securities + (Market Risk premium × Beta) =7.50% + (8.50% × 1.434) = **19.69%**
6. **Cost of Equity for each Division**

Division	Cost of Equity for each Division = **Return of Risk Free Securities + (Market Risk premium × Beta)**
Mainframe	= 7.50% + (8.50% × 1.10) = 16.85%
Personal Computer	= 7.50% + (8.50% × 1.50) = 20.25%
Software	= 7.50% + (8.50% × 1.10) = 24.50%
Printers	= 7.50% + (8.50% × 1.00) = 16.00%

For valuing Printer Division, K_e of 16% would be used.

Answer: 11 (b)

The venture capital can be defined as the "long term equity investments in business which displays potential for significant growth and financial return".

The term 'venture capital' comprises of two words viz. 'venture' and 'capital'. The dictionary meaning of 'venture' is a course of proceedings associated with risk, the outcome of which is uncertain and 'capital means resources to start the enterprise. In a narrower sense venture capital is understood as the capital which is available for financing new venture. Broadly, it can be interpreted as the investment of long-term equity finance where the venture capitalist earns his return from capital gain.

The venture capital financing refers to the financing of new high risky venture promoted by qualified entrepreneurs who lack experience and funds to give shape to their ideas. In a broad sense, under venture capital financing, venture capitalist make investment to

purchase equity of debt securities from inexperienced entrepreneurs who undertake highly risky venture with potential of success.

The main features of venture capital investment are :

i. Providing finance of entrepreneurial talents
ii. Providing capital to persons having managerial skills.
iii. Expecting a high return in the form of capital gain.

The venture capital schemes are designed to promote technological advancement and innovation through introduction of new products, process or plants and equipments. The activities which, in general need venture capital support are :

i. Commercial production of viable new process or products.
ii. Technological up-gradation, including adoption of imported technology suitable to Indian condition.
iii. Energy conservation with innovative technology.
iv. Commercial exploitation of proven technology.

Thus, the distinguishing characteristic of venture capital sources is an investment policy aimed at achieving most of the profit through capital gain.

12.

(a) Explain what is meant by Free Cash Flow?

(b) Elite Builders has been approached by a foreign embassy to build for it a block of six flats to be used as guest houses. As per the terms of the contract, the foreign embassy would provide Elite Builders the plans and the land costing ₹25 lakhs. Elite Builders would build the flats at their own cost and lease them to the foreign embassy for 15years. At the end of which the flats will be transferred to the foreign embassy for a nominal value of ₹ 8 lakh. Elite Builders estimates the cost of constructions as follows:

Area per flat, 1,000 sq. feet ; Construction cost, ₹400 per sq. feet ; Registration and other costs, 2.5 per cent of cost of construction; Elite Builders will also incur ₹4 lakhs each in years 14 and 15 towards repairs.

Elite Builders proposes to charge the lease rentals as follows:

Years	Rentals
1 - 5	Normal
6 – 10	120 per cent of normal
11 - 15	150 per cent of normal

Elite builders present tax rate averages at 35 per cent which is likely to be the same in future. The full cost of construction and registration will be written off over 15 years at a uniform rate and will be allowed for tax purposes.

You are required to calculate the normal lease rental per annum per flat. For your exercise you may assume: (a) Minimum desired return of 10 per cent, (b) Rentals and repairs will arise on the last day of the year, and, (c) Construction, registration and other costs will be incurred at time= 0.

Answer: 12 (a)

Free Cash Flow is the cash flow available to a company from operations after interest expenses, tax, debt repayments and lease obligations, any charge in working capital and capital spending on assets needed to continue existing operations. The free cash

flow is the legitimate cash flow for the purpose of business valuation in that it reflects the cash flows generated by a company's operations for all the providers (debt and equity) of its capital. The free cash flow is a more comprehensive term as it includes cash flows due to after tax non-operating income as well as adjustment for non-operating assets.
The procedure of determining FCF is exhibited below:

Operating earning after tax	xxxxxx	
Add: Depreciation, amortization and other non-cash items	xxxxxx	
Less: Investments in long term assets	xxxxxx	
Less: Investments in operating net working capital	xxxxxx	
Operating free cash flows	xxxxxx	
Add: Non-operating income/ cash flows after tax	xxxxxx	
Add: Decrease 9less in increase) in non-operating assets (Say marketable securities)	xxxxx	
Free Cash Flow		xxxxx

A company that generates sufficient free cash flow has to decide how to use this cash flow. Primarily the cash should be invested in such investments as will increase the shareholder wealth.
Any surplus cash after all positive NPV investments have been undertaken, should be returned to the shareholders, in the form of (i) dividends or, (ii) by share repurchase.

Answer: 12 (b)

Calculation of present value of Cash out flow: (₹)

Cost of construction 400x1,000x6		24,00,000
Registration and other costs @ 2.5%		60,000
Cost of Repairs	4,00,000	
(-) tax savings @ 35%	1,40,000	
	2,60,000	
At t_{14} = Present value = 2,60,000 x 0.26333 = 68466		
At t_{15} = present value = 2,60,000 x 0.23939 = 62241		
		1,30,707
		25,90,707 (Rounded off to 25,90,700)

Let 'X' be Normal lease rent per 6 flats per annum. P/V of Recurring Cash Inflow for 15 years

Particulars	**1-5 years**	**6-10 years**	**11-15 years**
Lease Rent p.a.	X	1.2 X	1.5 X
Depreciation	164,000	164,000	164,000

PBT 24,60,000/15	X-164,000	1.2X-164000	1.5X-164,000
PAT 65 %	0.65X-106600	0.78X-106600	0.975X-106600
CIAT = PAT + Dep.	0.65X + 57400	0.78X + 57400	0.975X + 57400
PVCF	3.7908	2.3538	1.4615
PV	2.4635X + 217592	1.836X + 135108	1.42X + 83890

Total = 5.7195 X + 436590

P/V of Terminal Cash Inflows: ₹

Nominal value of flats after 15 years	800,000
Less: Tax on Profit [800000x35%]	280,000
	520,000

P/V = 520,000 x 0.239 = ₹124,280

At 10% Rate of Return: P/V of Cash Inflows = P/V of Cash outflows

5.719X + 436,590 + 124,280 = 2590700

X = ₹3,54,896 .

Lease Rent per Flat = 354896/6 = ₹59,150.

13.

(a) Info way Ltd. is considering the purchase of an automatic pack machine to replace the 2 machines which are currently used to pack Product X. The new machine would result in reduced labour costs because of the more automated nature of the process and in addition, would permit production levels to be increased by creating greater capacity at the packing stage with an anticipated rise in the demand for Product X, it has been estimated that the new machine will lead to increased profits in each of the next 3 yea₹ Due to uncertainty in demand however, the annual cash flows (including savings) resulting from purchase of the new machine cannot be fixed with certainty and have therefore, been estimated probability as follows:

Annual cost flows:

Year 1	Probability	Year 2	Probability	Year 3	Probability
10	**0.3**	**10**	**0.1**	**10**	**0.3**
15	**0.4**	**20**	**0.2**	**20**	**0.5**
20	**0.3**	**30**	**0.4**	**30**	**0.2**
		40	**0.3**		

Because of the overall uncertainty in the sales of Product X, it has been decided that only 3 years cash flows will be considered in deciding whether to purchase the new machine. After allowing for the scrap value of the existing machines, the net cost of the new machine will be ₹42,000. The effects of taxation should be ignored.

Required:

I. Ignoring the time value of money, identify which combinations of annual cash flows will lead to an overall negative net cash flow, and determine the total probability of this occurring.

II. One the basis of the average cost flow for each year, calculate the net present value of the new machine gives that the company's cost of capital is 15%. Relevant discount factors are as follows:

Year	Discount factor
1	0.8696
2	0.7561
3	0.6575

III. Analyse the risk inherent in this situation by simulating the net present value calculation. You should use the random number given at the end of the illustration in 5 sets of cash flows. On the basis of your simulation results what is the expected net present value and what is the probability of the new machine yielding a negative net present value?

	Set 1	Set 2	Set 3	Set 4	Set 5
Year 1	4	7	6	5	0
Year 2	2	4	8	0	1
Year 3	7	9	4	0	3

(b) ABC Ltd. is contemplating whether to replace an existing machine or to spend money on overhauling it. ABC Ltd. currently pays no taxes. The replacement machine costs ₹ 90,000 now and requires maintenance of ₹ 10,000 at the end of every year for eight years. At the end of eight years it would have a salvage value of ₹ 20,000 and would be sold. The existing machine requires increasing amounts of maintenance each year and its salvage value falls each year as follows :

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

The opportunity cost of capital for ABC Ltd. Is 15%.

Required:
When should the company replace the machine?
(Notes : Present value of an annuity of Re. 1 per period for 8 years at interest rate of 15% : 4.4873; present value of Re. 1 to be received after 8 years at interest rate of 15% : 0.3269)

Answer: 13 (a)

i) If the total cash flow in years 1, 2 and 3 is less than ₹42,000, the net cash flow will be negative. The combinations of cash flow which total less than ₹42,000 are given in table below:

Cash flow (₹ '000)

Year 1	Year 1	Year 1	Total	Probability
10	10	10	30	0.3 × 0.1 × 0.3 = 0.009
10	10	20	40	0.3 × 0.1 × 0.5 = 0.015
10	20	10	40	0.3 × 0.2 × 0.3 = 0.018
15	10	10	35	0.4 × 0.1 × 0.3 = 0.012
20	10	10	40	0.3 × 0.1 × 0.3 = 0.009
				Total = 0.063

The probability of a negative cash flow is 0.063

ii) Expected cash flow = Σ [Cash flow × Probability]

		(₹ '000)
Year 1 EV	= (10×0.3) + (15×0.4) + (20×0.3)	15
Year 2 EV	= (10×0.1) + (20×0.2) + (30×0.4) + (40×0.3)	29
Year 3 EV	= (10×0.3) + (20×0.5) + (30×0.2)	19

P.V. of the cash = (15×0.8696) + (29×0.7561) + (19×0.6575) = 47.4634

The net present value of the new machine = 47,463 – 42,000 = ₹ 5,463

iii) Allocate random number ranges to the cash flows for each year.

	Cashflow (₹ '000)	Probability	Random number
Year 1	10	0.3	0.2
	15	0.4	3.6
	20	0.3	7.9
Year 2	10	0.1	0
	20	0.2	1-2
	30	0.4	3-6
	40	0.3	7-9

Year 3	10 20 30	0.3 0.5 0.2	0.2 3-7 8-9

We can now carry out the simulation. (₹ 000)

Year 1			Year 2			Year 3				
No.	**Random**	**Cash**	**DCF**	**Random**	**Cash**	**DCF**	**Random**	**Cash**	**DCF**	**Net PV**
1	4	15	13.044	2	20	15.122	7	20	13.150	-6.684
2	7	20	17.392	4	30	22.683	9	30	19.725	17.800
3	6	15	13.044	8	40	30.244	4	20	13.150	14.438
4	5	15	13.044	0	10	7.561	0	10	6.575	-14.820
5	0	10	8.696	1	20	15.122	3	20	13.150	-5.032
									Total	11.702

The average net present value of the cash flow = 11,702/5 = ₹2,340.40

There out of the five simulations produced negative NPV, therefore, we estimate the probability of a negative NPV as 3/5=0.6. Since the simulation is small, the estimates are unlikely to be reliable.

Answer: 13 (b)

We need to use the equivalent annual cost method as the machine which is currently used and the replacement machine are having different lives. We first find the equivalent annual cost of new machine and then see for each of the four years the incremental cost. We choose that year in which incremental cost is least.

PV of costs of new machine =₹ 90,000 + ₹ 10,000 x PVIFA (15%, 8) – ₹ 20,000 x PVIF (15%, 8)
= ₹ 90,000 + ₹ 44,873 – ₹ 6,538
= ₹ 1,28,335

Equivalent annual cost of new machine = ₹ 1,28,335 / PVIFA (15%, 8)
= ₹ 28,600

If we replace machine now:
We get ₹ 40,000 now and then spend from the end of first year ₹ 28,600 for eight years thereafter.

If we replace machine after one year:
We do not get ₹ 40,000 now. This should be treated as lost opportunity. This should be taken as cost. Secondly, we get ₹ 25,000 at the end of the year. Thirdly, we need to spend ₹ 10,000 on maintenance. Thus,
PV of cost of old machine (if replaced after one year)
= ₹ 40,000 (opportunity cost) + ₹ 10,000 PVIF (15%, 1) – ₹ 25,000 x PVIF (15%, 1)
= ₹ 26,960

Since, we are to spend this amount after one year only; we need to find the future value of this,

= 1.15 x ₹ 26,960 = ₹ 31,000

It is very clear from the above analysis that anyone would prefer to replace it now and spend just ₹ 28,600 and thereafter, rather than spending ₹ 31,000 and ₹ 28,600 thereafter. Though similar calculation can be performed for each year's replacement, the calculations are unnecessary. This is because; the opportunity cost and increasing maintenance would only increase the equivalent annual cost of old machine. The same would be certainly higher than ₹ 28,600.

14.

(a) What is the difference between Economic Value Added and Accounting Profit?

(b) The following is the condensed Balance sheet of HTML Ltd. at the beginning and end of the year.

Balance Sheets

As at ……..

Particulars	31.12.2011	31.12.2012
Cash	50,409	40,535
Sundry debtors	77,180	73,150
Temporary investments	1,10,500	84,000
Prepaid expenses	1,210	1,155
Inventories	92,154	1,05,538
Cash surrender value of Life Insurance Policy	4,607	5,353
Land	25,000	25,000
Building, machinery etc.	1,47,778	1,82,782
Debenture discount	4,305	2,867
	5,13,143	5,20,380
Sundry creditors	1,03,087	95,656
Outstanding expenses	12,707	21,663
4% mortgage debentures	82,000	68,500
Accumulated depreciation	96,618	81,633
Allowance for inventory loss	2,000	8,500
Reserve for contingencies	1,06,731	1,34,178
Surplus in P & L A/c	10,000	10,250
Share capital	1,00,000	1,00,000
	5,13,143	5,20,380

The following information concerning the transaction is available:

i. **Net profit for 2012 as per Profit and loss account was ₹ 49,097**
ii. **A 10% cash dividend was paid during the year.**
iii. **The premiums of Life Insurance Policies were ₹ 2,773 of which ₹ 1,627 were charged to Profit and Loss Account of the year.**
iv. **New machinery was purchased for ₹ 31,365 and machinery costing ₹ 32,625 were sold during the year. Depreciation on machinery sold had accumulated to ₹ 29,105 at the date of sale. It was sold as scrap for ₹ 1,500. The remaining increase in Fixed Assets resulted from construction of a Building.**
v. **The Mortgage Debentures mature at the rate of ₹ 5,000 per year. In addition to the above, the company purchased and retired ₹ 8,500 of Debentures at ₹ 103. Both**

the premium on retirement and the applicable discount were charged to Profit and Loss Account.

vi. **The allowance for Inventory Loss was created by a charge to expenses in each year to provide for obsolete items.**

vii. **A debit to reserve for contingencies of ₹ 11,400 were made during the year. This was in respect of a past tax liability.**

You are required to prepare a statement showing the Sources and Applications of funds for the year 2012.

Answer: 14 (a)

Earning profit is not sufficient; a business should earn sufficient profit to cover its cost of capital and surplus to grow. Any surplus generated from operating activities over and above the cost of capital is termed as Economic Value Added (EVA). Economic Value Added measures economic profit/ loss as opposed to accounting profit/loss. EVA calculates profit/loss after taking into account the cost of capital, which is the weighted average cost of equity and debt.

Accounting profit on the other hand ignores cost of equity and thus overstates profit or under states loss.

EVA = NOPAT – K x WACC

Where,

NOPAT = Net operating profit after tax = EBIT (1 – t)

K = Capital employed (Equity + Debt)

WACC = Weighted average cost of equity and debt.

The estimates are fine-tuned through several adjustments. For instance, NOPAT is estimated excluding non-recurring income or expenditure. PAT is shown in the profit and loss account to include profit available to the shareholders, both preference and equity. Ability to maintain dividend is not a test of profit adequacy.

EVA is the right measures for goal setting and business planning, performance evaluation, bonus determination, capital budgeting and evaluation.

Simply stated Accounting Profit equals Sales Revenue minus all costs except the cost of equity capital, while Economic Profit is Sales Revenue minus all costs including the opportunity cost of equity capital. Thus economic profit may be lower than the accounting profit. If accounting profit equals the opportunity cost of equity capital, economic profit is zero. Only when accounting profit is greater than the opportunity cost of equity capital, economic profit is positive. Under perfect competition, all firms in the long run earn zero economic profit.

Answer: 14 (b)

Statement of Sources and Applications of Funds
For the year ended 31st December 2012

Sources	₹	Applications	₹
Sale of Machinery	1,500	Purchase of machinery	31,365
Trading profit (adjusted)	75,457	Payment for construction of building	36,264
	76,957	Dividend paid	10,000
Add: Decrease in working capital	28,600	Redemption of debentures	13,755
		Tax liability paid	11,400
		Premium on Life Policy (1,146 + 1,627)	2,773

	1,05,557		1,05,557

Workings:

Statement of Change in Working Capital

	2011 ₹		2012 ₹	
Current Assets :				
Cash		50,409		40,535
Sundry debtors		77,180		73,150
Temporary investments		1,10,500		84,000
Prepaid expenses		1,210		1,155
Inventories		92,154		1,05,538
		3,31,453		3,04,378
Less : Current Liabilities :				
Sundry creditors	1,03,087		95,656	
Out. Expenses	12,707		21,663	
		1,15,794		1,17,319
Working capital		2,15,659		1,87,059
Decrease in working capital		-		28,600
		2,15,659		2,15,659

4% Mortgage Debenture A/c.

Dr. Cr.

Particulars	₹	Particulars	₹
To, 4% Mortgage debenture holders	13,500	By bal b/d	82,000
To, Bal c/d	68,500		
	82,000		82,000

4% Mortgage Debenture holders' A/c.

Dr. Cr.

Particulars	₹	Particulars	₹
To, Bank A/c.	13,755	By, 4% Mortgage debenture a/c.	13,500
		By, P & L A/c.	255
	13,755		13,755

Accumulated Depreciation A/c.

Dr. Cr.

Particulars	₹	Particulars	₹
To, Building, machinery etc.	29,105	By, Bal b/d	96,618
To, Bal c/d	81,633	By, P & L A/c.	14,120
	1,10,738		1,10,738

Allowance for Inventory Loss A/c.

Dr. Cr.

Particulars	₹	Particulars	₹
To, Bal c/d	8,500	By, Bal b/d	2,000
		By, P & L A/c. (bal. fig.)	6,500
	8,500		8,500

Reserve for Contingencies A/c.

Dr. Cr.

Particulars	₹	Particulars	₹
To, Tax liability (paid)	11,400	By, Bal b/d	1,06,731
To, Bal c/d	1,34,178	By, P & L A/c. (bal. fig.)	38,847
	1,45,578		1,45,578

Life Insurance Policy A/c.

Dr. Cr.

Particulars	₹	Particulars	₹
To, Bal b/d	4,607	By, P & L A/c. (excess over surrender value)	400
To, Bank (premium)	1,146	By, Balance c/d	5,353
	5,753		5,753

Building and Machinery A/c.

Dr. Cr.

Particulars	₹	Particulars	₹
To, Balance b/d	1,47,778	By, Accumulated Dep.	29,105
To, Bank a/c (Purchase)	31,365	By, Bank a/c. (sales)	1,500
To, Bank a/c. (bal. fig.) (Construction cost of building)	36,264	By, P & L a/c. (loss on sale)	2,020
		By, Balance c/d	1,82,782
	2,15,407		2,15,407

Debenture Discount A/c.

Dr. Cr.

Particulars	₹	Particulars	₹
To, Balance b/d	4,305	By, P & L a/c. (bal. fig.)	1,438
		By, Balance c/d	2,867
	4,305		4,305

Profit and Loss A/c.

Dr. Cr.

Particulars	₹	Particulars	₹
To, Dividend	10,000	By, Balance b/d	10,000
To, Life insurance policy	400	By, Trading profit (adjusted bal. fig.)	75,457
To, Debenture discount	1,438		
To, Reserve for contingencies	38,847		
To, Allow. For inventory loss	6,500		
To, 4% Mort. Debenture holders	255		
To, Accumulated depreciation	14,120		
To, Building and Mach. (loss)	2,020		
To, Bank (life insurance premium)	1,627		
To, Balance c/d	10,250		
	85,457		85,457

15.

(a) From the following information, ascertain whether the firm is following an optimal dividend policy as per Walter's model :

Total earnings	**₹ 6,00,000**
No. of equity shares of ₹ 100 each	**40,000**
Dividend paid	**₹ 1,60,000**
Price-earnings (P/E) Ratio	**10**

The firm is expected to maintain its rate of return of fresh investment. What should be the P/E ratio at which dividend policy will have no effect on the value of the share ? Will your decision change if the P/E ratio is 5 instead of 10 ?

(b) Khan Ltd. has a capital of ₹ 10,00,000 in equity shares of ₹ 100 each. The shares are currently quoted at par. The company proposes declaration of a dividend of ₹ 10 per share. The capitalization rate for the risk class to which the company belongs is 12%.
What will be the market price of the share at the end of the year, if – (i) no dividend is declared; and (ii) 10% dividend is declared ?
Assuming that the company pays the dividend and has net profits of ₹ 5,00,000 and makes new investments of ₹ 10,00,000 during the period, how many new shares must be issued ? Use the M. M. Model.

Answer: 15 (a)

Calculation of market price of share under Walter's model:

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

Where P = Market price per share
E = Earnings per share
D = Dividend per share
R_a = Internal rate of return on investment
R_C = Cost of capital

Dividend per share (D) = ₹ 1,60,000 / 40,000 shares = ₹ 4
Earnings per share (E) = ₹ 6,00,000 / 40,000 shares = ₹ 15

Rate of return on firms investment (R_a)

$$= \frac{₹\ 6,00,000}{₹\ 40,00,000} \times 100 = 15\% \text{ of } 0.15$$

R_C = Cost of capital (inverse of P/E ratio i.e. 1/10) = 0.10

$$P = \frac{4 + \left(\frac{0.15}{0.10}\right)(5 - 4)}{0.10} = \frac{20.50}{0.10} = ₹205$$

Calculation of P/E ratio at which dividend policy will have no effect on the value of the share

Firm's dividend payout ratio = $\frac{₹\ 1,60,000}{₹\ 6,00,000} = 0.2667$ or 26.67%

Rate of return of the firm (R_a) is 15%, which is more than its cost of capital (R_c) is 10%. Therefore, by distributing 16.67% of earnings, the firm is not following an optimal dividend policy. The optimal dividend policy for the firm would be to pay zero dividends and in such case, the market value of share under Walter's model would be as follows:

$$P = \frac{4+\left(\frac{0.15}{0.10}\right)(5-0)}{0.10} = \frac{22.50}{0.10} = ₹\ 225$$

The market value of the share would increase by not paying dividend and by retaining all the earnings of the company.

Calculation of market value of share when P/E ratio is 5 instead of 10.

The R_c of the firm is the inverse of P/E ratio i.e. 1/5 = 0.20. In such case $R_c > R_a$

$$P = \frac{4+\left(\frac{0.15}{0.20}\right)(5-4)}{0.20} = \frac{12.25}{0.20} = ₹\ 61.25$$

The P/E ratio at which the dividend policy will have no effect on the value of the firm when R_c is equal to the rate of return of the firm R_a. Under the situation, P/E ratio is 5, the optimum dividend policy for the company would be 100% dividend payout at which the value of the firm would be maximum.

Answer: 15 (b)

(i) Calculation of share price under MM – Dividend Irrelevancy Model

$$P_0 = \frac{P_1 + D_1}{1+K_e}$$

(a) When dividend is not declared

$$100 = \frac{P_1 + 0}{1+0.12} \qquad P_1 = 100 \times 1.12 = ₹\ 112$$

(b) When dividend is declared

$$100 = \frac{P_1 + 10}{1+0.12} \qquad P_1 + 10 = 100 \times 1.12 = ₹\ 102$$

(ii) Calculation of No. of shares to be issued **(₹)**

Particulars		If no dividend declared	If dividend declared
Net income		5,00,000	5,00,000
Less : Dividend paid		-	1,00,000
Retained earnings		5,00,000	4,00,000
New investments		10,00,000	10,00,000
Amount to be raised by issue of new shares	(i)	5,00,000	6,00,000
Market price per share	(ii)	112	102
No. of new shares to be issued	(i)/(ii)	4,464	5,882

Verification of M. M. Dividend Irrelevancy Theory

Particulars		If no dividend declared	If dividend declared
Existing shares		10,000	10,000
New shares		4,464	5,882
Total no. of shares at the yearend	(i)	14,464	15,882
Market price per share	(ii)	₹ 112	₹ 102
Total market value of shares at the end of year (i)x(ii)		₹ 16,20,000	₹ 16,20,000

Analysis – The market value of shares at the end of year will remain the same whether dividends are distributed or not declared.

16.

(a) Describe the Little – Mirrlees approach to Social Cost Benefit Analysis (SCBA) of a project and the Indian modification of the same.

(b) Superior Engineering proposes a project with the following data:

i. Total asset: ₹ 450 lakhs (₹ 250 lakhs of Fixed Assets and ₹ 200 lakhs of Current Assets)

ii. Scheme of financing: ₹ 100 lakhs equity, ₹ 200 lakhs term loan, ₹ 100 lakhs working capital advance and ₹ 50 lakhs trade creditors.

iii. Interest rate: Term loan 12% p.a. and working capital advance: 15% p.a.

iv. Term loan is repayable in 5 equal installments, commencing from 3rd year of operations. (Assume that installment for each year is paid on the last day of the year).

v. Depreciation: 30% on written down value.

vi. Production is expected to reach 60% of capacity in the 1st year of operations, 70% in the 2nd year and 80% from the 3rd year onwards.

vii. Expected revenue from the project will be ₹ 500 lakhs p.a. on 10% capacity utilization and corresponding Direct Costs are ₹ 200 lakhs. Fixed costs are ₹ 100 lakhs p.a. Working capital advance of ₹ 100 lakhs is on 80% capacity and proportionately reduced in the first two years.

viii. Tax rate applicable is 50%.

Assuming that each year's production is sold away in the same year, draw the projected profit & loss account for each year of operation and the operational cash flow. Also calculate the Debt Service Coverage Ratio.

Answer: 16 (a)

In Social Cost Benefit Analysis (SCBA), the focus is on social costs and benefits of a project. These often tend to differ from the costs incurred in monetary terms and benefits earned in monetary terms of the project.

The principal reasons for the discrepancies are:

i. Market imperfections
ii. Externalities
iii. Taxes and levies
iv. Concern for savings
v. Concern for redistribution and
vi. Merit and demerit of goods.

Little-Mirrlees approach to SCBA involved determining the accounting of shadow prices particularly for foreign exchange, savings and unskilled labour, considering the equity factor and the use of Discounted Cash Flow (DCF) analysis. It seeks to measure costs and

benefits in terms of international prices, rather than in terms of domestic prices and also in terms of uncommitted social income.

The Project Appraisal Division of the Planning Commission uses a modified and simplified version of the Little-Mirrlees approach. All industrial projects are evaluated on three aspects – economic rate of return, effective rate of protection and domestic resource cost.

To calculate economic rate of return, the domestic market prices are substituted with international prices for all non-labour inputs and outputs. CIF prices for inputs and FOB prices for outputs are used for all tradable items. For tradable items where international prices are not available and for non-tradable items, social conversion factors are used.

The effective rate of protection is calculated as follows:

$$\left[\frac{(\text{Value added at domestic prices}) - (\text{Value added at worldprices}) \times 100}{(\text{Value added at worldprices})}\right]$$

Domestic selling prices are net of taxes and excise duty but inclusive of selling commission. The selling price at world prices is the CIF value for imports and FOB value for exports.

Domestic Resource Cost is computed as:

[(Value added at domestic prices)/ (Value added at world prices)] x Exchange Rate.

Answer: 16 (b)

Projected Profit & Loss Account

Year of operation	1	2	3	4	5	6	7
Capacity utilization (%)	60	70	80	80	80	80	80
							(₹ In lakhs)
Revenue	300	350	400	400	400	400	400
Direct variable costs	120	140	160	160	160	160	160
Fixed costs	100	100	100	100	100	100	100
Int. on working cap. adv.	11.25	13.13	15.00	15.00	15.00	15.00	15.00
Profit before depreciation & interest on term loan	68.75	96.87	125.00	125.00	125.00	125.00	125.00
Depreciation	75.00	52.50	36.75	25.73	18.01	12.61	8.82
Interest on term loan	24.00	24.00	24.00	19.20	14.40	9.60	4.80
Profit after dep. & int.	(-)30.25	20.37	64.25	80.07	92.59	102.80	111.38
Tax @ 50%	--	10.19	32.13	40.04	46.30	51.40	55.69
PAT	--	10.19	32.13	40.04	46.30	51.40	55.69
Operational cash flow (PAT + Dep. + Int. on term loan)	68.75	86.68	92.87	84.96	78.70	73.60	69.31
Payments							
Int. on term loans	24.00	24.00	24.00	19.20	14.40	9.60	4.80
Repayment of terms loan	--	--	40.00	40.00	40.00	40.00	40.00
Total	24.00	24.00	64.00	59.20	54.40	49.60	44.80
DSCR (Op. cash flow/	2.86	3.61	1.45	1.44	1.45	1.48	1.55

Total payments)							

Average DSCR = (Total operation cash flow) / (Total payment against debts)
= (554.87 ÷ 320.00) = 1.73.

17.

(a) What category should the following projects be attributed to – Balancing/ Modernisation/Replacement/ Expansion/ Diversification/ Rehabilitation – or a combination of the above? Justify your answer.

i. Duracare Ltd., a company producing consumer durables has been having been severe production constraints due to frequent and long disruption of power supply. They have their own captive power generation facility which can meet 75% of their capacity. They are considering augmenting their own generation to take care of their entire capacity at an investment of ₹ 60 lakhs.

ii. XYZ Ltd., produces blue detergent powder. Recent studies carried out by marketing indicate that there is a growing opportunity for white detergent powder. Producing detergent powders in two different colours in the same plant requires modification to the existing plant such as, additional facilities for storage and handling. The total investment involved would be ₹ 85 lakhs.

iii. Economic Producers Ltd., is an ancillary unit producing components for trucks. Their main machinery was installed 17 years back. The equipment is frequently breaking down throwing the delivery schedules out of balance. The equipment can produce 700 components per day. New equipment available for producing the same component costs ₹ 25 lakhs with a delivery time of 3 months.

iv. Sri Ajit Singh owns 25 acres of land on which he grows wheat. He is planning to buy a tractor to speed up his farm operations as well as reduce input costs.

v. Milk Products Ltd., is in dairy business, producing milk powder and ghee. Recently, a market survey carried out by the consultants appointed by the company indicates an opportunity for selling cheese. The total outlay in terms of capital expenditure would be ₹ 270 lakhs.

(b) The projected cash flows and the expected net abandonment values for a project are given below:

Year	Cash inflows (₹)	Abandonment value (₹)
0	(-) 1,00,000	Nil
1	35,000	65,000
2	30,000	45,000
3	25,000	20,000
4	20,000	Nil

Should the project be abandoned and if so, when?
Cost of capital may be taken as 10%.
Present value (PV) factor @ 10% is 1.000, 0.909, 0.826, 0.751 an d0.683 for 0,1,2,3 & 4 years respectively.

Answer: 17 (a)

Project classification:

i. This is a case of Balancing Project in which the capacity of power generation is being augmented by investing ₹ 60 lakhs to cope up with interruptions in power supply and to ensure continuous production.

ii. This is a case of Modernisation through expansion. The present plant needs sufficient modification to adapt to different colour combinations in detergents along with additional facilities in terms of storage capacity. Thus, it is decided to expand the present warehouse and handling facilities by investing ₹ 85 lakhs.

iii. This is a Replacement Project. Since the existing machinery was installed 17 years back and is insufficient to support the present demands of the market. It needs to be replaced rather than modified or modernized.

iv. This is a case of Modernisation of the farming process. By using tractors on farm land, the farming can be done more productively than in the case of a conventional process. Therefore, Shri Ajit Singh is intending to modernize his operations, which would reduce his time & energy and optimize his costs, while increasing the output considerably.

v. This is a case of Diversification. Since Milk Products Ltd. is already in the business of dairy products, it simply is extending the product line in its existing line of business.

Answer: 17 (b)

Expected NPV over 4 years of economic life:

Year	Cash flow (₹)	Abandonment value (₹)	PV factor @ 10%	NPV (₹) of cash flow	NPV (₹) of abandonment value
0	(-) 1,00,000	-	1.000	(-) 1,00,000	-
1	35,000	65,000	0.909	31,815	59,085
2	30,000	45,000	0.826	24,780	37,170
3	25,000	20,000	0.751	18,775	15,020
4	20,000	-	0.683	13,660	-
Total				(-) 10,970	

From the table above, the Total NPV of the project (NPV of cash flows + NPV of abandonment value) at the end of each year are computed as shown below:

Year	Total NPV at the end of			
	3 years	2 years	1 year	
0	(-) 1,00,000	(-) 1,00,000	(-) 1,00,000	
1	31,815	31,815	31,815	
			59,085	Abandonment value
2	24,780	24,780		
		37,170	Abandonment value	
3	18,775			
	15,020	Abandonment value		
Total	(-) 9,610	(-) 6,235	(-) 9,100	

Conclusion: The project should be abandoned since there is no +ve NPV at the end of any year. Further, it should be abandoned at the end of 2nd year, where the losses are the minimal.

18. From the following information prepare cash flow statement:

Better Ltd.

Balance Sheet as at 31-12-2011 and 31-12-2012

					(₹ in thousands)
Ref No.	**Particulars**		**Note No.**	**31.12.2012**	**31.12.2011**
I		**EQUITY AND LIABILITIES**			
	1	**Shareholders' fund**			
		(a) Share capital		1,500	1,250
		(b) Reserves and surplus		3,410	1,380
		(c) Money received against share warrants			
	2	**Share application money pending allotment**			
	3	**Non-current liabilities**			
		(a) Long-term borrowings		1,110	1,040
		(b)Deferred tax liabilities (Net)			
		(c)Other Long term liabilities			
		(d) Long-term provisions			
	4	**Current Liabilities**			
		(a) Short-term borrowings			
		(b) Trade payables		150	1,890
		(c)Other current liabilities		230	100
		(d) Short-term provisions		400	1,000

					(₹ in thousands)
Ref No.	**Particulars**		**Note No.**	**31.12.2012**	**31.12.2011**
		Total		**6,800**	**6,660**
II		**ASSETS**			
	1	Non-current assets			
		(a) Fixed assets			
		(i) Tangible assets		730	850
		(ii) Intangible assets			
		(iii) Capital work-in-progress			
		(iv) Intangible assets under development			
		(b) Non-current investments		2,500	2,500
		(c)Deferred tax assets (Net)			
		(d) Long-term loans and advances			
		(e) Other non-current assets			
	2	**Current assets**			
		(a)Current investments		670	135
		(b) Inventories		900	1,950
		(c) Trade receivables		1,700	1,200
		(d) Cash and cash equivalents		200	25
		(e)Short-term loans and advances			

					(₹ in thousands)
Ref No.	**Particulars**		**Note No.**	**31.12.2012**	**31.12.2011**
		(f) Other current assets			
		Total		**6,800**	**6,660**

Notes on Accounts

(₹ in thousands)

1. Other Current Liabilities	**31.12.2012**	**31.12.2011**
Interest Payable	230	100
Total	230	100

(₹ in thousands)

2.Short Term Provision	**31.12.2012**	**31.12.2011**
Income Tax Payable	400	1,000
Total	400	1,000

(₹ in thousands)

3. Fixed Assets	**31.12.2012**	**31.12.2011**
Fixed Assets at cost	2,180	1,910
Less: Accumulated Depreciation	1,450	1,060
Total	730	850

(₹ in thousands)

4. Other Current Assets	**31.12.2012**	**31.12.2011**
Interest Receivable	100	-
Total	100	-

Statement of Profit and Loss for the year ended 31-12-2012 *(₹ in thousands)*

Sales	30,650
Cost of sales	(26,000)
Gross profit	4,650
Depreciation	(450)
Administration and selling expenses	(910)
Interest expenses	(400)
Interest income	300
Dividend income	200
Foreign exchange loss	(40)
Net profit before taxation and extraordinary item	3,350
Extraordinary item - Insurance proceeds from earthquake disaster settlement	180
Net profit afte extraordinary item	3,530
Income-tax	(300)
Net profit	3,230

Additional information (₹ in thousands):

I. **An amount of ₹ 250 was raised from the issue of share capital and a further ₹ 250 was raised from long-term borrowings.**
II. **Interest expense was ₹ 400 of which ₹ 170 were paid during the period. ₹ 100 relating to interest expenses of the prior period were also paid during the period.**
III. **Dividends paid were ₹ 1,200.**
IV. **Tax deducted at source on dividends received (included in the tax expenses of ₹ 300 for the year) amounted to ₹ 40**
V. **During the period, the enterprise acquired fixed assets for ₹ 350. The payment was made in cash.**
VI. **Plant with original cost of ₹ 80 and accumulated depreciation of ₹ 60 was sold for ₹ 20.**

VII. Foreign exchange loss of ₹ 40 represents reduction in the carrying amount of a short-term investment in foreign currency designated bonds arising out of a change in exchange rate between the date of acquisition of the investments and the balance sheet date.

VIII. Sundry debtors and sundry creditors include amounts relating to credit sales and credit purchases only.

Answer: 18

Cash Flow Statement (Direct Method) *(₹ in thousands)*

Cash Flows from Operating Activities:		
Cash receipts from customers	30,150	
Cash paid to suppliers and employees	(27,600)	
Cash generated from operations	2,550	
Income taxes paid	(860)	
Cash flow before extraordinary item :	1,690	
Proceeds from earthquake disaster settlement	180	
Net cash from operating activities (a)		1,870
Cash Flows from Investing Activities:		
Purchase of fixed assets	(350)	
Proceeds from sale of equipment	20	
Interest received	200	
Dividend received	160	
Net cash from investing activities (b)		30
Cash Flows from Financing Activities:		
Proceeds from issuance of share capital	250	
Proceeds from long-term borrowing	250	
Repayments of long-term borrowings	(180)	
Interest paid	(270)	
Dividend paid	(1,200)	
Net cash used in financing activities (c)		(1,150)
Net increase in cash and cash equivalents		750
Add: Cash and cash equivalents at beginning of period		160
Cash and cash equivalents at end of period		910

Cash Flow Statement (Indirect Method)

Cash flows from Operating Activities		
Net profit before taxation, and extraordinary item	3,350	
Adjustments for:		
Depreciation	450	
Foreign exchange loss	40	
Interest income	(300)	
Dividend income	(200)	
Interest expenses	400	
Operating profit before working capital changes	3,740	
Increase in sundry debtors	(500)	
Decrease in inventories	1,050	
Decrease in sundry creditors	(1,740)	
Cash generated from operations	2,550	
Income taxes paid	(860)	
Cash flow before extraordinary item :	1,690	
Proceeds from earthquake disaster settlement	180	
Net cash from operating activities		1,870
Cash Flows from Investing Activities		
Purchase of fixed assets	(350)	
Proceeds from sale of equipment	20	
Interest received	200	
Dividend received	160	
Net cash from investing activities		30
Cash Flows from Financing Activities:		
Proceeds from issuance of share capital	250	
Proceeds from long-term borrowings	250	
Repayment of long-term borrowings	(180)	

Interest paid	(270)	
Dividends paid	(1,200)	
Net cash used in financing activities		(1,150)
Net increase in cash and cash equivalents		750
Cash and cash equivalents at beginning of period		160
Cash and cash equivalents at end of period		910

Working Notes:

1. Cash and Cash Equivalents

Cash and cash equivalents consist of cash on hand and balance with banks, and investments in money-market instruments. Cash and cash equivalents included in the cash flow statement comprise the following balance sheet amounts:

Particulars		**2012**	**2011**
Cash on hand and balances with banks		200	25
Short-term investments		670	135
Cash and cash equivalents	870	160	
Effect of exchange rate changes	40		
Cash and cash equivalents as restated		910	160

Cash and cash equivalents at the end of the period include deposits with banks of 100 held by a branch which are not freely remissible to the company because of currency exchange restrictions. The company has undrawn borrowing facilities of 2,000 of which 700 may be used only for future expansion.

2. Total tax paid during the year (including tax deducted at source on dividends received) amounted to 900.

3. ***Cash receipts from customers***

Sales	30,650
Add : Sundry debtors at the beginning of the year	1,200
	31,850
Less : Sundry debtors at the end of the year	1,700
	30,150

4. ***Cash paid to suppliers and employees***

Cost of sales			26,000
Administrative & selling expenses			910
			26,910

Add:	Sundry creditors at the beginning of the year	1,890	
	Inventories at the end of the year	900	2,790
			29,700
Less :	Sundry creditors at the end of the year	150	
	Inventories at the beginning of the year	1,950	2,100
			27,600

5. **Income taxes paid (including tax deducted at source from dividends received)**

Income tax expenses for the year (including tax)	
deducted at source from dividends received)	300
Add : Income tax liability at the beginning of the year	1,000
	1,300
Less : Income tax liability at the end of the year	400
	900

Out of 900, tax deducted at source on dividends received (amounting to 40) is included in cash flows from investing activities and the balance of 860 is included in cash flows from operating activities.

6. **Repayment of long-term borrowing**

Long-term debt at the beginning of the year	1,040
Add : Long-term borrowings made during the year	250
	1,290
Less : Long-term borrowings at the end of the year	1,110
	180

7. **Interest Paid**

Interest expenses for the year	400
Add : Interest payable at the beginning of the year	100
	500
Less : Interest payable at the end of the year	230
	270

19. The following data relate to two companies belonging to the same risk class:

Particulars	X Ltd.	Y Ltd.
Expected net operating income	₹ 2,40,000	₹ 2,40,000
10% debt	₹ 7,20,000	-
Equity capitalization rate	20%	15%

Required:

i. **Determine the total value and the weighted average cost of capital for each company assuming no taxes before the start of Arbitrage Process.**
ii. **Show the arbitrage process by which an investor who holds 10% equity shares in Y Ltd. will be benefited by investing in X Ltd.**
iii. **Will he gain by investing in the undervalued firm?**
iv. **Explain how he will be better off by investing the total funds available in undervalued firm.**
v. **When will this arbitrage process come to an end?**
vi. **Determine the equilibrium value, equity capitalization rate and overall capitalization rate after the end of arbitrage process.**

Answer: 19

i. Calculation of total value of firm and weighted average cost of capital

Particulars	X Ltd.	Y Ltd.
Net operating income (NOI)	₹ 2,40,000	₹ 2,40,000
Less : Interest on debt	₹ 72,000	--
Earnings for equity shareholders (NI)	₹ 1,68,000	₹ 2,40,000
Equity capitalization rate (k_e)	0.20	0.15
Market value of equity (S) [NI/ k_e]	₹ 8,40,000	₹ 16,00,000
Market value of debt (D) [I/ Rate of interest]	₹ 7,20,000	--
Total value of firm (V = S + D)	₹ 15,60,000	₹ 16,00,000
Weighted average cost of capital (k_o) $k_o = (k_e \times S/V) + (k_d \times D/V)$	0.15385	0.15000

ii. Arbitrage process when unlevered firm is overvalued

Particulars	₹
A. Investor's present position in overvalued firm	
- Market value of investment (10% of ₹ 16,00,000)	1,60,000
- Dividend income (10% of ₹ 2,40,000)	24,000
B. He sells his present equity holdings for ₹	1,60,000
C. – He purchases equity holdings of undervalued firm for ₹ (10% of ₹ 8,40,000)	84,000
- He purchases debts of undervalued firm for ₹	72,000
- Total amount invested	1,56,000
D. His net income after switching over process	
- Dividend income	16,800
- Add : Interest on debt	7,200
- Net income	24,000
E. The amount by which investor could reduce his outlay through the use of arbitrage process (B - C)	4,000

iii. He will gain by investing in undervalued firm since the same amount of present income can be earned by investing ₹ 1,56,000 which is less than the present investment of ₹ 1,60,000.

iv. Calculation of the amount by which investor could increase his income through the use of arbitrage process

Particulars	₹
A. Investor's present position in overvalued firm	
- Market value of investment (10% of ₹ 16,00,000)	1,60,000
- Dividend income (10% of ₹ 2,40,000)	24,000
B. He sells his present equity holdings for ₹	1,60,000
C. He purchases equity holdings of undervalued firm for [₹ 1,60,000 x ₹ 8,40,000/ ₹ 15,60,000]	86,154
- He purchases debts of undervalued firm for [₹ 1,60,000 x ₹ 7,20,000/ ₹ 15,60,000]	73,846
- Total amount invested	1,60,000
D. His net income after switching over process	
- Dividend income (20% of ₹ 86,154)	17,231
- Add : Interest on debt (10% of ₹ 73,846)	7,385
- Net income	24,616
E. The amount by which investor could increase his income through the use of arbitrage process [D – A (Dividend income)	616

v. According to Modigliani and Miller, this arbitrage process will come to an end when the values of both the companies become identical.

vi. Statement showing the computation of equilibrium values and equity capitalization rate

Particulars	X Ltd.	Y Ltd.
Net operating income (NOI)	₹ 2,40,000	₹ 2,40,000
Less : Interest on debt (I)	₹ 72,000	--
Earnings for equity shareholders (NI)	₹ 1,68,000	₹ 2,40,000
Overall capitalization rate (k_o)	0.15385	0.15385
Total value of firm (V = NOI/ k_o)	₹ 15,60,000	₹ 15,60,000
Less : Market value of debt (D) [I/ Rate of interest]	₹ 7,20,000	--
Market value of equity (S)	₹ 8,40,000	₹ 15,60,000
Equity capitalization rate [k_e = NI/S]	0.20	0.15385
Weighted average cost of capital (k_o) $k_o = (k_e \times S/V) + (k_d \times D/V)$	0.15385	0.15385

20.

(a) XYZ Ltd. initially decides that it will pay ₹ 10 lakhs dividends next year. It has 10 lakhs shares outstanding with a total market value of ₹ 200 lakhs. The dividends payable are expected to grow 5% over ₹ 10 lakhs after next year in perpetuity. However, in order to keep the price of share high the company decides to increase the dividends payable for the next year to ₹ 20 lakhs. After that the dividends payable are not likely to change i.e. growing 5% over ₹ 10 lakhs and so on. The shortfall for payment of additional dividend would be met by issue of shares.

i. At what price the new shares will be issued in year 1?

ii. How many new shares will be issued?

iii. What is the expected payment of dividend on these new shares and what payment the old shareholders would receive after year 1?

iv. Had the new shares were issued at ₹ 10 a share in year 1, who gains and who loses? Is the MM dividend irrelevance still hold good?

(b) A newly formed company has applied for a short-term loan to a commercial bank for financing its working capital requirement.

As a Cost Accountant, you are asked by the bank to prepare an estimate of the requirement of the working capital for that company. Add 10% to your estimated figure to cover unforeseen contingencies.

The information about the projected Profit and Loss Account of the company is as under:

		₹
Sales		**21,00,000**
Cost of goods sold		**15,30,000***
Gross profit		**5,70,000**
Administrative expenses	**1,40,000**	
Selling expenses	**1,30,000**	**2,70,000**
Profit before tax		**3,00,000**
Provision for tax		**1,00,000**

***Cost of goods sold has been derived as:**

Materials used	**8,40,000**	
Wages and manufacturing expenses	**6,25,000**	
Depreciation	**2,35,000**	**17,00,000**
Less: Stock of finished goods (10 % produced, not yet sold)		**1,70,000**
		15,30,000

The figures given above relate only to the goods that have been finished and not to work-in-progress; goods equal to 15% of the year's production (in terms of physical units) are in progress on an average, requiring full materials but only 40% of the other expenses. The company believes in keeping two months' consumption of material in stock.

All expenses are paid one month in arrears' suppliers of material extend 1 ½ months' credit; sales are 20% cash; rest are at two months' credit, 70% of the income-tax has to be paid in advance in quarterly installments.

You can make such other assumptions as you deem necessary for estimating working capital requirement.

Answer: 20 (a)

i. Now the shares are valued at ₹ 20 (i.e. Market value/ No. of shares = 200/10 = ₹ 20).
This price is based on the initial expectation that future dividend is Re. 1 (Original dividend/ No. of share = 10 lakhs /10 lakhs). Using this information we find k, the expected rate of return of the shareholders.

$P_0 = \frac{D_1}{k - g}$ i.e. $20 = \frac{1}{k - 0.05}$; Solving we get k = 10%

Now we know that ₹ 10.50 lakhs i.e. 5% over and above ₹ 10 lakhs, dividends are payable in year 2. Therefore, value of firm in year 1 = $\frac{10.50 \text{ lakhs}}{0.10 - 0.05}$ = ₹ 210 lakhs

This value is nothing but price x total number of shares = P_1 x (10 lakhs + N), where P_1 is price of share at the end of year 1 and N is the number of new shares issued. We also know that P_1 x N = ₹ 10 lakhs, because the extra dividend was raised by issue of shares. Using all information stated above we can say that:

P_1 x ₹ 10 lakhs + 10 lakhs = ₹ 210 lakhs

Therefore P_1 = ₹ 20 (Price at the end of year 1). At this price the new shares would be issued.

ii. To raise ₹ 10 lakhs @ ₹ 20, 50,000 new shares would be issued. Therefore, N = 50,000 or 0.50 lakhs.

iii. After year 1, total dividends distributable = ₹ 10.50 lakhs. With 10.50 lakhs shareholders each shareholder receives Re. 1 dividend. This would increase 5% every year thereafter.

iv. The fair price of share at the end of year 1 is ₹ 20. Now if the shares are issued at ₹ 10 at the half the fair price, the old shareholders lose and the new shareholders gain. Secondly, MM irrelevance theory fails, as an important assumption that new shares would be issued at P_1 gets violated. If this happens, investors would not be indifferent.

Answer: 20 (b)

Statement showing the Net Working Capital Estimate of a Company:

Particulars	₹	₹	₹
Current Assets:			
Stock of raw material (2 months): (₹ 8,40,000 x 2/12)			1,40,000
Work-in-progress:		1,26,000	
Raw materials (₹ 8,40,000 x 15/100)			
Other expenses :			
Wages and manufacturing exp.	6,25,000		
Administrative expenses	1,40,000		
	(7,65,000 × 40%)	3,06,000	4,32,000
Stock of finished goods:			
Stock		1,70,000	
Less: Depreciation 10% (i.e. 2,35,000 × 10%)		23,500	1,46,500
Debtors (2 months):			
Cost of goods sold – Dep. (15,30,000 – 2,11,500) [Dep. (2,35,000 – 23,500)		13,18,500	
Administrative expenses		1,40,000	
Selling expenses		1,30,000	
Total		15,88,500	
Less : Cash sales @ 20%		3,17,700	
	$\left(12,70,800 \times \frac{2}{12}\right)$		2,11,800
Cash (say)			50,700
Total investment in current assets			9,81,000
Less Current liabilities:			
Creditors $\left(1\frac{1}{2}\text{months}\right)\left(\frac{₹\ 8,40,000}{12} \times 1\frac{1}{2}\right)$		1,05,000	
Lag in payment of expenses (1month):			
Wages and manufacturing expenses (₹ 6,25,000 x 1/12)	52,083		
Administrative expenses (₹ 1,40,000 x 1/12)	11,667		
Selling expenses (₹ 1,30,000 x 1/12)	10,833	74,583	1,79,583

Net working capital			8,01,417
Add: 10% for contingencies			80,142
Estimated working capital requirement			8,81,559

Notes:

I. Depreciation is excluded from the computation of cost of goods sold as it is a non-cash item.
II. Element of profit is excluded here.
III. Assume that cash is required for ₹ 50,700 in order to meet the day-to-day expenses.

21.

(a) Explain the term "Swaps". Outline the possible benefits to a Company of undertaking an Interest rate swap.

(b) Today is 24th March. A refinery needs 1,050 barrels of crude oil in the month of September. The current price of crude oil is ₹ 3,000 per barrel. September futures contract at Multi Commodity Exchange (MCX) is trading at ₹ 3,200. The firm expects the price to go up further and beyond ₹ 3,200 in September. It has the option of buying the stock now. Alternatively it can hedge through futures contract.

a. If the cost of capital, insurance, and storage is 15% per annum, examine if it is beneficial for the firm to buy now?

b. Instead, if the upper limit to buying price is ₹ 3,200 what strategy can the firm adopt?

c. If the firm decides to hedge through futures, find out the effective price it would pay for crude oil if at the time of lifting the hedge

i) The spot and futures price are ₹ 2,900 and ₹ 2,910 respectively,

ii) The spot and futures price are ₹ 3,300 and ₹ 3,315 respectively.

Answer: 21 (a)

Swaps, as the name implies, are exchange / swap of debt obligations (interest and/or principal payments) between two parties. These are of two types, namely interest swaps and currency swaps. While interest swaps involve exchange of interest obligations between two parties, currency swaps involve two parties who agree to pay each other's debt obligations denominated in different currencies.

Benefits of Interest rate swap:

i. A company can lower its overall interest burden by making use of the comparative advantage; it has of borrowing in one market compared with another company that has a comparative advantage in another market.
ii. A company that is paying one type of interest can switch to paying another type of interest, for example from fixed to floating or floating to fixed rates.
iii. Swaps can be a more cost effective way of reducing interest rate risk than other hedging methods.
iv. A company can change the structure of its borrowing without giving to terminate existing loan arrangements, and hence incur early termination costs.
v. Swaps are more flexible than other methods of hedging – there are no prescribed sums or periods of swaps. Swaps can be reversed as required by swapping with another counter party.

Answer: 21 (b)

a. If cost of carry (including interest, insurance, and storage) is 15%, the fair price of the futures contract is $s_0 \times e^{-rt} = 3,000 \times e^{-6/12 \times 0.15} =$ ₹ 3,233.65.

It implies that the firm buys crude oil today to be used after six months it would effectively cost ₹ 3,233.65 per barrel.

b. Since futures are trading at ₹ 3,200 it can lock-in the price of around ₹ 3,200 through a long hedge. Under long hedge the firm would buy the futures on crude oil today and sell it six months later while simultaneously meeting the physical requirements from the market at the price prevailing at that time. Irrespective of price six months later, the firm would end up paying a price of around ₹ 3,200.

c. If the firm adopts the strategy as mentioned in (b), the effective price to be paid by the firm in cases of rise and fall in spot values is shown below:-

Quantity of crude oil to be hedged	=1,075 barrels
Size of one futures contract	= 100 barrels
No. of futures contracts bought 1,075/100	= 11 contracts (Rounded)
Futures price	= ₹ 3,200
Exposure in futures 3,200 x 11 x 100	= ₹ 35,20,000

Six months later the firm would unwind its futures position and buy the requirement from the spot market.

	₹	₹
Futures sold at price	2910	3315
Amount of futures sold	32,01,000	36,46,500
Gain/Loss on futures (11 contracts)	(3,19,000)	1,26,500
Spot Price	2,900	3,300
Actual Cost of buying(1075 barrels)	31,17,500	35,47,500
Effective cost of buying	34,36,500	34,21,000
Effective Price	**3,197**	**3,182**

22.

(a) The price of Compact Stock of a face value of ₹10 on 31st December, 2012 was ₹414 and the futures price on the same stock on the same date i.e., 31st December, 2012 for March, 2013 was ₹444.

Other features of the contract and the related information are as follows.

- **Time to expiration 3 months (0.25 year)**
- **Annual dividend on the stock of 30% payable before 31.3.2012.**
- **Borrowing Rate is 20 % p.a.**

Based on the above information, calculate future price for Infosys stock on 31st December, 2012. Please also explain whether any arbitrage opportunity exists.

(b) MNC rolls over a $25 million loan priced at LIBOR on a three-month basis. The company feels that interest rates are rising and that rates will be higher at the next roll- over date in three months. Suppose the current LIBOR is 5.4375%. Explain how MNC can use FRA at 6% offered by a bank to reduce its interest rates its FRA? Assume the three month period as 90 days.

Answer: 22 (a)

Securities of	Compact
Spot Price [S_X]	₹414
Expected rate of Dividend [y]	30% or 0.30
Borrowing Rate	20%
Tenor / Time Period [t] in Years	3 Months or 0.25 Year
Present Value of Dividend	= 30% x 10 x $e^{-0.20x0.25}$ = 30% X 10 ÷ 1.05127 = 2.8537
Adjusted Spot Price [Spot Price- Present Value of Dividend] [AS_X]	= 414 - 2.8537 =₹411.1463
Theoretical Forward Price [TFP_X] $TFP_X = AS_X X\ e^{(r-y)xt}$	= ₹411.1463 x $e^{0.20x0.25}$ = ₹411.1463 X $e^{0.05}$ = ₹411.1463 x 1.05127 = ₹432.23
3-Months Futures Contract Rate [AFP_X]	₹ 444
TFP_X Vs. AFP_X	AFP_X is Higher
Inference	AFP_X is overvalued
Recommended Action	Buy Spot. Sell Future.

2. Cash Flows to Gain on the Arbitrage Opportunity

Activity Flow:

(a) Borrow ₹414 for a period of 3 months at the rate of 20% p.a.

(b) Buy the Stock at ₹414 at T_0

(c) Receive the Dividend at the time of 3 months [₹10 X 30% = ₹3].

(d) Sell the Index Futures at the Forward Price at the end of 3 months [₹444].

(e) repay the amount of Loan with interest at the end of the period.

Cash Flows arising out of the Activities to gain on the Arbitrage.

Sl. No.	Particulars	₹
(a)	Borrow for a period of 3 months and Buy Stock at T_0	₹ 414
(b)	Receive the Dividend at the end of 3 months	3
(c)	Sell the Futures at the Forward Price at the end of 3 months	444
(d)	Repay the amount of borrowing together with Interest = [414(1+0.20x0.25)]	(434.7)
(e)	**Net Cash Inflow [(c)-(d)]**	**9.3**

Answer: 22 (b)

MNC can use 3 x 6 FRA, if it expects that the rates would be higher at the next roll- over of three months, starting three months from today. In other words MNC would buy 3 x 6 FRA @6.25%, clearly with a view that higher rate would prevail on the settlement date i.e. 3 months from now.

Now if on the settlement date, the rate is 6.5%, then MNC's decision to buy 3 x 6 FRA has been proved right and it would receive the present value of the interest differentials on the loan amount i.e. it would receive:

Pay off = national amount x $\frac{(\text{reference Rate} - \text{Fixed rate})}{1+\text{Reference Rate x}\alpha}$ (a is the day count function)

= \$2,50,00,000 x $\frac{(0.065-0.0625)x90/360}{1+0.0625x90/360}$ = \$15,385

23.

(a) A Laptop Bag is priced at \$ 105.00 at New York. The same bag is priced at ₹ 4,250 in Kolkata. Determine Exchange Rate in Kolkata.

i. If, over the next one year, price of the bag increases by 7% in Kolkata and by 4% in New York, determine the price of the bag at Kolkata and-New York? Also determine the exchange rate prevailing at New York for ₹ 100.

ii. Determine the appreciation or depreciation in Re. in one year from now.

(b) What is foreign exchange risk? Briefly explain the major types of foreign exchange exposures.

Answer: 23 (a)

1. Exchange Rate in Kolkata (Purchasing Power Parity Theory) Exchange Rate in Kolkata per \$ = Bag Price in ₹ at Kolkata / Bag Price in \$ at New York = ₹ 4,250 ÷ USD 105 = ₹ 40.4762
2. Price in a Year's time
   Kolkata = Prevailing Price X (1 + Increase in Rate) = ₹ 4250 X (1 + 7%)
   = ₹ 4,250 x 1.07 = ₹ 4,547.50
   New York = Prevailing Price x (1 + Increase m Rate) = USD 105 X (1 + 4%)
   = USD 105 X 1.04 = USD 109.20
3. Exchange Rate in New York (after one year)
   Exchange Rate in New York per ₹ 100
   = Bag Price in \$ at New York/ Bag Price in ₹ at Kolkata x ₹ 100

= (USD 109.20 ÷ ₹ 4.547.50) x ₹ l00= USD 2.4013

4. Depreciation (in %) of Re. over the year

Depreciation = [(1 + Indian Inflation Rate) / (1 + New York Inflation Rate)] - 1
= [(1 + 7%) / (1 + 4%)] - 1 = 1.07 / 1.04 - 1 = 2,88%

Alternatively = (Future Spot Rate ₹ / $ - Spot Rate of ₹ / $) ÷ Spot Rate X 100

Future Spot = Bag Price in Kolkata/Bag Price in New York in one year
= ₹4,547.50/USD109.20 = ₹ 41.6438

Depreciation= (Future Spot ₹ 41.6438 - Spot Rate ₹ 40.4762) ÷ Spot Rate
₹40.4762 x 100 = ₹ 1.1676 ÷ ₹ 40.4762 X 100 = 2.88%

Answer: 23 (b)

Foreign exchange risk concerns the variance of the domestic currency value of an asset, liability or operating income that is attributable to unanticipated variances in the exchange rates. Foreign exchange risk is an exposure of facing uncertain future exchange rate. When firm and individuals are engaged in cross-border transactions, they are potentially exposed to foreign exchange risk that they would not normally encounter in purely domestic transactions.

Foreign exchange exposures can be classified into three broad categories:

i. Transaction exposure: Transaction exposure arises when one currency is to be exchanged for another and when a change in foreign exchange rate occurs between the time a transaction is executed and the time it is settled.

ii. Translation exposure: When the assets and liabilities of trading transactions are denominated in foreign currencies, then there may be risk of translation from such denominations into home currencies. This will also be due to fluctuations in the rates of different currencies.

iii. Economic exposure: Economic exposure is the risk of a change in the rate affecting the company's competitive position in the market. It is normally defined as the effect on future cash flows of unpredicted future movements in exchange rates. This affects a firm's competitive position across the various markets and products and hence the firm's real economic value.

24.

(a) An Indian software company receives an order from an European union country. The buyer will pay in four quarterly installments each of €0.5 million, starting from the end of the first quarter. The rate for euros in India is as follow:

Spot	3 month forward	6 month forward	9 month forward	1 year forward
₹ 52.80	₹ 52.70	₹ 52.55	₹ 52.50	₹ 52.48

If an Indian company hedges its foreign exchange rate risk in the forward market, how much revenue does it earn?

(b) Are arbitrage gains possible from the following set of information to the arbitrageur?

Spot rate : 47.88/$
3 month forward rate : ₹ 47.28/$
3 month interest rates:
Re. : 7% p.a.
$: 11% p.a.

Answer: 24 (a)

Indian Software Company will have the following income streams:

Installment	Euro income (€)	Rate (₹)	Revenue (₹)
1st quarter-end	5,00,000	52.70/€	2,63,50,000
2nd quarter – end	5,00,000	52.55/€	2,62,75,000
3rd quarter-end	5,00,000	52.50/€	2,62,50,000
4th quarter-end	5,00,000	52.48/€	2,62,40,000
Total revenue income is			10,51,15,000

Answer: 24 (b)

3 month forward rate of the dollar is higher (at ₹ 48.28) than the spot rate (₹ 47.88). It implies that the dollar is at premium.

Premium (%) = $\frac{(₹\ 48.28 - ₹\ 47.88)}{₹\ 47.88} \times \frac{12}{3} \times 100 = 3.34\ \%$ per annum.

Interest rate differential = 11% - 7% = 4% per annum

Since interest rate differential (4%) and premium % (3.34%) do not match, there are arbitrage gain possibilities. An arbitrageur can take the following steps in this regard :

i. Arbitrageur borrows, say, ₹ 100 million at 7% for 3 months (he borrows in Indian currency as it carries lower interest rate).
ii. He then converts ₹ 100 million in US $ at the spot rate of ₹ 47.88 in the spot market. He gets an amount of US $ 2,088,554.72 (₹ 100 million/ ₹ 47.88).
iii. He invests US $ 2,088,554.72 in the money market at 11% interest per annum for 3 months. As a result of this investment, he obtains the interest of US $ 57,435.2548 ($ 2,088,554.72 x 3/12 x 11/100).
iv. Total sum available with arbitrageur, 3 months from now is (US $ 2,088,554.72 amount invested + US $ 57,435.2548 interest) = US $ 2,145,989.974.
v. Since he would get US $ 2,1451989.974 after 3 months, he sells forward US $ 2,145,989.974 at the rate of ₹ 48.28.
vi. As a result of a forward deal, at the end of 3 months from now, he would get ₹ 103,608,395.90, i.e. ($ 2,1451989.974 x 48.28).
vii. He refunds the ₹ 100 million borrowed, along with interest due on it. The refunded sum is ₹ 100 million + ₹ 1,750,000 i.e. (₹ 100 million x 3/12 x 7/100) = ₹ 101,750,000.
viii. Net gain is ₹ 103,608,395.90 – ₹ 101,750,000 = ₹ 18,58,395.90.

25. The investment manager of a large Indian software company receives the following quotes from its foreign exchange broker.
US dollar spot rate: ₹ 47.75/ US $

US dollar option quotation

Strike price	Call			Put		
	September	December	March	September	December	March
45.0000	3.0	-	-	-	-	-
45.5000	2.6	2.9	-	-	-	-
46.0000	2.0	2.3	2.45	0.2	-	-
46.5000	1.85	1.95	2.15	0.25	-	-
47.0000	1.25	1.85	2.00	0.70	-	-
47.5000	0.85	1.15	1.45	1.00	1.25	1.75

48.0000	**0.50**	**0.74**	**0.89**	**1.59**	**1.92**	**2.50**
48.5000	**0.30**	**0.52**	**0.68**	**1.70**	**2.20**	**-**
49.0000	**0.15**	**-**	**-**	**1.90**	**-**	**-**
49.5000	**0.10**	**-**	**-**	**2.00**	**-**	**-**
50.0000	**0.08**	**-**	**-**	**2.30**	**-**	**-**

What calculation will the investment manager make for following questions?

i. **What is the intrinsic value for the December 47.5 call option?**
ii. **What is the intrinsic value for the September 46 put option?**
iii. **What is the break-even exchange rate for the March 46.5 call and the March 48 put?**
iv. **If the March spot rate is expected to be ₹ 48.50/US $, which call option should be bought?**
v. **The software company will receive its export income in March and the expected spot rate (in March) will be ₹ 46.5/US $, which put option should be bought?**

Answer: 25

Intrinsic value of an option is the amount by which the option is in-the-money.
For a call option, intrinsic value = Maximum [(Spot rate – Strike rate), 0]
For a put option, intrinsic value = Maximum [(Strike rate – Spot rate), 0]

i. Intrinsic value for the December 47.5 call option
= Max [(₹ 47.75/US $ - ₹ 47.5/US $), 0]
= Max [₹ 0.25/ US $, 0] = ₹ 0.25/ US $

ii. Intrinsic value for the September 46 put option
= Max [(₹ 46/ US $ - ₹ 47.75/US $), 0]
= Max [-(₹ 1.75/ US $), 0] = 0

iii. The break-even exchange rate for the March 46.5 call on settlement date is Re. X/US $

So, The premium paid = ₹ 2.15/US $
Profit from the call option = ₹ (X – 46.5)/US $
At break even, ₹ (X – 46.5)/US $ = ₹ 2.15/ US $
X = ₹ 48.65/ US $

The break even exchange rate for March 48 put is:
Premium paid = ₹ 2.50/US $
Profit from the put option = ₹ (48 – X)/US $
At break-even, ₹ (48 – X)/US $ = ₹ 2.50/US $
X = ₹ 45.5/US $

iv. For an expected spot rate of ₹ 48.50/US $, we need to find out profit from buying the March call option at various strike prices.
Gain from call option

= Max [(Settlement rate – Strike rate),0] – Premium
= value of option at expiration – Premium

Option	Strike price (₹)	Premium (A) (₹)	Option value at expiration (B) (₹)	Gain/ Loss [B – A] (₹)
March call	46.00/ US $	2.45/ US $	2.50 / US $	0.05/ US $
March call	46.50/ US $	2.15/ US $	2.00/ US $	- 0.15/ US $
March call	47.00/ US $	2.00/ US $	1.50/ US $	- 0.50/ US $

March call	47.50/ US $	1.45/ US $	1.00/ US $	- 0.45/ US $
March call	48.00/ US $	0.89/ US $	0.50/ US $	- 0.39/ US $
March call	48.50/ US $	0.68/ US $	0.00/ US $	- 0.68/ US $

So, for the expected March spot rate of ₹ 48.50/ US $, the March call option of strike price ₹ 46.00/ US $ should be bought.

v. Gain from purchasing the March put option of various strikes, for which quotes are available, for an expiration price of ₹ 46.50/ US $.

Option	Strike price (₹)	Premium (A) (₹)	Option value at expiration (B) (₹)	Gain/ Loss [B – A] (₹)
March put	47.50/ US $	1.75/ US $	1.00 / US $	- 0.75/ US $
March put	48.00/ US $	2.50/ US $	1.50/ US $	- 1.00/ US $

As no gains accrue by purchasing the different March put available for the expected March expiration rate of ₹ 46.50/ US $, the software company should not hedge through the put options.

26. VEDIKA TRADERS LTD. exports edible oils to Middle – East and African countries. In June the company exported a consignment worth $5 million to Zambia. The payment for the same is expected to realize during the month of September. The company has entered into a option forward contract for delivery of $5 million over the month of September.

The market quotes on June 30 at the time of entering into the contract were as follows:

June 30, Spot	**₹/ $**	**47.05/08**
Forward	**1 month**	**23/25 paise**
	2 month	**47/49 paise**
	3 month	**70/72 paise**

On September '01, the company approached the bank for extension of the contract by another two months that is for delivery during the months of November.

The market quotes on September '01 were as follows:

Spot	**₹/ $**	**47.58/60**
Forward	**1 month**	**18/20 paise**
	2 month	**37/39 paise**
	3 month	**55/57 paise**

On November '01, the company approached the bank to cancel the forward contract. The exchange rates as on November '01 were as follows:

Spot	**₹/ $**	**47.97/99**
Forward	**1 month**	**16/18 paise**
	2 month	**33/35 paise**

You are required to Calculate:

i) The forward rate to be quoted on June 30.

ii) The exchange rate to be quoted by the bank on September '01 for the extension of the contract.

iii) The amount of cash flows due to extension of the contract.

iv) The exchange rate at which the forward contract to be cancelled on November ' 01.
v) The amount of cash flows due to cancellation of the contract.
(Ignore EFDAI margin for merchant quotes.)

Answer: 26

VEDIKA LTD. (V.T. LTD.)

i) The company obtained a forward cover for its receivable of US $5 Million on June 30, for delivery in September.

Particulars	₹
The forward to be quoted is:	47.05
Add: 2 months premium since	0.47
The Dollar is at Premium	47.52

ii) The exchange rate to be quoted on September for delivery November is ₹ (47.58 + 0.37) ₹47.95.

iii) On September 01, the Company approach for extension by 3 month. The request fo the company is considered by canceling at one month forward selling rate, that is ₹47.80 (47.60 + .20).

The amount of cash Flow due to extension of the contract is as follows:

Particulars	₹
Bank buys Dollars under original contract at:	47.52
Bank sells under cancellation at:	47.80
Difference payable by the party is per $	0.28

₹ 0.28 x 5000000 = ₹14.00 lakh

a. The Company approached for cancellation on November ' 01 which means only cancellation by one month. The contract would be cancelled at one month forward selling prevailing on the date of cancellation.

That is ₹47.99 + Premium ₹0.18 = ₹48.17

b. The amount of CASH FLOW due to cancellation of Forward contract is as follows:

Particulars	₹
Bank buys under original contract at	47.95
Bank Sells on cancellation:	48.17
Amount payable by the company is per $	0.22

Total cash flow due to cancellation is ₹11.00 lakhs.
(5000000 x 0.22)

27.

(a) The equity share of AMTREX LTD. is quoted at ₹210. A 3- months call option is available at a premium of ₹6 per share and a 3 – month put option is available at a premium of ₹5 per share.

(i) Ascertain the next pays- offs to the option holder of a call option and a put option, given that:
1) The strike price in both cases is ₹ 220; and
2) The share price on that exercise day is ₹200, ₹210, ₹220, ₹230 and ₹240 respectively.

(ii) Also indicate the price range at which the call and the put options may be gainfully exercised

(b) What are currency futures? List the steps involved in the technique of hedging through futures.

Answer: 27 (a)

AMTREX LTD

NET PAY – OFF FOR THE HOLDER OF THE CALL OPTION (₹)					
Share price on Exercise day	200	210	220	230	240
Option Exercise	No	No	No	Yes	Yes
Outflow (strike Price)	Nil	Nil	Nil	220	220
Outflow (Premium)	6	6	6	6	6
Total Outflow	6	6	6	226	226
Less: Inflow (sales proceeds)	0	0	0	230	240
NET PAY – OFF [Gain/(Loss)]	(6)	(6)	(6)	4	14

NET PAY – OFF FOR THE HOLDER OF THE CALL OPTION (₹)					
Share price on Exercise DAY	200	210	220	230	240
Option Exercise	Yes	Yes	No	No	No
Inflow (Strike Price)	220	220	Nil	Nil	Nil
Less: Outflow (Purchase)	200	210	0	0	0
Less: Outflow (Premium)	5	5	5	5	5
Net pay – off [Gain/(Loss)]	15	5	(5)	(5)	(5)

COMMENTS: The loss of the option holder is restricted to the amount of premium paid. The profit (positive pay off) depends on the difference between the strike price and the share price on the exercise day.

In case of call option, the investor will be benefit if the actual price exceeds ₹226.
In case of put option, the investor will be benefited if the actual price is less than ₹215.

Answer: 27 (b)

A currency futures contract is a derivative financial instrument that acts as a conduct to transfer risks attributable to volatility in prices of currencies. It is a contractual agreement between a buyer and a seller for the purchase and sale of a particular currency at a specific future date at a predetermined price. A futures contract involves an obligation on both parties to fulfil the terms of the contract. A futures contract can be bought or sold only with reference to the USD.

There are six steps involved in the technique of hedging through futures:

i. Estimating the target income (with reference to the spot rate available on a given date.)
ii. Deciding on whether Futures Contracts should be bought or sold.
iii. Determining the number of contracts (since contract size is standardised).
iv. Identifying profit or loss on target outcome.
v. Closing out futures position and
vi. Evaluating profit or loss on futures.

28. WILSON LTD. an Indian company has a payable of US $1,00,000 due in 3 months. The company is considering to cover the payable through the following alternatives:

(i) Forward Contract:
(ii) Money market; and
(iii) Option.

The following information is available with the company:
Exchange rate:
Spot ₹/$ 45.50/45.55
3 – m Forward 40/45

Interest rates (%):	Per Annum
US	4.5/5.0 (Deposit/ Borrow)
India	10.0/11.0 (deposit/ Borrow)

Call option on $ with a strike price of ₹46.00 is available at a premium of ₹0.10/$. Put option on $ with a strike price of ₹46.00 is available with a premium of ₹0.05/$
Treasury department of the company forecasted the future spot rate after 3 months to be:

Spot rate after 3 – m	Probability
₹45.60/$	0.10
₹46.00/$	0.60
₹46.40/$	0.30

You are required to suggest the best alternative of hedging.

Answer: 28

WILSON LTD

Exchange rate ₹/$
Spot 45.50/45.55
3 – m forward 45.90/46.00
3 – m interest rate (%)
US 4.5/5.0
India 10.0/11.0

i. Forward Hedge
After 3 – m, ₹ outflow for the firm is ₹(1,00,000 x 46.0) = ₹46,00,000.

ii. Money Market hedge
The firm should borrow ₹ convert into $ at the spot rate, invest $ proceeds for 3 – m and settle the payable at the maturity out of $ Investment.

$ to be investment to get $ 100000 3 – m hence is $\frac{100000}{\left(1+\frac{0.045}{4}\right)}$ = $98887.52

To get $98887.52, required ₹ is 4504326.54 (98887.52 x 45.55)
The firm need to borrow ₹45,04,326.54 to get required $.
Rupee repayment after 3 – m is

₹45,04,326.54 $\left(1+\frac{0.11}{4}\right)$ = ₹46,28,195.52

iii. Option Hedge

Since the firm has a $liability, it should go long on call $ option. That is buy $ call option with a strike price of ₹46.00 at a premium of ₹0.10/$.

∴ Total premium paid is ₹ (1,00,000 x 0.10) = ₹10,000

Possible spot rate after 3 – m (₹/$)	Exercise Option?	Total rupee outflow	Probability
45.60	No	4570000	0.10
46.00	No	4610000	0.60
46.40	Yes	4610000	0.30

∴Expected rupee outflow after 3 – months is

(4570000 x 0.10) + 46,10,000 x (0.60 + 0.30) = ₹46,06,000

The firm can also go short on the put option, that is sell $ put option with strike price of ₹46.00 at a premium of ₹0.05/$

∴ Total premium received is ₹ (1,00,000 x 0.05) = ₹5,000

Possible spot rate after 3 – m (₹$)	Exercise Option?	Total rupee outflow	Probability
45.60	Yes	4595000	0.10
46.00	No	4595000	0.60
46.40	No	4635000	0.30

Expected rupees outflow after 3 – m is

(45,95,000 x 0.10 + 45,95,000 x 0.60 + 46,35,000 x 0.30) = ₹46,07,000

SUGGESTION:
Forward hedge is suggested to cover the payable since the outflow is less than the outflow under money market hedge and less than the expected outflow under covers.

29.

(a) X COMPANY LTD. and Y COMPANY LTD. both wish to raise US 40M dollar's loan five years. X Company Ltd. has the choice of issuing fixed rate debt at 7.50% or floating rate debt at LIBOR + 25 basis points. On the other, Y company Ltd., which has a lower credit rating can issue fixed rate debt of the same maturity at 8.45% or floating rate at LIBOR + 37 basis points. X Company Ltd. prefers to issue floating rate debt and Y Company Ltd. prefers fixed rate debt with a lower coupon. City Bank is in the process of arranging an interest rate swap between these two companies.

X Company Ltd. negotiates to pay the bank a floating rate of LIBOR flat while the bank agrees to pay X Company Ltd. a fixed rate of 7.60%. Y Company Ltd. agrees to pay the bank a fixed rate of 7.75% while the bank pays Y Company Ltd. a floating rate of LIBOR flat.

Required:

(i) With a schematic diagram, show how the swap deal can be structured.
(ii) What are interest savings by each company?
(iii) How much would city bank receive?

(b) The FERGUSON SYSTEMS was trading at ₹ 134 on April 3, 2009 and call option exercisable in three months time had a strike price of ₹130.

The following are the other parameters of the option:

- **The annualized standard deviation in Ferguson Systems stock price over the previous year was 60%**
- **The annualized Treasury Bill rate corresponding to this option life is 8%**

Requirements:

(i) Compute the value of a three month CALL option on the stock of Ferguson system using Black and Scholes model.

(ii) What would be the value of PUT?

(iii) If this CALL option is Priced at ₹15 what investment strategy would you adopt?

(iv) If this PUT option is available in the market at ₹14 what investment strategy would you adopt?

Note: Extracted from the tables:

(1) Natural logarithms: ln (0.9701) = -0.0303
ln (1.0308) = 0.0303

(2) Value of e^x: $e^{-0.02}$ = 0.9802, $e^{-0.016}$ = 0.9841

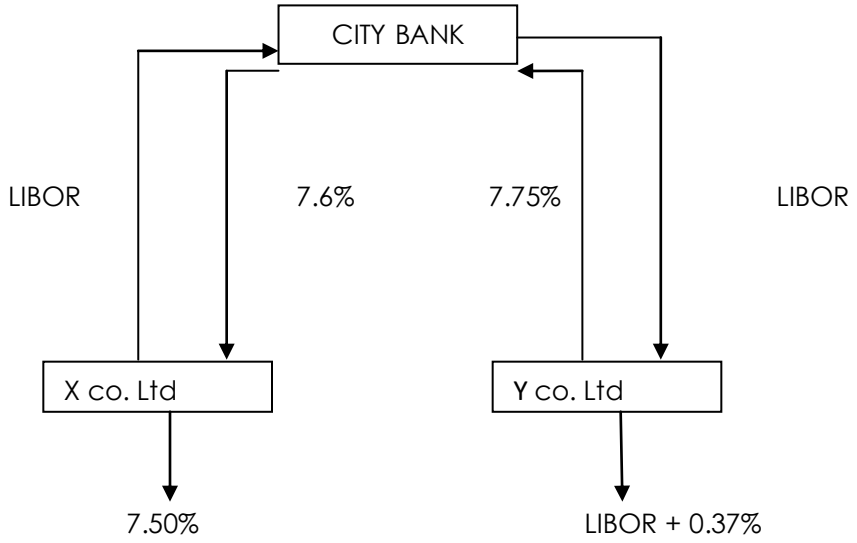
(3) For N (X): where X ≥ 0: N (0.3177) = 0.6246
N (0.0177) = 0.5071
Where X ≤ 0: N (-0.3177) = 0.3754
N (-0.0177) = 0.4929

Answer: 29 (a)

(i) First let us tabulate the details to find the quality spread differential:

		Cost of fund to X co. Ltd & Y Co Ltd	
	Objective	Fixed rate	Floating Y Co Ltd
X company Ltd	Floating	7.50% P.A	LIBOR + 0.25%
Y company Ltd	Fixed	8.45%	LIBOR + 0.37%
Difference on Risk Premium		0.95%	0.12%
Net differential			0.83%

The differential between two markets = 0.83%.
This needs to be shared between X Co. Ltd, Y Co Ltd and City Bank.



Economics of Swap deal:

	X Co Ltd	Bank	Y Co Ltd
Paid to Lender	(7.50%)	-	(LIBOR + 0.37%)
Bank pays X Co. Ltd	7.60%	7.60%	-
Y Co. Ltd pays bank	-	7.75%	(7.75%)
X Co. Ltd pays bank	(LIBOR)	LIBOR	-
Bank pays Y co. Ltd	-	(LIBOR)	LIBOR
Net Position	(LIBOR – 0.10%)	0.15%	(8.12%)
Cost without SWAP	LIBOR + 0.25%	-	8.45%
GAIN	0.35%	0.15%	0.33%

(ii) SAVINGS:
X Company Ltd: (LIBOR + 0.25 + 7.60% - 7.50% - LIBOR) = 0.35%
Y Company Ltd: (8.45% + LIBOR – 7.75% - LIBOR – 0.37%) = 0.33%

(iii) Gain to City Bank: LIBOR – LIBOR + 7.75% - 7.60 = 0.15%

Answer: 29 (b)

(i) Valuation of call option: (Using Black & Scholes model)

$V_{co} = Vs\ N(d_1) – E\ e^{-rt}\ N(d_2)$

Where Vs = Current price of stock = ₹134

E = Exercise price = ₹130, r = Risk – free rate = 0.08

T = 0.25 yr

$$d_1 = \frac{In(Vs/E)+[r+0.5\sigma^2]xt}{\sigma\sqrt{t}}$$

$$= \frac{In(134/130)+(0.08+0.5x0.6^2)x0.25}{0.6\sqrt{0.25}} = \frac{In(1.0308)+0.065}{0.3}$$

$$= \frac{0.0303+0.065}{0.3} = 0.3177$$

$D_2 = d_1 - \sigma\sqrt{t} = 0.3177 – 0.30 = 0.0177$

$N(d_1) = N(0.3177) = 0.6246$, $Nd_2 = N(0.0177) = 0.5071$

Thus,

Value of call option (V_{co}) : $Vs\ N(d_1) – E\ e^{-rt}\ N(d_2)$

Where, $e^{-rt} = e^{-0.08 \times 9.25} = > e^{-0.02} = 0.9802$

∴ (134 x 0.6246) – (130 x 0.98020 x 0.5071)

= 83.70 – 64.62 =₹19.08

(ii) Value of put (Vp_0) = C + PV of E – So

= ₹ [19.08 + (130 x 0.9802) – 134]

= 19.08 + 127.43 – 134 = >12.51 = ₹12.51

STRATEGY: (iii) & (iv)

Option	Actual option Price (₹)	Fair Option Price (₹)	Valuation	Decision
(iii) CALL	15	19.08	Under	Buy call option
(iv) PDT	14	12.51	Over	Sell put option

30. Unilever's subsidiary in India, Hindusthan Lever, procures most of its soaps from a Japanese company. Because of the shortage of working capital in India, payments terms for the Indian importers are typically 180 days or more. Hindusthan Lever wishes to hedge a 8.5 million Japanese Yen payable. Although options are not available on the Indian Rupee (₹), forward rates are available against the Yen. Additionally, a common practice in India is, for companies like Hindusthan Lever, to work with a currency agent who will, in this case, lock in the current spot exchange for a 4.85% fee. Using the following data, recommend a hedging strategy.

Spot rate, USD/JPY	**Yen 120.60/$**
Spot rate, USD/ INR	**₹ 47.75/$**
180-day forward rate, JPY/INR	**₹ 0.4166/ Yen**
Expected spot exchange rate in 180 days	**₹ 0.3846 / Yen**
180-day Yen investment rate	**1.5%**
180-day rupee investment rate	**8.0%**
Cost of Capital	**12.0%**

Answer:

180-day account payable, Japanese Yen	8500000
Spot rate, Yen/$	120.60
Spot rate, ₹ /$	47.75
Implied (Calculated) Spot rate Yen/₹ (120.60/47.75)	2.5257
180-day Forward rate: Yen/₹	2.4000
Expected spot rate in 180-days Yen/₹	2.6000
180-day Indian Rupee investing Rate	8.00%
180-day Japanese yen investing Rate	1.50%
Currency Agent's exchange rate fee	4.85%
Hindustan Lever's cost of capital	12.00%

HEDGING ALTERNATIVES:

1. REMAIN UNCOVERED

Particulars	**Rate Yen per Rupee**	**Amount (₹)**
Settling Account	2.5257	
Payable in 180-days at spot rate. * If spot rate in 180-days is same as Current spot	(8500000/2.5257)	3365464.34 Risky
* If spot rate in 180-days is same as Forward rate [8500000/2.4000]	2.4000	3541666.67 Risky
* If spot rate in 180 – days is expected spot rate [8500000/2.6000]	2.600	3269230.77 Risky

2. BUY JAPANESEYEN FORWARD 180 DAYS:

Settlement amount at forward rate. [8500000/2.400]	2.400	3541666.67 Certain

3. MONEY MARKET HEDGE:

Principle account payable:	Yen 8500000	
Discount factor for year Investing Rate for 180 days: (1/1.0075)	0.99256	
Principle needed to meet Account payable in 180 – days: (8500000 x 0.99256)	Yen 8436760.00	
Current spot rate	Yen per rupee 2.5257	
Indian Rupee current amount: [8436760/2.5257]	₹ 3340365.05	
Hindustan Lever WACC Carry–forward Factor for 180 day: FUTURE VALUE OF MONEY MARKET HEDGE: (3340365.05 x 1.06)	1.0600 ₹3540786.95	Certain

4. INDIAN CURRENCY AGENT HEDGE:

Principle account payable:	Yen 8500000	
Current spot rate Yen per rupee	2.5257	
Current account payable (8500000/2.5257)	₹ 3365403.65 (A)	
Plus: Agent's Free (4.85%)	₹ 163222.08	
Hindustan's Lever WACC		
Carry – forward factor for 180 days on fee (163222.08 x 1.06)	₹ 173015.40 (B)	
TOTAL	₹ 3538419.05	Certain

EVALUATION ALTERNATIVES:

Hedging through currency agent is the best alternative hedging strategy if risk avoidance is the objective.