FINAL EXAMINATION

(REVISED SYLLABUS - 2008)

GROUP - III

Paper-12 : FINANCIAL MANAGEMENT & INTERNATIONAL FINANCE

Q. 1. 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) Bidhan purchased a second hand machine for Rs. 8,000 on April, 2008 and spent Rs. 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 Rs. 6,500. What is the loss to be written –off?

A. Rs. 1,265.80

B. Rs. 1,262.50

C. Rs. 1,309.80

D. Rs. 1,350.05

(ii) Surya Ltd. has issued 30,000 irredeemable 14% debentures of Rs. 150 each. The cost of floatation of debentures is 5% of the total issued amount. The company's taxation rate is 40%. The cost of debentures is :

A. 8.95%

B. 7.64%

C. 9.86%

D. 8.84%

(iii) A company has obtained quotes from two different manufacturers for an equipment. The details are as follows :

Product	Cost (Rs. 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.

(iv) ABC Ltd. has a debt-equity mix of 30/70. If ABC Ltd.'s debt beta is 0.3 and 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

(v) Anand Ltd. announced a rights issue of four shares of Rs. 100 each at a premium of 160% for every five shares held by the existing shareholders. The market value of the shares at the time of rights issue is Rs. 395. The value of right is :

A. Rs. 90

B. Rs. 80

C. Rs. 60

D. Rs. 55

(vi) A company is planning to issue a discount bond with a par value of Rs. 1,000, implicit interest rate of 11.5% and a redemption period of 5 years. The company also intends to offer an early bird incentive of 1.5%. The issue price (rounded up to nearest rupee) will be [Given : PVIF (11.5%, 5 years) = 0.5803]

A. Rs. 580

B. Rs. 572

C. Rs. 543

D. Rs. 490

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

A. Rs. 16

B. Rs. 20

C. Rs. 10

D. Zero

(viii) An investor has Rs. 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	Rs. 2,00,000
	0.4	(–) Rs. 1,50,000
Risk-free security	1.0	Rs. 25,000

A. Rs. 35,000

B. Rs. 45,000

C. Rs. 60,000

D. Rs. 85,000

(ix) 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

(x) Variable rate investors are the typical users of :

A. Interest rate caps

B. Interest rate collars

C. Both (A) and (B)

D. Interest rate floors

Answer 1. (a)

(i) **B.** Rs. 1,262.50

Particulars	**Rs.**
Cost of machine (8,000 + 3,500)	11,500.00
Less : Depreciation @ 10% (1-4-2008 to 31-3-2011) (Rs. 11,500 × 10/100 × 3 years)	3,450.00
Book value as on 1-4-2011	8,050.00
Less : Depreciation @ 10% (1-4-2011 to 30-6-2011) (Rs. 11,500 × 10/100 × 3/12)	287.50
Book value as on 30-6-2011	7,762.50
Sale value	6,500.00
Loss on sale of machine	1,262.50

(ii) **D.** 8.84%

Particulars	**Rs.**
Total issued amount (30,000 × Rs. 150)	45,00,000
Less : Floatation cost (Rs. 45,00,000 × 5/100)	2,25,000
Net proceeds from issue	42,75,000

Annual interest charge = Rs. 45,00,000 × 14/100 = Rs. 6,30,000

$$K_d = \frac{I(1-t)}{NP} = \frac{6,30,000(1-0.40)}{42,75,000} = 0.0884 \text{ or } 8.84\%$$

(iii) **A. Make A will be cheaper**

Make A

Purchase cost = Rs. 4.50 million

Equivalent annual cost = 4.50/6.1446 = Rs. 0.73235 million

Make B

Purchase cost = Rs. 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.

(iv) **B.** 1.60

$b_A = b_d(D/V) + b_e(E/V)$

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

$1.21 = 0.09 + 0.7\ b_e$

$b_e = 1.12/0.7 = 1.60$

(v) **C.** Rs. 60

$$\text{Value of right} = \frac{r(M-S)}{N+r}$$

Where, r = number of rights issued = 4

N = Number of equity shares = 5

M = Market price = Rs. 395

S = Issue price of rights = Rs. 100 + (Rs. 100 × 160%)
= Rs. 260

$$\text{Value of rights} = \frac{4(395-260)}{5+4} = \text{Rs. } 60$$

(vi) **B.** Rs. 572

B_o = B_n × PVIF (K%, n years)

Where, B_n = Rs. 1,000; n = 5 years

K% = 11.5% incentive = 0.015

B_o = Rs. 1,000 × 0.5803 = Rs. 580.30

Issue price will be = Rs. 580.30 (1 – 0.015) = Rs. 571.60 or Rs. 572

(vii) **A.** Rs. 16

Expected value of call option

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

(viii) **A.** Rs. 35,000

Expected premium = (0.6 × Rs. 2,00,000) + [0.4 × (–) Rs. 1,50,000] – Rs. 25,000

= Rs. 1,20,000 – Rs. 60,000 – Rs. 25,000

= Rs. 35,000

(ix) **B.** Managed float

(x) **D.** Interest rate floors

Q. 2. Write short notes on :

(i) Financial Engineering

(ii) Scenario Analysis

(iii) Seed capital assistance

(iv) Embedded Derivatives

(v) Butterfly Spread

Answer 2.

(i) **Financial Engineering** – '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.

(ii) Scenario Analysis – 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 defined 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 Worst 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.

(iii) Seed capital assistance – 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.

(iv) Embedded Derivatives – 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.

(v) Butterfly Spread – 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.

Q. 3. Super Grow Manufacturing Co. has two mutual exclusive projects. Projects A requires a cash outlay of Rs. 2,00,000 and requires cash running expenses of Rs. 70,000 per annum. Project B will cost Rs. 3,00,000 and requires cash running expenses of Rs. 40,000 per year. Both projects have an 8 year life. Project A has a salvage value of Rs. 8,000 and project B has Rs. 28,000. The Company's tax rate is 50% and has a 10% required rate of return.

Assuming depreciation on straight line basis, advice the Company on the project to be chosen.

Answer 3.

Alternative I – Evaluation based on Net Present Cost

Computation of Annual Depreciation and Tax Savings on Depreciation

Particulars	Project A	Project B
Initial outlay	2,00,000	3,00,000
Less : Salvage Value	8,000	28,000
Depreciable value	1,92,000	2,72,000
Period of use	8 years	8 years
Annual depreciation	24,000	34,000
Tax savings on depreciation [Annual depreciation x Tax rate @ 50%]	12,000	17,000

Computation of Annual Cash Flow

Particulars	Project A	Project B
Cash operating expenses	70,000	40,000
Less : Tax savings on cash operating expenses @ 50%	35,000	20,000
Net cash operating expenses	35,000	20,000
Less : Tax savings on depreciation	12,000	17,000
Net cash outflow	23,000	3,000

Evaluation

Particulars	Year	Disc. Factor @ 10%	Project A		Project B	
			Cash flow	DCF	Cash flow	DCF
Initial investment	0	1.000	2,00,000	2,00,000	3,00,000	3,00,000
Net operating cash outflows	1-8	5.335	23,000	1,22,705	3,000	16,005
Total present value of cash outflows				3,22,705		3,16,005
Less : Salvage Value	8	0.467	8,000	3,736	28,000	13,076
Net present cost				3,18,969		3,02,929

Conclusion : Project B offers a lower net present cost, and hence should be preferred.

Alternative –II – Evaluation based on incremental cost

Hypothesis – Project B be selected.

Computation of Incremental Outflow

Particulars	Rs.
Investment for project B	3,00,000
Less : Investment for project A	2,00,000
Incremental investment cost in project B	1,00,000

Computation of Incremental Savings

Particulars	Rs.	Rs.
Cash operating cost for project A		70,000
Less : Cash operating cost for Project B		40,000
Savings in operating cost due to selection of Project B		30,000
Less : Tax payable on cost savings		15,000
Net savings in cash operating cost		15,000
Add : Tax savings on additional depreciation		
Depreciation for project B	34,000	
Less : Depreciation for project A	24,000	
Incremental depreciation for project B	10,000	
Tax savings on additional depreciation – Rs. 10,000 × 50%		5,000
Total annual savings by selecting project B		20,000

Evaluation of Hypothesis

Particulars	Year	Disc. Factor @ 10%	Cash flow	DCF
Incremental savings for 8 years	1-8	5.335	20,000	1,06,700
Incremental salvage proceeds [28,000 – 8,000]	8	0.467	20,000	9,340
Total present value of cash outflows				1,16,040
Less : Incremental investment	0	1.000	1,00,000	1,00,000
Net present value				16,040

Conclusion : There is a net saving of Rs. 16,040 in present value terms, by opting for project B instead of project A. Therefore, the hypothesis is correct i.e. Project B should be selected.

Q. 4. Computronics India Ltd. has been analyzing the firm's policy regarding computers, which are now being leased on a yearly basis on rental amounting to Rs. 1,00,000 per year. The computers can be bought for Rs. 5,00,000. The purchase would be financed by 16% loan repayable in 4 equal annual installments.

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

The company uses the straight line method of depreciation. Corporate tax rate is 50%.

(i) Comment on whether the equipment should be bought or leased?

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

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

(iv) Determine the lease rent which will yield an IRR of 16% to the lessor.

Answer 4.

(i) PV of cash outflows under leasing alternative

Year	Lease rent after taxes	PV factor (0.08)	Total PV
1-4	Rs. 50,000	3.312	Rs. 1,65,600

Cash outflows under buying alternative

Year-end	Loan at the beginning of the year	Loan installment	Interest on loan (0.16)	Principal repayment	Principal outstanding at the end of year
1	5,00,000	1,78,699*	80,000	98,699	4,01,301
2	4,01,301	1,78,699	64,208	1,14,491	2,86,810
3	2,86,810	1,78,699	45,890	1,32,809	1,54,001
4	1,54,001	1,78,699	24,698	1,54,001	–

* [Rs. 5,00,000 ÷ 2.798 (PV factor of annuity of Re 1 at 16% for 4 years)].

PV of cash outflows under buying alternatives

Year	Loan installment	Payment of Interest		Net cash outflows Depreciation	PV factor (0.08)	Total PV
1	1,78,699	40,000	37,500	1,01,199	0.926	93,710
2	1,78,699	32,104	37,500	1,09,095	0.857	93,494
3	1,78,699	22,945	37,500	1,18,254	0.794	93,894
4	1,78,699	12,349	37,500	1,28,850	0.735	94,705
4	Salvage value			(2,00,000)	0.735	(1,47,000)
						2,28,803

(ii) Viability form the lessor's point of view

Determination of CFAT

Particulars	Rs.
Lease rent received	1,00,000
Less : Depreciation	75,000
EBT	25,000
Less : Taxes (0.50)	12,500
EAT	12,500
Add : Depreciation	75,000
CFAT	87,500

Determination of NPV

Year	CFAT	PV factor (at 0.14)	Total PV
1-4	87,500	2.914	2,54,975
4	2,00,000	0.592	1,18,400
	Total PV		3,73,375
	Less : Cost of computer		5,00,000
	NPV		(1,26,625)

The proposal is not financially viable to the lessor.

(iii) Lease rent, at which lessor would break-even

Particulars	Rs.
Cost of computers	5,00,000
Less : PV of salvage value of computers	1,18,400
Net cost to be recovered	3,81,600
Divide by PV annuity factor (14,4)	2.914
CFAT (desired)	1,30,954
Less : Depreciation	75,000
EAT	55,954
Add : Taxes	55,954
EBT	1,11,908
Add : Depreciation	75,000
Lease rental (desired)	1,86,908

(iv) Lease rent to yield 16% IRR

Particulars	Rs.
CFAT (desired)	1,39,242
Less : Depreciation	75,000
EAT	64,242
Add : Tax (0.50)	64,242
EBT	1,28,484
Add : Depreciation	75,000
Lease rental (desired)	2,03,484

Working notes :

Desired CFAT : Rs. 5,00,000 $= \sum_{t=1}^{4} \frac{X}{(1+0.16)^t} + \frac{\text{Rs. } 2,00,000}{(1+0.16)^4}$, where X = CFAT

$$\text{Rs. } 5,00,000 - \frac{\text{Rs. } 2,00,000}{(1+0.16)^4} = \sum_{t=1}^{4} \frac{X}{(1+0.16)^t}$$

Substituting PV factor of annuity (16,4) 2.798 and PV factor (16,4), 0.552,

Rs. 5,00,000 – (Rs. 2,00,000 × 0.552) = X (2.798)

3,89,600/2.798 = X

X = Rs. 1,39,242.

Q. 5. The following data relate to two companies belonging to the same risk class :

Particulars	*X Ltd.*	*Y Ltd.*
Expected net operating income	**Rs. 2,40,000**	**Rs. 2,40,000**
10% debt	**Rs. 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 5.

(i) Calculation of total value of firm and weighted average cost of capital

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

(ii) Arbitrage process when unlevered firm is overvalued

Particulars		Rs.
A.	Investor's present position in overvalued firm	
	– Market value of investment (10% of Rs. 16,00,000)	1,60,000
	– Dividend income (10% of Rs. 2,40,000)	24,000
B.	He sells his present equity holdings for Rs.	1,60,000
C.	– He purchases equity holdings of undervalued firm for Rs. (10% of Rs. 8,40,000)	84,000
	– He purchases debts of undervalued firm for Rs.	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 Rs. 1,56,000 which is less than the present investment of Rs. 1,60,000.

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

Particulars		Rs.
A.	Investor's present position in overvalued firm	
	— Market value of investment (10% of Rs. 16,00,000)	1,60,000
	— Dividend income (10% of Rs. 2,40,000)	24,000
B.	He sells his present equity holdings for Rs.	1,60,000
C.	He purchases equity holdings of undervalued firm for [Rs. 1,60,000 × Rs. 8,40,000/Rs. 15,60,000]	86,154
	— He purchases debts of undervalued firm for [Rs. 1,60,000 × Rs. 7,20,000/ Rs. 15,60,000]	73,846
	— Total amount invested	1,60,000
D.	His net income after switching over process	
	— Dividend income (20% of Rs. 86,154)	17,231
	— *Add* : Interest on debt (10% of Rs. 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)	Rs. 2,40,000	Rs. 2,40,000
Less : Interest on debt (I)	Rs. 72,000	—
Earnings for equity shareholders (NI)	Rs. 1,68,000	Rs. 2,40,000
Overall capitalization rate (k_o)	0.15385	0.15385
Total value of firm (V = NOI/ k_o)	Rs. 15,60,000	Rs. 15,60,000
Less : Market value of debt (D) [I/ Rate of interest]	Rs. 7,20,000	—
Market value of equity (S)	Rs. 8,40,000	Rs. 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 × S/V) + (k_d × D/V)	0.15385	0.15385

Q. 6. Pawan Ltd. provides you the following information :

(i) Capital structure as per Balance Sheet as at 1st April, 2010 :

Particulars	*Rs.*
15% Debentures of Rs. 100 each	**10,00,000**
18% Preference shares of Rs. 100 each	**2,00,000**
Equity shares of Rs. 10 each	**2,00,000**
Retained earnings	**4,40,000**
Total	**18,40,000**

(ii) Currently quoted prices in stock exchange (as at 31st March, 2011)

15% Debentures at Rs. 120 per debenture

18% Preference shares at Rs. 120 per share

Equity shares at Rs. 78 per share

(iii) EPS and DPS

EPS for the current year is Rs. 20 per share. Dividend Payout Ratio is 60%. Anticipated growth rate is 4%.

(iv) Corporate tax rate is 40%.

***Required* :**

(i) Calculate the weighted average cost of capital using (a) Book Value Weights, (b) Market Value Weights.

(ii) Calculate the cost of new debentures, new preference shares, new equity shares and retained earnings if anticipated external financing opportunities are as follows :

(a) 12% debentures of Rs. 100 each issued at par and redeemable after 5 years at 5% premium. Flotation cost is 5% of issue price.

(b) 15% preference shares of Rs. 100 each issued at par and redeemable after 5 years at 5% premium. Flotation cost is 5% of the issue price.

(c) Equity shares of Rs. 10 each issued at Rs. 60. Flotation cost being Rs. 5 per share.

(iii) How much can be spent for capital investment before new equity shares must be issued?

(iv) Calculate the weighted average cost of capital using marginal weights if the company requires Rs. 4,00,000 for future investment and intends to maintain the existing optimal capital structure.

(v) What is the required amount of capital budget if the company wants to expands its total assets by 47.50%? There are no short term debts.

(vi) How much of the capital budget must be financed by the external equity to maintain the optimal capital structure in part (v).

(vii) Calculate the weighted average cost of capital using marginal weights in part (vi) assuming that the company intends to maintain the existing optimal capital structure.

(viii) Calculate the numbers of new equity shares, debentures and preference shares to be issued in part (vi).

Answer 6.

Calculation of retained earnings as at 31.03.2011

Retained earnings as at 01.04.2010	Rs. 4,40,000
Add : Current year's retained earning [(20,000 × Rs. 20) × 40%]	Rs. 1,60,000
Retained earnings as at 31.03.2011	Rs. 6,00,000

(i) (a) Statement showing the weighted average cost of capital
(Using book value weights)

Source of capital A	Amount of each source of capital B (in lakhs)	Proportion of each source of capital C	After tax cost of each source of capital D	Product E = C × D
Equity share capital	2.00	0.100	0.200	0.0200
Retained earnings	6.00	0.300	0.200	0.0600
18% preference share capital	2.00	0.100	0.150	0.0150
15% debentures	10.00	0.500	0.075	0.0375
Total	**20.00**	**1.000**		**0.1325**

(i) (b) Statement showing the weighted average cost of capital
(Using market value weights)

Source of capital A	Amount of each source of capital B (in lakhs)	Proportion of each source of capital C	After tax cost of each source of capital D	Product E = C × D
Equity share capital	15.60	0.520	0.200	0.104
18% preference share capital	2.40	0.080	0.150	0.012
15% debentures	12.00	0.400	0.075	0.030
Total	30.00	1.000		0.146

Cost of equity capital (k_e) or retained earnings (k_r)

$$= \frac{D_1}{P_0} + g = \quad + g \quad = \frac{12(1+0.04)}{78} + 0.04 = 0.16 + 0.04 = 0.20$$

(ii) Calculation of the new cost

(a) Cost of new debentures (k_d)

k_d =

= = 0.092 or 9.2%

(b) Cost of new preference share (k_p)

k_p =

= = 0.17 or 17.00%

(c) Cost of new equity shares (k_e)

$$k_e = \frac{D_0(1+g)}{P_0}+g = \frac{12\,(1+0.04)}{(60-5)}+0.04 = 0.2269 + 0.04 = 0.2669 \text{ or } 26.69\%$$

(d) Cost of retained earnings (k_r)

$$k_r = \frac{D_1}{P_0}+g = \frac{D_0(1+g)}{P_0}+g = \frac{12\,(1+0.04)}{60}+0.04 = 0.208 + 0.04 = 0.248 \text{ or } 24.80\%$$

(iii) Calculation of investment before issue of equity shares

Retained earnings available = Total number of shares × EPS – Dividend paid
= (20,000 × Rs. 20) – (20,000 × Rs. 12)
= Rs. 4,00,000 – Rs. 2,40,000 = Rs. 1,60,000

Total investment = (1,60,000/0.40) = Rs. 4,00,000

Hence, the company can expand its project by Rs. 4,00,000 without issuing new equity shares.

(iv) Calculation of weighted average cost by using marginal weights

Source of capital A	Amount of each source of capital B (in lakhs)	Proportion of each source of capital C	After tax cost of each source of capital D	Product E = C × D
Retained earnings	1.60	0.400	0.248	0.0992
New 15% preference share capital	0.40	0.100	0.170	0.0170
New 12% debentures	2.00	0.500	0.092	0.0460
Total	**4.00**	**1.000**		**0.1622**

(v) Required amount of capital budget = 47.5% of Rs. 20 lakhs = Rs. 9.50 lakhs

(vi) External equity to be raised = Equity portion in new investment – Retained earnings available
= (40% of Rs. 9,50,000) – Rs. 1,60,000 = Rs. 2,20,000

(vii) Statement showing the weighted average cost of capital (using marginal weights)

Source of capital A	Amount of each source of capital B (in lakhs)	Proportion of each source of capital C	After tax cost of each source of capital D	Product E = C × D
New Equity share capital	2.20	0.232	0.267	0.0619
Retained earnings	1.60	0.168	0.248	0.0417
New 15% preference share capital	0.95	0.100	0.170	0.0170
New 12% debentures	4.75	0.500	0.092	0.0460
Total	**9.50**	**1.000**		**0.1666**

(viii) Calculation of number of new securities

$$\text{No. of new equity shares} = \frac{\text{Rs. } 2,20,000}{\text{Rs.}55} = 4,000$$

$$\text{No. of new preference shares} = \frac{\text{Rs. } 95,000}{\text{Rs.}95} = 1,000$$

$$\text{No. of new debentures} = \frac{\text{Rs. } 4,75,000}{\text{Rs.}95} = 5,000$$

Q. 7. The financial statements and operating results of Better Ltd., revealed the following position as on 31st March, 2010.

Equity share capital (Rs. 100 per share fully paid-up)	**Rs. 2,00,000**
Working capital	**Rs. 1,56,000**
Bank overdraft	**Rs. 24,000**
Current ratio	**2.5**
Quick ratio (with reference to quick liabilities)	**1.5**
Proprietary ratio (fixed assets: proprietary fund)	**0.6**
Gross profit ratio	**20%**
Stock velocity	**5**
Debtors velocity	**1 month**
Net profit of sales	**10%**

Expenses included depreciation Rs. 26,000. Closing stock was 25% higher than the operating stock. There were also free reserves brought forward from earlier years. Current assets included stock, debtors and cash at bank only. Current liabilities consisted of bank, overdraft and creditors. There were no fictitious assets. The following information was gathered from the books and records for the year ended 31st March 2011 :

(a) From 1st April, 2010, the sale price was enhanced by 5%. Further, sales for the year were also 10% higher in volume as compared to the previous year.

(b) Stock level was raised to Rs. 1,80,000 from January and maintained at that level all throughout the year.

(c) Percentage of gross profit on turnover has gone up from 20% to 25%.

(d) Depreciation on fixed assets to be provided at 10% on written down value method. Full year's depreciation is to be provided on additions.

(e) Ratio of net profit to sales – 12.5%

(f) Debtors velocity was same and creditors were Rs. 1,00,000

(g) Bank overdraft – fully discharged

(h) Fixed assets acquired Rs. 40,000

(i) Outstanding expenses amounts to Rs. 5,000.

***Required* : From the above information prepare :**

(i) Trading, Profit and Loss A/c. for the year ended 31st March, 2011, and a Balance Sheet as at that date.

(ii) Cash flow statement.

Answer 7.

(i) (a) Trading and Profit and Loss A/c. for the year ending 31st March, 2011

Particulars	Rs.	Particulars	Rs.
To, Opening stock	1,40,000	By Sales	9,09,563
To Purchases	7,22,173	By Closing stock	1,80,000
To Gross Profit b/d (25%)	2,27,390		
	10,89,563		10,89,563
To Expenses (bal. fig.)	86,296	By Gross profit c/d	2,27,390
To Depreciation	27,400		
To Net profit @ 12.5%	1,13,694		
	2,27,390		2,27,390

(i) (b) Balance Sheet as at March, 2011

Liabilities		Rs.	Assets		Rs.
Share capital :			**Fixed assets :**		
2,000 equity shares of Rs. 100 each		2,00,000	Opening balance	2,34,000	
fully paid			Addition	40,000	
Reserve and surplus :				2,74,000	
General reserve		1,11,250	*Less* : Depreciation	27,400	2,46,600
Profit & Loss A/c.					
Opening balance	78,750		Current assets, loans and advances :		
Add : Profit for the year	1,13,694	1,92,444	Stock in trade		1,80,000
			Sundry debtors		75,797
Current liabilities and provisions :			Cash at bank		1,06,297
Sundry creditors		1,00,000			
Outstanding expenses		5,000			
		6,08,694			6,08,694

(ii) Cash Flow Statement of M/s. Better Ltd. for the year ended 31st March, 2011

	Particulars	Rs.	Rs.
I.	Cash flows from operating activities :		
	A. Net profit before taxation, and extraordinary item		1,13,694
	B. *Add* : Depreciation		27,400
	C. Operating profit before working capital changes		1,41,094
	D. *Add* : Decrease in current assets & increase in current liabilities :		
	Increase in creditors	20,000	
	Increase in outstanding expenses	5,000	25,000
	E. *Less* : Increase in current assets & decrease in current liabilities :		
	Increase in stock	40,000	
	Increase in debtors	10,172	50,172
	F. Cash generated from operations [B + D – E]		1,15,922
	G. *Less* : Income taxes paid (net of refund)		—
	H. Cash flow before extraordinary item [F – G]		1,15,922
	I. Extraordinary items		—
	J. Net cash from operating activities		1,15,922
II.	Cash flows from investing activities :		
	Purchase of machinery		(40,000)
	Net cash used in investing activities		(40,000)
III.	Cash flows from financing activities :		—
IV.	Net increase in cash and cash equivalents [I + II + III]		75,922
V.	Cash and cash equivalents at beginning of period		
	Cash at bank	54,375	
	Less : Bank overdraft	24,000	30,375
VI.	Cash and cash equivalents at end of period [IV + V]		
	Cash at bank		1,06,297

Working notes :

2009-2010:

i. Current assets and current liabilities

Current ratio	=	CA/CL	=	2.5 or CA	=	2.5 CL
Working capital	=	CA – CL	=	2.5 CL – CL	=	Rs. 1,56,000
Current liabilities	=	CL	=	Rs. 1,56,000/1.5	=	Rs. 1,04,000
		CA	=	Rs. 1,04,000 × 2.5	=	Rs. 2,60,000

ii. Quick liabilities (creditors) = Current liabilities – Bank overdraft = Rs. 1,04,000 – 24,000 = Rs. 80,000

iii. Quick assets = Quick liabilities × Quick ratio = 80,000 × 1.5 = Rs. 1,20,000

iv. Closing stock in trade = Current assets – Quick assets = Rs. 2,60,000 – 1,20,000 = Rs. 1,40,000

v. Opening stock = 4/5 of closing stock = 4/5 of 1,40,000 = Rs. 1,12,000

vi. Average stock = (Opening stock + Closing stock) /2 = (Rs. 1,40,000 + Rs. 1,12,000)/2 = Rs. 1,26,000

vii. Cost of sales = Average stock × Stock velocity = Rs. 1,26,000 × 5 = Rs. 6,30,000

viii. Gross profit = 20% on sales or 25% on cost of sales = 25% of Rs. 6,30,000 = Rs. 1,57,500

ix. Sales = Cost of sales + Gross profit = Rs. 6,30,000 + 1,57,500 = Rs. 7,87,500

x. Sundry debtors = Rs. 7,87,500/12 = Rs. 65,625

xi. Fixed assets = Fixed assets to Proprietary funds = 0.6, it means working capital to proprietary funds will be 1 – 0.6 = 0.4.

Working capital = 1,56,000 = 0.4 × proprietary funds

Proprietary funds = Rs. 3,90,000

Fixed assets = 0.6 × 3,90,000 = Rs. 2,34,000

xii. Net profit = 10% of sales = 10% of Rs. 7,87,500 = Rs. 78,750

xiii. Cash at bank = Quick assets – Sundry debtors = Rs. 1,20,000 – 65,625 = Rs. 54,375

xiv. Balance sheet as at 31st March, 2010

Liabilities	Rs.	Assets		Rs.
Share capital :		**Fixed assets :**		
2,000 equity shares of Rs. 100		Cost	2,60,000	
each fully paid	2,00,000	*Less* : Depreciation	26,000	2,34,000
Reserves and surplus :		Current assets :		
General reserve (balancing figure)	1,11,250	Stock in trade		1,40,000
Profit and loss a/c.	78,750	Sundry debtors		65,625
Sundry creditors	80,000	Cash at bank		54,375
Bank overdraft	24,000			
	4,94,000			4,94,000

2010-2011 :

i. Sales = Rs. 7,87,500 × 110% × 105% = Rs. 9,09,563

ii. Total debtors account

Dr. ***Cr.***

Particulars	Rs.	Particulars	Rs.
To Balance b/d	65,625	By Bank a/c. (balancing figure)	8,99,391
To Sales	9,09,563	By Balance c/d	75,797
	9,75,188		9,75,188

iii. Total creditors a/c.

Dr. ***Cr.***

Particulars	Rs.	Particulars	Rs.
To Bank a/c. (bal. fig.)	7,02,173	By Balance b/d	80,000
To Balance c/d	1,00,000	By Purchases	7,22,173
	8,02,173		8,02,173

iv. Expenses paid from bank

Particulars		Rs.
Gross profit (25% of Rs. 9,09,563)		2,27,391
Net profit (12.5% of Rs. 9,09,563)		1,13,695
Gross expenses		1,13,695
Less : Depreciation	27,400	
Outstanding Expenses	5,000	32,400
		81,296

v. Bank account

Dr. ***Cr.***

Particulars	Rs.	Particulars	Rs.
To Balance b/d	54,375	By Bank overdraft	24,000
To Total debtors a/c.	8,99,391	By Sundry creditors	7,02,173
		By Sundry expenses	81,296
		By Fixed assets	40,000
		By Balance c/d	1,06,297
	9,53,766		9,53,766

Q. 8. The following accounting information and financial ratios of ABC Ltd. relate to the year ended 31-3-2011 :

Accounting information **:**

Gross profit	**15% of sales**
Net profit	**8% of sales**
Raw materials consumed	**20% of works cost**
Direct wages	**10% of works cost**
Stock of raw materials	**3 months' usage**
Stock of finished goods	**6% of works cost**
Debt collection period	**60 days**
All sales are on credit	

Ratios **:**

Fixed assets to sales	**1:3**
Fixed assets to current assets	**13:11**
Current ratio	**2**
Long-term loan to current liabilities	**2:1**
Capital to reserves and surplus	**1:4**

If values of fixed assets as on 31.3.2010 amounted to Rs. 26 lakhs prepare a summarized profit and loss account of the company for the year ended 31.3.2011 and balance sheet as at 31.3.2011.

Answer 8.

Working notes :

i. Calculation of sales :

Fixed assets to sales = 1:3 (given)

$$\frac{\text{Sales}}{\text{Fixed assets}} = 3$$

$$\frac{\text{Sales}}{26,00,000} = 3$$

Sales = 3 × 26,00,000 = Rs. 78,00,000

ii. Calculation of current assets :

Fixed assets to current assets = 13:11

Therefore, Current assets = Fixed assets × 11/13

= 26,00,000 × 11/13 = Rs. 22,00,000

iii. Calculation of raw material consumption :

Particulars	**Rs.**
Sales	78,00,000
Less : Gross profit	11,70,000
Works cost	66,30,000
Raw material consumption (20% of works cost) (given)	13,26,000
Direct wages (10% of works cost) (given)	6,63,000

iv. Calculation of stock of raw materials :

Stock of raw material = 3 months usage (given)

= Rs. 13,26,000 × 3/12 = Rs. 3,31,500

v. Calculation of stock of finished goods :

Stock of finished goods = 6% of works cost (given)

= Rs. 66,30,000 × 6/100 = Rs. 3,97,800

vi. Calculation of current liabilities :

Current ratio = 2 (given)

$$\frac{\text{Current assets}}{\text{Current liabilities}} = 2$$

$$\frac{22,00,000}{\text{Current liabilities}} = 2$$

2 × Current liabilities = 22,00,000

Current liabilities = 22,00,000/2 = Rs. 11,00,000

vii. Calculation of debtors :

Average collection period = 60 days (given)

$$\frac{\text{Debtors}}{\text{Credit sales}} \times 365 = 60$$

$$\frac{\text{Debtors} \times 365}{78,00,000} = 60$$

Debtors = (78,00,000 × 60)/365 = Rs. 12,82,000

viii. Calculation of long-term loan :

Long-term loan to current liabilities = 2:1 (given)

$$\frac{\text{Long - term loan}}{\text{Current liabilities}} = 2$$

$$\frac{\text{Long - term loan}}{11,00,000} = 2$$

Long-term loan = 2 × 11,00,000 = Rs. 22,00,000

ix. Calculation of cash balance :

Particulars	**Rs.**	**Rs.**
Current assets		22,00,000
Less : Debtors	12,82,000	
Raw material stock	3,31,500	
Finished goods stock	3,97,800	20,11,300
Cash balance		1,88,700

x. Calculation of net worth :

Particulars	**Rs.**	**Rs.**
Fixed assets		26,00,000
Current assets		22,00,000
Total assets		48,00,000
Less : Long-term loan	22,00,000	
Current liabilities	11,00,000	33,00,000
Net worth		15,00,000

Net worth = Share capital + Reserves

Capital to reserves and surplus = 1:4 (given)

Share capital = 15,00,000 × 1/5 = Rs. 3,00,000

Reserves and surplus = 15,00,000 × 4/5 = Rs. 12,00,000

Profit and Loss A/c. of ABC Ltd for the year ended 31.3.2011

Particulars	Rs.	Particulars	Rs.
To Direct materials	13,26,000	By Sales	78,00,000
To Direct wages	6,63,000		
To Work overhead (bal. figure)	46,41,000		
To Gross profit c/d (15% of sales)	11,70,000		
	78,00,000		78,00,000
To Selling & Dist. Expenses (bal. figure)	5,46,000	By Gross profit b/d	11,70,000
To Net profit (8% of sales)	6,24,000		
	11,70,000		11,70,000

Balance Sheet of ABC Ltd. as at 31st March 2011

Liabilities	Rs.	*Assets*	Rs.
Share capital	3,00,000	Fixed assets	26,00,000
Reserves and surplus	12,00,000	Current assets :	
Long-term loans	22,00,000	Stock of raw materials	3,31,500
Current liabilities	11,00,000	Stock of finished goods	3,97,800
		Debtors	12,82,000
		Cash	1,88,700
	48,00,000		48,00,000

Q. 9. The initial investment outlay for a capital investment project consists of Rs. 100 lakhs for plant and machinery and Rs. 40 lakhs for working capital. Other details are summarized below :

Output	**1 lakh units of output per year for years 1 to 5**
Selling price	**Rs. 120 per unit of output**
Variable cost	**Rs. 60 per unit of output**
Fixed overheads (excluding depreciation)	**Rs. 15 lakhs per year for years 1 to 5**
Rate of depreciation on plant and machinery	**25% on WDV method**
Salvage value of plant and machinery	**Equal to the WDV at the end of year 5**
Applicable tax rate	**40%**
Time horizon	**5 years**
Post-tax cut off rate	**12%**

***Required* :**

(i) Indicate the financial viability of the project by calculating the net present value

(ii) Determine the sensitivity of the project's NPV under each of the following conditions :

(a) Decrease in selling price by 5%

(b) Increase in variable cost by 10%

(c) Increase in cost of plant and machinery by 10%

Answer 9.

i. Initial investment outlay Rs. 140 lakhs

Depreciation schedule

Particulars	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Opening plant and machinery	100	75.00	56.25	42.19	31.64
Annual depreciation	25	18.75	14.06	10.55	7.91
Closing plant and machinery	75	56.25	42.19	31.64	23.73

Selling price	120
Less : Variable cost	60
Contribution	60

Total contribution per year = 1 lakh units × Rs. 60 p.u. = Rs. 60 Lakhs.

(Rs. In lakhs)

Total contribution per year	60
Less : Fixed overheads, other than depreciation, per year	15
Profit before depreciation and tax per year (PBDT)	45

Computation of P.V. of Net Cash Inflow :

(Rs. In lakhs)

End of year	**1**	**2**	**3**	**4**	**5**
PBDT	45	45.00	45.00	45.00	45.00
Less : Depreciation	25	18.75	14.06	10.55	7.91
PBT	20	26.25	30.94	34.45	37.09
Less : Tax @ 40%	8	10.50	12.38	13.78	14.84
PAT	12	15.75	18.56	20.67	22.25
Add : Depreciation	25	18.75	14.06	10.55	7.91
Salvage value of plant and machinery	-	-	-	-	23.73
Realisation of working capital	-	-	-	-	40.00
Net cash inflow	37	34.50	32.62	31.22	93.89
P.V. factor @ 12%	0.893	0.797	0.712	0.636	0.567
P.V. of net cash inflow	33.04	27.50	23.23	19.86	53.24

NPV = P.V. of net cash inflow – Initial investment outlay = 156.87 – 140.00

= Rs. 16.87 lakhs

As the NPV @ 12% is positive, the project is financially viable.

ii. Sensitivity analysis :

(a) 5% decline in selling price :

The above change leads to (0.05 × Rs. 120) × (1 – 0.4)

= 3.6 lakhs per year for years 1 to 5. Decline in post-tax net cash inflow.

Decline in NPV = Rs. 3.6 lakhs × PVIF of annuity @ 12%, 5 years
= Rs. 3.6 × 3.605 = Rs. 12.98 lakhs

Percentage decline in NPV compared to the base case NPV of Rs. 16.87 lakhs
= (12.98 / 16.87) × 100 = 76.94%

(b) Increase in variable cost by 10%:

The above change results in a decline in post-tax net cash inflow to the extent of (1 – 0.4) Rs. 6 lakhs or Rs. 3.6 lakhs per year for years 1 to 5. Calculations made in (a) above will be equally valid here as the decline in net present value will be 76.94%.

(c) Increase in cost of plant and machinery by 10% :

As a result initial outlay will be higher by Rs. 10 lakhs. However, the net cash inflow will be higher due to the tax benefit on depreciation of the increase in the cost of plant and machinery. The present value calculation are shown below :

(Rs. In lakhs)

Year	**1**	**2**	**3**	**4**	**5**
Opening value	10.00	7.50	5.62	4.21	3.16
Depreciation	2.50	1.88	1.41	1.05	0.79
Closing value	7.50	5.62	4.21	3.16	2.37
Tax benefit on depreciation @ 40%	1.00	0.75	0.56	0.42	0.32
Increase in salvage value	–	–	–	–	2.37
Increase in net cash inflow	1.00	0.75	0.56	0.42	2.69
P.V. factor @ 12%	0.893	0.797	0.712	0.636	0.567
Present values	0.89	0.60	0.40	0.27	1.53

Decline in NPV = P.V. of additional outflow reduced from Rs. 10 lakhs to Rs. 6.31 lakhs

Percentage decline in NPV = (Rs. 6.31/Rs. 16.87 lakhs) × 100 = 37.40%

Further work – The value of the sensitivity analysis could be improved by

(a) Using different rates of change for the single rate of 10%

(b) Examining effect of favourable, as well as, adverse changes

(c) Using a combination of changes and using probability to find out expected values.

Q. 10. The clients of an accounting firm wherein you are employed are concerned about the fall in dividends from a company whose shares they hold as investments. The abridged profit and loss account and balance sheet of the company for 2 years are given as follows :

Abridged P & L A/c. (year ended March 31st)

(Rs. In lakhs)

Particulars	*Current year*	*Previous year*
Income :		
Sales and other income	**19,200**	**15,500**
Expenditure :		
Operating and other expenses	**15,600**	**11,900**
Depreciation	**700**	**650**
Interest	**1,850**	**1,750**
	18,150	**14,300**
Profit for the year	**1,050**	**1,200**
Taxes	**500**	**200**
Profit after taxes	**550**	**1,000**
Proposed dividend	**200**	**400**

Abridged Balance Sheet as on March 31st

(Rs. In lakhs)

Particulars	*Current year*	*Previous year*
Sources of funds :		
Share capital (of Rs. 10 each)	**4,200**	**2,600**
Reserves and surplus	**7,550**	**1,200**
Convertible portion of 12.5% debentures	**—**	**500**
Loan funds :		
Secured loans (16%)	**10,100**	**8,700**
Unsecured loans (15%)	**1,000**	**3,300**
Total	**22,850**	**16,300**
Application of funds :		
Fixed assets :		
Cost	**14,800**	**11,200**
***Less* : Depreciation**	**2,700**	**2,000**
	12,100	**9,200**
Advances on capital a/c. and capital work-in-progress	**1,000**	**200**
	13,100	**9,400**
Current assets, loans and advances :		
Inventories	**8,600**	**7,100**
Sundry debtors	**1,400**	**550**
Cash and bank balances	**850**	**680**
Loans and advances	**3,000**	**1,600**
	13,850	**9,930**
***Less* : Current liabilities**	**4,100**	**3,030**
	9,750	**6,900**
Total	**22,850**	**16,300**

You are required to :

(i) Compute the following interest cover, return on net worth, earnings per share, dividend cover.

(ii) State whether the shares are to be disposed of or to be retained as investment. Indicate the justification for your opinion.

Answer 10.

(i) Abridged P&L A/c. (year-ended March 31st) **(Rs. In lakhs)**

Particulars	Current year	Previous year
Sales and other income	19,200	15,500
Less : Operating and other expenses	15,600	11,900
Depreciation	700	650
Earnings before interest and taxes (EBIT)	2,900	2,950
Less : Interest	1,850	1,750
Earnings before taxes	1,050	1,200
Less : Taxes	500	200
Earnings after taxes (EAT)	550	1,000
Proposed dividend (D_p)	200	400
Interest coverage ratio (EBIT/Interest)	1.57	1.69
Return on net worth (EAT/Net worth)*	0.047	0.263
Earnings per share (EAT/Number of shares)**	1.31	3.85
Dividend cover (EAT/D_p)	2.75	2.50

* **Net worth :** Previous year = Rs. 3,800 (Rs. 2,600 + Rs. 1,200); Current year = Rs. 11,750 (Rs. 4,200 + Rs. 7,550)

** **Number of shares :** Previous year = 260 lakhs ; Current year = 420 lakhs.

(ii) As regards disposal or retention of shares, the aspects of the operations of the accounting firm having a bearing on the decision are characterized by sharp decline in the current year *vis*-à-*vis* the previous year; return on net worth, earnings per share, dividend per share and the profitability ratios. There appears to be a prima facie case for disposal of the shares.

However, the firm has raised additional funds (equity and secured loan) during the current year which have been invested in fixed assets or blocked in capital work-in-progress. The firm seems to be at a growing stage and the expansion programme may yield additional profits with a positive impact on EPS and DPS. As growth shares, it may be a judicious decision to presently hold the shares of the firm.

Q. 11. (a) Bala is facing water crisis in Chennai. He is considering drilling a well within his compound. In the past, only 70% of wells drilled showed adequate water at 200 feet of depth. However, on finding no water at 200 feet, some persons drilled it further by 50 feet but only 20% struck water at 250 feet. The prevailing cost of drilling is Rs. 50 per feet. Bala estimated that if he does not dig a well in his compound, he will have to pay Rs. 15,000 over the next 10 years in present value terms to buy water from outside. Draw a decision tree and advise Bala.

(b) XYZ Ltd. initially decides that it will pay Rs. 10 lakhs dividends next year. It has 10 lakhs shares outstanding with a total market value of Rs. 200 lakhs. The dividends payable are expected to grow 5% over Rs. 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 Rs. 20

lakhs. After that the dividends payable are not likely to change i.e. growing 5% over Rs. 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 Rs. 10 a share in year 1, who gains and who loses? Is the MM dividend irrelevance still hold good?

Answer 11. (a)

The given problem can be depicted by the following decision tree. The point to be remembered is that Bala has always got the alternative of purchasing water from outside. Hence this option should form part of analysis at every level whenever other alternatives are unsuccessful.

EMV (C2) = 0.2 [250 × 50] + 0.8 [250 x 50 + 15,000*] = 24,500

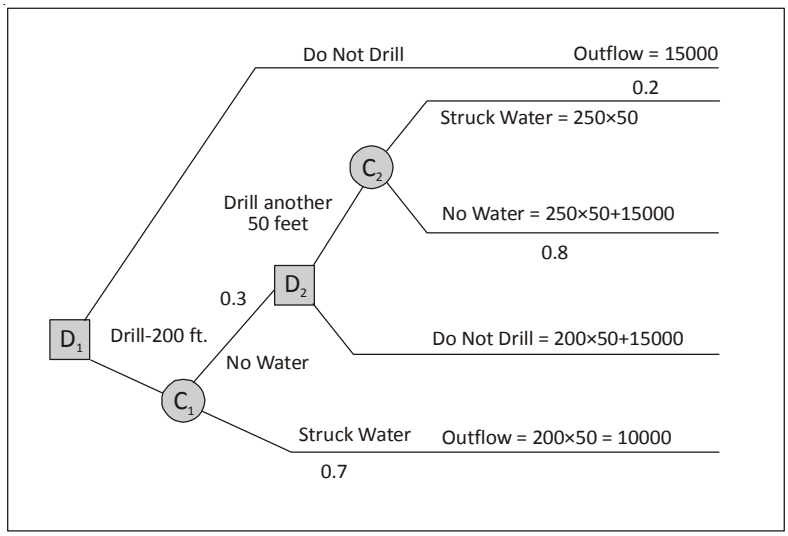
EMV (D2) = Min [D21, D22] = Min [24,500, 25,000] = 24,500 (because all are costs)

EMV (C1) = 0.3 × 24,500 + 0.7 × 10,000 = 14,350

EMV (D1) = Min [D11, D12] = Min [14,350, 15,000*] = 14,350

* 15,000 is the amount to be paid to get water from outside.

Therefore, optimal strategy is to drill up to 200 ft. & if no water, then drill till 250 feet.



Answer 11. (b)

(i) Now the shares are valued at Rs. 20 (i.e. Market value/ No. of shares = 200/10 = Rs. 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 Rs. 10.50 lakhs i.e. 5% over and above Rs. 10 lakhs, dividends are payable in year 2.

Therefore, value of firm in year 1 = $\frac{10.50 \text{ lakhs}}{0.10-0.05}$ = Rs. 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 = Rs. 10 lakhs, because the extra dividend was raised by issue of shares. Using all information stated above we can say that :

P_1 × Rs. 10 lakhs + 10 lakhs = Rs. 210 lakhs

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

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

(iii) After year 1, total dividends distributable = Rs. 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 Rs. 20. Now if the shares are issued at Rs 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.

Q. 12. (a) Moderate Industries Ltd. is desirous of assessing its working capital requirements for the next year. The finance manager has collected the following information for the purpose.

Estimated cost per unit of finished product

Particulars	*Rs.*
Raw materials	**90**
Direct labour	**50**
Manufacturing and administrative overhead (excluding depreciation)	**40**
Depreciation	**20**
Selling overheads	**30**
Total cost	**230**

The product is subject to excise duty of 10% (levied on cost of production) and is sold at Rs. 300 per unit.

Additional information **:**

(i) Budgeted level of activity is 1,20,000 units of output for the next year.

(ii) Raw material cost consists of the following :
Pig iron Rs. 65 per unit, Ferro alloys Rs. 15 per unit, and Cast iron borings Rs. 10 per unit.

(iii) Raw materials are purchased from different suppliers, extending different credit period.
Pig iron – 2 months, Ferro alloys – ½ month, and cost iron borings – 1month.

(iv) Product is in process for a period of ½ month. Production process requires full unit (100%) of pig iron and ferro alloys in the beginning of production, cast iron boring is required only to the extent of 50% in the beginning and the remaining is needed at a uniform rate during the process. Direct labour and other overheads accrue similarly at a uniform rate throughout production process.

(v) Past trends indicate that the pig iron is required to be stored for 2 months and other materials for 1 month.

(vi) Finished goods are in stock for a period of 1 month.

(vii) It is estimated that one-fourth of total sales are on cash basis and the remaining sales are on credit. The past experience of the firm has been to collect the credit sales in 2 months.

(viii) Average time-lag in payment of all overheads is 1 month and ½ months in the case of direct labour.

(ix) Desired cash balance is to be maintained at Rs. 10 lakhs.

You are required to determine the amount of net working capital of the firm. State your assumptions, if any.

(b) Lovely Ltd. is a major player in the soap and detergent business. It has a market share of 25% which is almost twice as much as that of the next competitor. The current sales of Lovely Ltd. amount to Rs. 1,400 crore. Its bad debts are in the range of 1%. The company has a P/V ratio of 45%. The policy of Lovely Ltd. is to extend to all its customers a credit of 30 days. The existing fixed costs are Rs. 120 crore which are unaffected by changes in sales.

Lovely Ltd. is facing severe competition both from multinational and regional players. The CEO of the company, has asked the chief marketing manager, to submit proposals to meet the challenge from the competitors. He, after a detailed survey and discussion, proposed three options for the consideration of the CEO.

Option 1 **: Increase the credit period to 60 days. In that case, the sales are likely to increase by 20%. But bad debts would go up to 2% and an additional investment of Rs. 20 crore will be required in working capital (without taking into account the effect of debtors).**

Option 2 **: Offer a credit term, 2/10 net 30. In this case, sales are expected to increase by 10%. 50% of the debtors are likely to avail of the discount. There would be no change in bad debts.**

Option 3 **: Offer both extended credit to 60 days and cash discount of 2% (2/10 net 30). An increase of 25% in sales could be expected and cash discount could be availed of by 30% of the customers. But bad debts will increase to 2% and the additional investment in working capital of Rs. 20 crore will be required (without taking into account the effect of debtors).**

The CEO desires the CFO to carry out a financial evaluation of the above alternative proposals and suggest the course of action to be taken. The required rate of return of Lovely Ltd. is 20%.

Answer 12. (a)

Determination of net working capital of Moderate Industries Ltd.

Particulars	**Rs.**
Current assets :	
Minimum desired cash balance	10,00,000
Raw materials :	
Pig iron (1,20,000 × Rs. 65 x 2/12)	13,00,000
Ferro alloys (1,20,000 × Rs. 15 × 1/12)	1,50,000
Cast iron borings (1,20,000 × Rs. 10 × 1/12)	1,00,000
Work-in-process (1,20,000 × Rs. 132.5 × 1/24)	6,62,500 [1]
Finished goods (1,20,000 × Rs. 180 × 1/12)	18,00,000
Debtors (1,20,000 × 0.75 × Rs. 230 × 2/12)	34,50,000 [2]
Total	84,62,500

Current liabilities :	
Pig iron (1,20,000 × Rs. 65 × 2/12)	13,00,000
Ferro alloys (1,20,000 × Rs. 15 × 1/24)	75,000
Cast iron borings (1,20,000 × Rs.10 × 1/12)	1,00,000
Wages (1,20,000 × Rs. 50 × 1/24)	2,50,000
Total overheads (1,20,000 × Rs. 70 × 1/12)	7,00,000
Total	24,25,000
Net working capital	60,37,500

Working notes :

i.

Determination of work-in-process		**Rs.**
Pig iron		65
Ferro alloys		15
Cast iron boring (0.50 x Rs. 10)		5
Other costs :		
Cast iron borings (0.50 x Rs. 5)	2.50	
Direct labour (0.5 x Rs. 50)	25.00	
Manufacturing and administrative overhead (0.50 x Rs. 40)	20.00	
		47.50
		132.50

ii.

Debtors	**Rs.**
Raw material	90
Direct labour	50
Manufacturing and administrative overheads	40
Selling overheads	30
Excise duty (0.10 × Rs. 200)	20
	230

Answer 12. (b)

Financial evaluation of credit proposal **(Rs. Crore)**

Particulars	Option 1		Option 2		Option 3	
Incremental sales	(1,400 × 0.20)	280	(1,400 × 0.10)	140	(1,400 × 0.25)	350
Less : Incremental variable cost	(280 × 0.55)	154	(140 × 0.55)	77	(350 × 0.55)	192.50
Incremental contribution	(280 × 0.45)	126	(140 × 0.45)	63	(350 × 0.45)	157.50
Less : Other relevant costs						
Bad debts		19.6 [a]		1.4[c]		21[d]
Cost of investment in working capital (20 × 0.20)		4		-		4
Cost of investment in debtors		19.97 [b]		-		12.2[e]
Cash discount		-		15.4		10.5
Add : Savings on account of reduction in debtors		-		4.1[f]		-
Incremental profit		82.43		50.3		109.8

[a](Rs. 1,680 crore × 0.02) – (Rs. 1,400 crore × 0.01) = Rs. 19.6 crore

[b] Proposed investment in debtors [(Rs. 1,680 crore × 0.55) + Rs. 120 crore] ÷ 6

(Debtors turnover, 360 days ÷ 60 days = 6 days) =	174 crore
Present investment in debtors [(Rs. 1,400 crore × 0.55) + Rs. 120 crore] ÷ 12(360 ÷ 30)	74.2 crore
Incremental investment in debtors	99.80
Cost of incremental investment in debtors (Rs. 99.8 crore × 0.20)	19.97

[c] (Rs. 1,540 crore × 0.01) – (Rs. 1,400 crore × 0.01) = 1.4 crore

[d] (Rs. 1,750 × 0.20) – (Rs. 1,400 crore × 0.01) = 21 crore

[e] Proposed investment in debtors [(Rs. 1,750 crore × 0.55) + Rs. 120 crore)

÷ 8 (360 days ÷ 45 days)	135.30
Present investment in debtors	74.20
Incremental investment in debtors	61.10
Cost of incremental investment in debtors (Rs. 61.1 crore × 0.20)	12.20

[f] Debtors turnover = 360 days/[(0.5 × 10 days) + (0.5 × 30 days) = 20 days] = 18

Proposed investment in debtors [(Rs. 1,540 crore × 0.55) + Rs. 120 crore) ÷ 18 = Rs. 53.7 crore

Decrease in investment in debtors (Rs. 74.2 crore – Rs. 53.7 crore) = Rs. 20.5 crore

Savings on account of reduction in debtors (Rs. 20.5 crore × 0.2) = Rs. 4.1 crore.

Q. 13. XYZ Ltd. plans to extend assets by 50%. To finance the expansions, it is choosing between a straight 12% debt issue and equity shares. Its balance sheet and profit and loss account are shown below :

Balance Sheet as at 31st March 2011

Liabilities	*Rs. (lakhs)*	*Assets*	*Rs. (lakhs)*
11% debentures	40.00	Total assets	200.00
Equity shares of Rs. 10 each	100.00		
Retained earnings	60.00		
	200.00		200.00

P & L Account of XYZ Ltd. for the year ended March 31st, 2011

Particulars	Rs. (in lakhs)
Sales	600.00
Total cost (excluding interest)	540.00
Net income before interest and taxes (EBIT)	60.00
Interest on debentures @ 11%	4.40
Income before taxes (EBT)	55.60
Taxes @ 40%	22.24
Profit after tax (PAT)	33.36
Earnings per share (Rs. 33.36/10.00)	Rs. 3.336
Market price (7.5 × 3.336)	Rs. 25.02

If XYZ Ltd. finance Rs. 1 crore expansion with debt, the rate of the incremental debt will be 12% and the price/ earning ratio of the quity shares will be 5 times. If the expansion is financed by equity, the new shares can be sold at Rs. 12 per share and the price/earning ratio will remain at 7.5 times.

Required **:**

(i) Assuming that net income before interest and taxes (EBIT) is 10% of sales. Calculate, earnings per share at sales levels of Rs. 4 crores, Rs. 8 crores and Rs. 10 crores, when financing is with (a) equity shares, and (b) debt.

(ii) Using the P/E ratio, calculate the market value per share for each sales level for both the debt and the equity financing.

(iii) At what level of earnings before interest and taxes (EBIT), after the new capital is acquired, would earnings per share (EPS) be the same whether new funds are raised by issuing equity shares or raising debt?

(iv) Also determine the level of EBIT at which uncommitted earnings per shares (UEPS) would be the same if sinking fund obligations amount to Rs. 5 lakhs per year.

Answer 13.

Part (i) and (ii)

Statement showing the calculation of EPS and market price of share under debt plan (Rs. In lakhs)

Particulars	Sales level A	Sales level B	Sales level C
Sales	400.00	800.00	1,000.00
Less : Total cost	360.00	720.00	900.00
Earnings before interest & tax (EBIT)	40.00	80.00	100.00
Less : Interest	16.40	16.40	16.40
Earnings before tax (EBT)	23.60	63.60	83.60
Less : Tax @ 40%	9.44	25.44	33.44
Earnings after tax (EAT)	14.16	38.16	50.16
Less : Preference dividend	—	—	—
Earnings for equity shareholders	14.16	38.16	50.16
No. of equity shares	10.00	10.00	10.00
Earnings per share (EPS)	1.416	3.816	5.016
Price earning ratio	5.00	5.00	5.00
Market price	7.08	19.08	25.08

Statement showing Calculation of EPS and Market Price of Share under Equity Plan

Particulars	Sales Level A Rs. (lakhs)	Sales Level B Rs. (lakhs)	Sales Level C Rs. (lakhs)
A. Sales	400.00	800.00	1000.00
B. *Less* : Total Costs	360.00	720.00	900.00
C. Earnings before Interest & Tax (EBIT)	40.00	80.00	100.00
D. *Less* : Interest	4.40	4.40	4.40
E. Earnings before Tax (EBT)	35.60	75.60	95.60
F. *Less* : Tax @ 40%	14.24	30.24	38.24
G. Earnings after Tax (EAT)	21.36	45.36	57.36
H. *Less* : Pref. Dividend	—	—	—
I. Eanings for Equity Shareholders	21.36	45.36	57.36
J. No. of Equity Shares	18.33	18.33	18.33
K. Earnings per Share (EPS)	1.165	2.475	3.13
L. Price Earning Ratio	7.50	7.50	7.50
M. Market Price (K × L)	Rs. 8.74	Rs. 18.56	Rs. 23.47

(iii) Level of EBIT at which EPS will be same under both the Financial Plans (Indifference Point)

Particulars	Plan A (Debt Plan)	Plan B (Equity Plan)
EBIT	X	X
Less : Interest	16,40,000	4,40,000
EBT	X - 16,40,000	X - 4,40,000
Less : Tax @ 40%	0.4X - 6,56,000	0.4X - 1,76,000
EAT	0.6X - 9,84,000	0.6X - 2,64,000
Less : Pref. Dividend	—	—
Earning Available for Equity Shareholders	0.6X - 9,84,000	0.6X - 2,64,000
No. of Equity Shares	10,00,000	18,33,334
Earning Per Share (EPS)	0.6X - 9,84,000	0.6X - 2,64,000
	10,00,000	18,33,334

At Indifference Point, EPS under both Plans will be equal :

$$\frac{0.6X - 9,84,000}{10,00,000} = \frac{0.6X - 2,64,000}{18,33,334}$$

X = Rs. 30,80,000

(iv) Level of EBIT at which UEPS will be same

Particulars	Plan A	Plan B
EBIT	X	X
Less : Interest	16,40,000	4,40,000
EBT	X - 16,40,000	X - 4,40,000
Less : Tax @ 40%	0.4X - 6,56,000	0.4X - 1,76,000
EAT	0.6X - 9,84,000	0.6X - 2,64,000
Less : Sinking Fund Obligation	5,00,000	5,00,000
Earning Available for Equity Shareholders	0.6X - 14,84,000	0.6X - 7,64,000
No. of Equity Shares	10,00,000	18,33,334
Earning Per Share (EPS)	0.6X - 14,84,000	0.6X - 7,64,000
	10,00,000	18,33,334

At Indifferent level, UEPS under both Plans will be same.

$$\frac{0.6X - 14,84,000}{10,00,000} = \frac{0.6X - 7,64,000}{18,33,334}$$

X = Rs. 39,13,334.

Q. 14. (a) Sagar Manufacturing Company (SMC) is considering refunding its preference shares. They have a par value of Rs. 100 and a stated dividend of 12 per cent. The call price is Rs. 104 per share and 5,00,000 shares are outstanding. The SMC can issue new preference shares at 11 per cent. The new issue can be sold at par, the total par value being Rs. 5 crore. Flotation costs would be Rs. 13,60,000. Marginal tax rate is 35 per cent. A 90-day period of overlap is expected between the time the new preferences share are issued and the time the existing preference shares are retired. Should the SMC refund its preference shares?

(b) Steel Junction has an outstanding issue of convertible debentures with a Rs. 1,000 par value. They are convertible into 100 ordinary shares. They have 10 per cent annual coupon rate and 10-year maturity. The interest rate on straight bond of similar risk is 12 per cent.

Required **:**

(I) Calculate the (i) straight debenture value of the debentures, (ii) conversion (or share) values of the debenture when the market price of the ordinary shares is Rs. 20, 25, 28, 35 and 50 per share.

(II) For each of the price given in (I) (ii), at what price would you expect the debenture to sell?

(III) What is the lowest price you would expect the debentures to sell for irrespective of the behaviour of the price of the ordinary shares?

Answer 14. (a)

Analysis of Preference Shares Refund Using Capital Budgeting Analysis

Net Cash Outflow :	**Rs.**
1. Cost of calling old preference shares (5,00,000 × Rs. 104)	5,20,00,000
2. Net proceeds of new issues (Rs. 5 crore – Rs. 13,60,000)	4,86,40,000
3. Difference (1– 2)	33,60,000
4. Preference share dividend on old preference shares during overlap (5,00,000 × Rs. 104 × 12% × 3/12)	15,60,000
5. Net cash outlay (3 + 4)	49,20,000
6. Annual net cash outflow on old preference shares : Preference share dividend	60,00,000
7. Annual net cash outflow on new preference share : Preference share dividend	55,00,000
8. Difference (6 – 7)	5,00,000
9. Present value (Rs. 5,00,000 ÷ 0.11[@])	45,45,454
10. Net benefit (Rs. 45,45,454 – Rs. 49,20,000)	(3,74,545)

[@] Discounted at 11 per cent for a perpetuity.

Answer 14. (b)

(I) **(i) Computation of straight debenture value**

Years	Payments (1)	PVIFA (0.12) (2)	Present value (3) [(1) × (2)]
1 – 10	Rs. 100*	5.650	Rs. 565
10	1,000	0.322	322
			887

* (Rs. 1,000 × 0.10)

(ii) Computation of conversion value of debentures

Market price of shares (1)	Conversion ratio (2)	Conversion value (3) [(1) × (2)]
Rs. 8.0	100	Rs. 800
10.00 (conversion price)	100	1,000 (par value)
11.2	100	1,120
14.0	100	1,400
20.0	100	2,000

(II) The debenture would be expected to sell at the higher of the conversion value and straight value. In no case it would sell for less than the straight value (i.e. Rs. 887). At a price of Rs. 8, the debenture would sell for its straight value of Rs. 887. At other prices, it would be expected to sell at the associated conveersion values respectively [as calculated in (I) (ii)].

(III) The lowest price would be the straight debenture value (i.e. Rs. 887).

Q. 15. Following are the Balance sheet of Shahid Ltd. as on 31st December, 2010 and 2011 and Income Statement for the period ending 31st December, 2011. During the year 2011, an equipment whose book value was Rs. 15,000 was sold for Rs. 6,000 and it had an accumulated depreciation of Rs. 8,000.

Balance Sheet **(*Rs.*)**

Liabilities	2010	2011	*Assets*	2010	2011
Capital	2,50,000	4,60,000	Building and equipment	4,20,000	4,80,000
Retained earnings	2,31,000	2,11,000	*Less* : Accu. depreciation	1,05,0000	1,20,000
Provision for tax	86,000	12,000		3,15,000	3,60,000
Prov. for social security tax	3,000	5,000	Land	60,000	60,000
Debentures	2,20,000	60,000	Patents	55,000	65,000
Accounts payable	58,000	94,000	Accounts receivable	54,000	47,000
Bills payable	28,000	8,000	Inventories	3,12,000	2,77,000
			Prepaid expenses	6,000	4,000
			Cash	74,000	37,000
	8,76,000	8,50,000		8,76,000	8,50,000

Income Statement (period ending 31st December, 2011)		**(Rs.)**
Net Sales		**19,70,000**
***Less* : Cost of goods sold**		**14,80,000**
Gross profit		**4,90,000**
***Less* : Operating expenses (includes depreciation on buildings and equipment of Rs. 23,000 and patent amortisation of Rs. 6,000)**		**5,00,000**
Net Loss from operations		**10,000**
***Less* : Other revenue**		**7,000**
		3,000
***Add* : Retained earnings**		**2,31,000**
		2,28,000
***Less* : Dividend paid**	**16,000**	
Loss on sale of asset	**1,000**	**17,000**
Retained earnings (31.12.2011)		**2,11,000**

Prepare a Funds flow statement. Give the required working notes.

Answer 15.

Buildings and Equipment A/c

Particulars	Rs.	Particulars	Rs.
To Balance b/d	4,20,000	By Sale of Asset	15,000
To Bank-purchase of assets (bal. fig.)	75,000	By Balance c/d	4,80,000
	4,95,000		4,95,000

Depreciation A/c

Particulars	Rs.	Particulars	Rs.
To Sale of asset (Dep. writtn off)	8,000	By Balance b/d	1,05,000
To Balance c/d	1,20,000	By Depreciation for the year	23,000
	1,28,000		1,28,000

Sale of Assets A/c

Particulars	Rs.	Particulars	Rs.
To Balance b/d	15,000	By Bank A/c (sale proceeds)	6,000
		By Depreciation A/c	8,000
		By Loss on sale of Assets	1,000
	15,000		15,000

Patents A/c

Particulars	Rs.	Particulars	Rs.
To Balance b/d	55,000	By Amortisation	6,000
To Bank - purchases	16,000	By Balance c/d	65,000
	71,000		71,000

Statement of Funds from Operations **(Rs.)**

Net earnings from operations as on 31.12.2011 (2,11,000 – 2,31,000)		(20,000)
Add : Depreciation written off	23,000	
Patent amortisation	6,000	
Dividend paid	16,000	
Loss on sale of equipment	1,000	46,000
Funds from Operations		26,000

Funds Flow Statement of Raman Ltd. for the year ended 31.12.2011 **(Rs.)**

Sources of Fund	
Share capital raised	2,10,000
Funds from operations	26,000
Sale of Equipment	6,000
Decrease in working capital	25,000
	2,67,000
Application of Funds	
Purchase of building equipment	75,000
Purchase of plant	16,000
Redemption of debentures	1,60,000
Dividend paid	16,000
	2,67,000

Statement of Changes in Working Capital **(Rs.)**

Particulars	**2010**	**2011**	**Increase**	**Decrease**
Current Assets :				
Accounts receivable	54,000	47,000	–	7,000
Inventories	3,12,000	2,77,000	–	35,000
Cash	74,000	37,000	–	37,000
Prepaid expenses	6,000	4,000	–	2,000
(a)	4,46,000	3,65,000		
Current Liabilities :				
Accounts payable	58,000	94,000	–	36,000
Bills payable	28,000	8,000	20,000	–
Provision for Income-tax	86,000	12,000	74,000	–
Provision for social security tax	3,000	5,000	–	2,000
(b)	1,75,000	1,19,000		
Net Working Capital (a) – (b)	2,71,000	2,46,000	–	–
Decrease in Working Capital	–	25,000	25,000	–
	2,71,000	2,71,000	1,19,000	1,19,000

Q. 16. The Entertainment Unlimited Company operates in Chennai. The firm is considering building an additional amusement park that will have a wild-water pool, buildings, and restaurants. Since all the firm's sales are for cash, the cash inflow from sales and gross revenue are identical. The firm's variable costs amount to 50% of its revenue, with 60% of these cost paid in cash and 40% paid for on credit for one year. The new investment is Rs. 200 Million (Rs. 100 Million in Equipment and Rs. 100 Million in Buildings), plus Rs. 10 Million investment in Net Working Capital (mainly cash).

Entertainment Unlimited will depreciate the equipment by the accelerated method (by which relatively high proportions of the asset's values are depreciated in early years) over four years, and the building will be depreciated over 31.5 years. The buildings will be placed in service in January. The annual depreciation percentates are as follows —

Years	1	2	3	4
Equipment (%)	33.33	44.45	14.81	7.41
Buildings (%)	3.042	3.175	3.175	3.175

Entertainment Unlimited estimates annual sale at Rs. 400 Million for each of the next four years. As a result of the new project, the after-tax cash flows from the firm's other amusement parks will decline by Rs. 20 million a year. The firm has already paid Rs. 25 million on an after-tax basis for Research and Development of the new project. The value of Buildings in the Chennai area is expected to increase to an estimated Rs. 110 million after Four Years of operation. The value of Equipment after four years of use will be zero.

Assume that the after-tax cost of capital is 15%, and the corporate tax rate is 34%. The firm uses vacant land for the new attraction, and it has no alternative use for the land for the next four years.

Should the company proceed with the project?

Answer 16.

1. **Computation of Tax Liability [Cash Operating Profit] (Rs. in Millions)**

Particulars	Year 1	Year 2	Year 3	Year 4
Sales from New Amusement Park	400.00	400.00	400.00	400.00
Less : Variable Costs @ 50% of Sales	(200.00)	(200.00)	(200.00)	(200.00)
Less : Depreciation —				
Equipment	(33.330) (100 × 33.33%)	(44.45) (100 × 44.45%)	(14.81) (100 × 14.81%)	(7.41) (100 × 7.41%)
Building	(3.042) (100 × 3.042%)	(3.175) (100 × 3.175%)	(3.175) (100 × 3.175%)	(3.175) (100 × 3.175%)
Net Profit from New Amusement Park	**163.628**	**152.375**	**182.015**	**189.415**
Less : Tax Liability at 34%	(55.634) (163.628×34%)	(51.808) (152.375×34%)	(61.885) (182.015×34%)	(64.401) (189.415×34%)
After Tax Profit fo the Year	**107.994**	**100.567**	**120.130**	**125.014**
Less : Loss in Revenue from Other Amusement Parks	(20.000)	(20.000)	(20.000)	(20.000)
Net Surplus due to Operation of New Amusement Park	**87.994**	**80.567**	**100.130**	**105.014**
Add : **Non Cash Items – Depreciation**				
Equipment	33.330	44.450	14.810	7.410
Building	3.042	3.175	3.175	3.175
Add : Variable Costs paid in arrears	80.000	80.000	80.000	80.000
Less : Variable Costs pertaining to previous year paid in Cash	—	(80.000)	(80.000)	(80.000)
Net Cash Surplus generated	**204.366**	**128.192**	**118.115**	**115.599**

Note : Variable Costs paid in Arrears

Total Variable Costs ***Less*** Variable Costs paid in Cash

= Rs. 200 Millions ***Less*** [Rs. 200 × 0.60] Millions = Rs. 200 Millions ***Less*** Rs. 120 Millions = **Rs. 80 Millions**

2. Computation of After Tax Inflow on Sale of Buildings

Particulars		**Value**
	Original Cost of Buildings	100.000
Less :	Depreciation on Buildings for 4 Years [3.042 + 3.175 + 3.175 + 3.175]	(12.567)
	Written Down Value on the date of sale	87.433
	Sale Value of Buildings	110.000
	Gain on Sale of Buildings	22.567
	Tax on Capital Gain on Sale of Buildings @ 34%	**7.673**
	After Tax Inflow on sale of Buildings [Sale Value **Less** Tax Liability]	**102.327**

3. Computation of Net Present Value

Particulars	**Years**	**Cash Flow**	**PV Factor @ 15%**	**Disc. Cash Flow**
Cash Surplus	1	204.366	0.870	177.798
	2	128.192	0.756	96.913
	3	118.115	0.658	77.720
	4	115.599	0.572	66.123
Surplus on sale of Buildings	4	102.327	0.572	58.531
Release of Fixed Working Capital	4	10.000	0.572	5.720
Payment to Creditors on account of Variable Costs	5	(80.000)	0.497	(39.760)
Present Value of Future Cash Net Inflows				**443.045**
Less : Initial Investment				
Buildings				(100.000)
Equipment				(100.000)
Investment in Working Capital				(10.000)
Net Present Value of the Project				**233.045**

Note : It is assumed that only the building is sold without selling the land. However, it is highly unlikely that Building alone can be sold without selling the land in which such building is located. Alternatively, it can also be assumed that the sum of Rs. 110 Millions is Advance Lease Rentals received, in which case NPV will be different.

Net Present Value can also be computed without considering Cash Inflow on account of Building Sale, as Rs. 110 Millions is only the value as at the end of the project life. We can also assume that the Building portion will be reused for some other purpose at the end of the period.

Q. 17. Given below is the Balance Sheet of Bikash Ltd. as on 31.3.2010 and Profit and Loss Statement for year ended 31.3.2010.

Balance Sheet as at 31.03.2010 (Rs. Lakhs)

Liabilities	*Rs.*	*Assets*	*Rs.*	*Rs.*
Share Capital	4,000	Fixed Asset		
Reserve	2,000	Gross block	7,000	
Profit and Loss Account	500	*Less* : Accumulated	2,000	5,000
20% Loan	500	Depreciation		
Sundry Creditors	3,400	Stock		2,500
Tax Provision (Net of Advance Tax)	100	Debtors		1,500
		Cash at bank		1,500
	10,500			10,500

Profit and Loss Statement (*Rs. Lakhs*)

Particulars		*Rs.*	*Rs.*
	Sales		5,800
Less :	Cost of Goods Sold		(4,600)
	Gross Profit		1,200
Less :	Administrative Expenses	100	
	Selling & Distribution Expenses	250	
	Depreciation	112	
	Research and Development Expenses	48	
	Finance Charges	100	(610)
	Profit Before tax		590
Less :	Tax Provision		(295)
	Profit After Tax		295

The Company wants to diversify and as per new investment plan, it has to raise Rs. 500 Lakhs for Fixed Assets and Rs. 100 Lakhs for Working Capital. Also it wants to maintain the present level of Current Ratio.

For the year 2010-2011, the Finance Department supplies the following information —

- **Sales will increase by 50% in Volume and 25% in price, Cost of Goods sold will increase by 20% in terms of price.**
- **Administrative and Selling and Distribution Expenses will be increased by 5%.**
- **The Finance Department also plans that the percentage of Stock and Sundry debtors to Sales and Sundry Creditors to Costs of Goods sold are to be maintained.**

Prepare the projected fund flow statement and find out the fund to be raised to finance the new investment plan.

Answer 17.

1. Projected Profit and Loss Statement for the year ending 31.03.2011 (Rs. in Lakhs)

	Particulars	***Rs.***	***Rs.***
	Sales (Rs. 5,800 × Volume Increase 1.5 × Price Increase 1.25)		10,875
Less :	Cost of goods sold (Rs. 4,600 × Volume Increase 1.5 × Price Increase 1.2)		(8,280)
	Gross Profit		**2,595**
Less :	Administrative Exp. (Rs. 100 × 1.05)	105.00	
	Selling & Dist. Exp. (Rs. 250 × 1.05)	262.50	
	Research and Development Expenses	48.00	
	Depreciation	112.00	
	Finance Charge	100.00	(627.50)
	Earnings Before Tax		**1,967.50**
Less :	Tax Provision @ 50% of Earnings Before Tax		983.75
	Earnings After Tax		**983.75**

2. Projected Balance Sheet as on 31.3.2011 [Without Giving Effect to New Investment]

Liabilities	***Rs.***	***Assets***	***Rs.***	***Rs.***
Share Capital	4,000.00	Fixed Asset — Gross Block	7,000.00	
Reserve	2,000.00	*Less* : Acc. Depn. [2000 + 112]	(2,112.00)	4,888.00
Profit and Loss A/c (500 + 983.75)	1,483.75	Stock (Sales 10,875 × 43.10%)		4,687.13
20% Loan	500.00	Debtors (Sales 10,875×25.86%)		2,812.28
Sundry Creditors (Cost of Goods Sold 8.280 × 73.91%)	6,119.75	Cash at bank [Balancing Fig.]		1,716.09
Total	**14,103.50**	**Total**		**14,103.50**

Note : Ratio of Stock to Sales Rs. 2,500 ÷ Rs. 5,800 = 43.10%
Ratio of Debtors to Sales Rs. 1,500 ÷ Rs. 5,800 = 25.86%
Ratio of Creditors to Cost of Gods Sold Rs. 3,400 ÷ Rs. 4,600 = 73.91%

3. Computation of Current Ratio

Year ending	**31.03.2010**	**31.03.2011**
Current Assets	5,500.00	9,215.50
Current Liabilities	3,400.00	6,119.75
Current Ratio	**1.618**	**1.506**

Current Asset Required for a Current Ratio of 1.618 as at 31.03.2011 = 1.618×Current Liabilities 6119.75
= Rs. 9,901.75 Lakhs

Year ending		**31.03.2011**
	Desired Current Assets	9,901.75
	Present Current Assets	9,215.50
	Additional Investment in Current Assets Required	**686.25**
Less :	Investment in Working Capital as per plan	(100.00)
	Additional Investment in Working Capital (to be funded by Long Term Sources to retain Current Ratio at 1.618)	**586.25**

4. Projected Funds Flow Statement

(a) Statement showing changes in Working Capital **[Rs. Lakhs]**

Particulars		31.3.2010	31.3.2011	Increase	Decrease
	Current Assets	2,50000	4687.13	2187.13	
	Debtors	1,500.00	2812.28	1312.28	
	Cash at Bank	1,500.00	1716.09	216.09	
	Total Current Assets	**5,500.000**	**9215.50**		
Less :	Sundry Creditors	(3,400.000)	(6119.75)		2719.75
	Working Capital	**2,100.00**	**3095.75**	**3715.50**	**2719.75**
	Increasing in Working Capital			**995.75**	

(b) Projected Fund Flow Statement **[Rs. Lakhs]**

Sources of Funds		Rs.	Rs.	Application of Funds		Rs.
Funds from Operations				Payment of tax for	2010	100.00
	Projected Profit for the year	983.75			2011	983.75
Add :	Depreciation	112.00		Increase in working capital		995.75
Add :	Provision for Tax	983.75	2,079.50			
	Total		**2,079.50**	**Total**		**2,079.50**

5. Funds to be raised by the Company **[Rs. Lakhs]**

Particulars	Rs.
Investment in Fixed Assets	500.00
Investment in Working Capital	100.00
Additional Investment in Working Capital	586.25
	1,186.25

Therefore, Funds to be raised is Rs. 1,186.25 Lakh to meet the new investment plan.

[**Note :** Effect of Depreciation on newly acquired fixed assets is ignored]

Q. 18. The balance sheet of Smart Ltd. as on March 31, current year is as follows (Figures in lakhs of rupees).

Liabilities	Amount	Assets	Amount
Share capital	**200**	**Fixed assets**	**500**
Reserves	**140**	**Inventories**	**300**
Long-term loans	**360**	**Receivables**	**240**
Short-term loans	**200**	**Cash and bank**	**60**
Payables	**120**		
Provisions	**80**		
	1,100		**1,100**

Sales for the current year were Rs. 600 lakh. For the next year ending on March 31, they are expected to increase by 20 per cent. The net profit margin after taxes and dividend payout are expected to be 4 and 50 per cent respectively.

You are required to :

(a) Quantify the amount of external funds required.

(b) Determine the mode of raising the funds given the following parameters.

(i) Current ratio should be 1.33

(ii) Ratio of fixed assets to long-term loans should be 1.5.

(iii) Long-term debt to equity ratio should not exceed 1.06

(iv) The funds are to be raised in the order of (1) short-term bank borrowings, (2) long-term loans and (3) equities.

Answer 18.

Assuming, assets will increase *pari passu* with sales, the level of projected assets will be Rs. 1,100 lakh × 1.2 = Rs. 1,320 lakh. The incremental assets required are Rs. 1,320 lakhs – Rs. 1,100 lakh = Rs. 220 lakh.

Assuming that payables and other provisions (CL) are also likely to move with sales, the projected payables and provisions will be Rs. 200 lakh × 1.2 = Rs. 240 lakh.

Expected retained earnings = (Expected EAT – Dividend paid) = (0.04 × Rs. 720 lakh = Rs. 28.8 lakh – Rs. 14.4 lakh Dividend paid) = Rs. 14.4 lakh.

(a) External funds needed :

	(Rs. lakh)
Projected level of assets	1,320
Less : Payable and provisions	240
Less : Retained earnings	14.4
Less : Existing funds used	
(Rs. 200 lakh + Rs. 140 lakh + Rs. 360 lakh + Rs. 200 lakh)	900
External funds required	165.6

(b) Mode of raising funds :

(i) Short-term borrowings (additional)

$$1.33 = CA/CL = \frac{\text{Existing CA, Rs. 600 lakh} \times 1.2}{(\text{Existing payable} + \text{Provision}) \times 1.2 + \text{Short-term loan (STL)}}$$

1.33 = Rs. 720 lakh/Rs. 240 lakh + STL

1.33 (240 lakh + STL) = Rs. 720 lakh or 1.33 STL = Rs. 400.8 or STL = Rs. 400.8/1.33 = Rs. 301.35 lakh.

Additional STL = Rs. 301.35 lakh – Rs. 200.00 = Rs. 101.35 lakh.

(ii) Long-term loan (additional)

Desired ratio of fixed assets (FA) to long-term (LTL) = 1.5

$$1.5 = \frac{\text{FA (Rs. 500 lakh} \times 1.2)}{\text{LTL}} = \text{1.5 LTL = Rs. 600 lakh or LTL = Rs. 400 lakh}$$

Additional LTL = Rs. 400 lakh – Rs. 360 lakh = Rs. 40 lakh

(iii) Equity funds (additional) :

	(Rs. lakh)
Total external funds required	Rs. 165.60
Less : Additional short-term bank borrowings	101.35
Less : Additional long-term loan	40.00
Equity capital to be issued	24.25

$= \frac{\text{New level of debt (long - term)}}{\text{Equity funds (ESC + Reserves)}}$ = Rs. 400 lakh/(Rs. 224.25 lakh + Rs. 154.5 lakh) = 1.056*

*Requirement of LTD/equity ratio of not more than 1.06 is satisfied.

Funds required to be raised :	**(Rs. lakh)**
Short-term bank borrowings	Rs. 101.35
Long-term loans	40.00
Equity share capital	24.25
	165.60

Q. 19. (a) The following data (related to interest rates) is available from the forex market :

US 1 month treasury bill	**: 2.50 – 2.55% p a**
India 1 month treasury bill	**: 6.75 – 6.80% p a**

If the dollar spot rate in India is Rs. 48.4050/48.4550 per US $, find the no-arbitrage range of future prices for a 1 month dollar future.

(b) Kamal Textiles Limited places an order to buy textile machinery with an American company. As per the agreement, Kamal Textiles Limited will be paying US $200,000 after 180 days. As the fluctuation in the spot rate of the US dollar over next 180 days will impact the rupee cost of import, the Board of Kamal Textiles Limited ask its finance manager to collect data from the currency forward market, money market, currency option market etc. The board also asks a consultant to assesss various possible dollar spot rates after six months.

The various findings are as follows :

(i) Possible spot rate of dollar after six months, as estimated by the consultant, is Rs. 47.25, Rs. 47.75, Rs. 48, Rs. 48.50, Rs. 48.90.

(ii) Spot rate of dollar as of today is Rs. 48/US $.

(iii) 180 day forward rate of dollar as of today is Rs. 48.48/US $.

(iv) Interest rates are as follows :

For 180 day deposit rate (per annum)	**7.5%**	**1.5%**
For 180 day borrowing rate (per annum)	**8.0%**	**2.0%**

(v) A call option on the dollar, which expires in 180 days, has an exercise price of Rs. 48/US $ and premium Rs. 0.52/US $.

(vi) A put option on dollar, which expires in 180 days, has an exercise price of Rs. 48/US $ and premium of Rs. 0.04/US $.

Carry out a comparative analysis of the various outcomes (rupee cost of import) under the alternatives of (i) not hedging (ii) forward hedging (iii) money market hedging and (iv) option hedging.

Answer 19. (a)

Let us assume the forward rate to be F. There are two possibilities for arbitrage.

(A) Borrow dollar, buy rupees, invest rupees, sell rupees in future.

(i) Borrow 1 dollar (@ 2.55%) and sell it in spot market to receive Rs. 48.4050.

(ii) Lend these rupees in money market to earn @ 6.75%. Thus, the future value after 1 month = 48.4050 (1+0.0675 × 1/12) = Rs. 48.6773.

(iii) Sell Rs. 48.6773 in future market (@ F) to receive dollars (48.6773 × 1/F).

(iv) As dollar 1 has been borrowed, after 1 month, the dollar to be returned is (1 × 0.255 × 1/12).

For a no arbitrage condition, dollars in (iii) must be less than dollar in (iv) or 48.6773 × 1/F < 1 × 0.255 × 1/12 or F > 48.5741.

(B) Borrow rupees, buy dollar, invest in dollar, buy rupees in future.

(i) Borrow 1 Re (@ 6.80%) and sell it in spot market to receive US $1/48.4550 = US $0.0206.

(ii) Lend these US $0.0206 in money market @ 2.50%. After 1 month it will fetch US $0.0206 (1 + 0.025 × 1/12).

(iii) Selling the dollar calculated in (ii) in the future market will provide Rs. F × 0.0206 (1 + 0.025 ×1/12).

(iv) As 1 Re will be borrowed, so after 1 month the rupee to be returned is Rs. (1 + 0.068 × 1/12).

For no arbitrage condition the rupee calculated in (iii) must be less than that in (iv) of F × 0.0206 (1 + 0.025 × 1/12) < (1 + 0.068 × 1/12) or F < 48.6275.

So the range in which forward prices will lie is Rs. 48.5741 < F < Rs. 48.6275.

Answer 19. (b)

Kamal Textiles will need to purchse US $2,00,000 to fulfill its import obligation. It will do so by making a purchase in the spot market after 180 days. Kamal textiles rupee outgo in this circumstances will be :

Expected spot rate after 180 days	Rupee outgo to purchase US $ 2,00,000
Rs. 47.25/US $	Rs. 94,50,000
47.75/US $	95,50,000
48.00/US $	96,00,000
48.50/US $	97,00,000
48.90/US $	97,80,000

Forward hedge :

Rupees needed to buy US $2,00,000 with forward contract = US $2,00,000 × Rs. 48.48/US $ = Rs. 96,96,000.

Money market hedge

Borrow rupee, convert to US dollar, invest US dollar to receive US $2,00,000 in 180 days. Amount in US dollar to be invested = US $2,00,000/(1 + 0.015 ×180/360) = US $1,98,511.

Amount in rupees that need to converted into US dollar for investing = US $1,98,511 × Rs. 48/US $ = Rs. 95,28,528.

Interest and principal owed in rupee loan to be returned after 180 days = Rs. 95,28,528 (1 + 0.08 × 180/360) = Rs. 99,09,669.

So the rupee outgo for Kamal Textile will be Rs. 99,09,669.

Option hedge

Purchase call (assuming that the option is to be exercised on the day the US dollare are needed) exercised price is Rs. 48/US $; premium is Rs. 0.52/US $.

Possible spot rate after 180 days Rs.	Premium per unit paid for option Rs.	Exercise option	Total price paid per unit Rs.	Total price paid for US $2,00,000 Rs.
47.25	0.52	No	47.77	95,54,000
48.00	0.52	No	48.27	96,54,000
48.50	0.50	No	48.52	97,04,000
48.90	0.52	Yes	48.52	97,04,000
48.90	0.52	Yes	48.52	97,04,000

Q. 20. A US based plastic manufacturer is considering a proposal to produce of high quality plastic glasses in India. The necessary equipment to manufacture the glasses would cost Rs. 1 lakh in India and it would last 5 years. The tax relevant rate of depreciation is 25 per cent on written down value. The expected salvage value is Rs. 10,000. The glasses will be sold at Rs. 4 each. Fixed cost will be Rs. 25,000 each year and variable cost Rs. 2 per glass. The manufacturer estimates it will sell 75,000 glasses per year; tax rate in India is 35 per cent. The US manufacturer assumes 20 per cent cost of capital for such a project. Additional working capital requirement will be Rs. 50,000.

The US manufacturer will be allowed 100 per cent repatriation each year with a withholding tax rate of 10 per cent. Should the proposal of setting up a manufacturing unit in India be accepted by the US manufacturer? Spot and expected exchange rates are as follows :

Spot		Rs. 50/$
Year-end	1	50
	2	50
	3	52
	4	52
	5	52

Answer 20.

Cash outflow	Rs.
Cost of production equipment	1,00,000
Additional working capital	50,000
	1,50,000
Cash outflow in dollar (1 $ = Rs. 50)	$ 3,000

Determination of CEAT and NPV

Particulars	Years				
	1	2	3	4	5
	Rs.	Rs.	Rs.	Rs.	Rs.
Sales revenue (75,000 × Rs. 4)	3,00,000	3,00,000	3,00,000	3,00,000	3,00,000
Less : Costs :					
Variable cost (75,000 × Rs. 2)	1,50,000	1,50,000	1,50,000	1,50,000	1,50,000
Fixed cost	25,000	25,000	25,000	25,000	25,000
Depreciation	25,000	18,750	14,062	10,547	—
Earning before taxes	1,00,000	1,06,250	1,10,938	1,14,453	1,25,000
Less : Taxes	35,000	37,187	38,828	40,059	43,750
Earning after taxes	65,000	69,063	72,110	74,394	81,250
CFAT	90,000	87,813	86,172	84,941	81,250
Recovery of working capital					50,000

Salvage value					10,000
Tax benefit on short-term capital loss*					7,574
Withholding tax	9,000	8,781	8,617	8,494	14,882
Repatriated amount	81,000	79,032	77,556	76,447	1,33,942
Repatriated amount in dollar	$1,620	1,581	1,491	893	2,576
Multiplied by PV factor 0.20	0.833	0.694	0.579	0.482	0.402
Present value	1,349	1,097	863	430	1,036
Total present value (t = 1 – 5)					$4,775
Less : Cash outflow					3,000
Net present value					1,775

* (Rs. 1,00,000 – Rs. 68,359, accumulated depreciation – Rs. 10,000, salvage value) × 0.35 = Rs. 7,574.

Q. 21. An investor purchased Reliance November Future (600 shares Tick size) at Rs. 542 and wrote a Rs. 580 November call opotion at a premium of Rs. 6 (600 shares Tick size). As on November 20, the spot prices rose and so also the future prices and the call premiums. Future price rises to Rs. 575 and call premium rises to Rs. 12. Find out profit/loss of the investor, if he/she settles the transaction on that date and at stated prices. Brokerage is 0.05% for the transaction value of futures and strike price net of call premium for option.

(a) Why the investor did write a call? Why did he/she buy a call subsequently?

(b) Do you think the strategy taken by investor was logical?

Answer 21.

Original Transactions	**Rs.**
Original purchase price of Futures @ Rs. 542	3,25,200.00
Add : Brokerage Paid	162.00
Total Outflow	3,25,362.00
Premium received by writing call @ Rs. 6	3,600.00
Less : Brokerage Paid	172.20
Total Inflow :	3,427.80
Net Outflow : [3,25,362.60 – 3,427.80]	3,21,934.80

Offsetting Transactions	**Rs.**
Sale of Futurs @ Rs. 575	3,45,000.00
Less : Brokerage Paid	172.50
Total Inflow	3,44,827.50
Squaring off written call @ Rs. 12 (Buy)	7,200.00
Add : Brokerage Paid	170.40
Total Outflow :	7,370.40
Net Inflow : [3,44,827.50 – 7,370.40]	3,37,457.10
Total Inflow arising out of all transactions :	15,522.30

(a) The investor it appears has hedged his long future position by selling calls. Any rise in future would be offeset by writing calls (though not fully). He bought the call to square off the written call.

(b) The strategy was to hedge that may arise out of future position by writing calls. The strategy may not be termed logical owing to the merger compensation provided by the written calls.

Q. 22. Vishnu is interested in purchasing a European call option on Colgate Ltd. a non-dividend paying stock, with a strike price of Rs. 100 and two years until expiration. Colgate Ltd. is currently trading at Rs. 100 per share and the annual variance of its continuously compounded rate of return is 0.04. The treasury bill that matures in two years yield a continuously compounded interest rate of 5% per annum.

(a) Use the Black Scholes Model to calculate the price of the call option that Vishnu is interested in buying?

(b) What does the put call parity imply about the price of the put, with strike price of Rs. 100 and two years until expiration?

Answer 22.

(a) The inputs to the Black-Scholes model are the current price of the underlying asset(S), the strike price of the option (K), the time to expiration of the option in fractions of a year (t), the variance of the underlying asset (s^2), and the continuouly-compounded risk-free interest rate are (r).

In this problem, the inputs are : S = Rs. 100 ; s^2 = 0.04; K = Rs. 100; r = 0.05; t = 2

After identifying the inputs, solve for d1 and d2 :

$$d1 = [In(S/K) + (r + ½s^2)(t)]/(s^2t)1/2$$
$$= [In(100/100) + \{0.05 + ½(0.04)\}(2)]/(0.04*2)1/2$$
$$= 0.4950$$
$$d2 = d1 – (s^2t)1/2$$
$$= 0.4950 – (0.04*2)1/2$$
$$= 0.2122$$

Find N(d1) and N(d2), the area under the normal curve from negative infinity to d1 and negative infinity to d2, respectively.

$$N(d1) = N(0.4950) = 0.6897$$
$$N(d2) = N(0.2122) = 0.5840$$

According to the Black-Scholes formula, the price of a European call option (C) on a non-dividend paying common stock is :

$$C = SN(d1) – Ke^{-rt}N(d2)$$
$$= (100)(0.6897) – (100)e^{-(0.05)(2)}(0.5840)$$
$$= Rs.\ 16.13$$

The Black-Scholes Price of the call option is Rs. 16.13.

(b) Put-Call Parity implies that the cost of a European call option (C) must equal the cost of a European put option with the same strike price and time to expiration (P) plus the current stock price (S) minus the present value of the strike price [PV(K)].

In this problem : C = Rs. 16.13; S = Rs. 100; PV (K) = Rs. $100/e^{(.05*2)}$ = Rs. 90.48

Rearranging the Put-Call Parity formula :

$$P = C - S + PV(K)$$
$$= \text{Rs. } 16.13 - \text{Rs. } 100 + 90.48$$
$$= \text{Rs. } 6.61$$

Therefore, Put-Call Parity implies that the Black-Scholes price of a European put option with a strike price of Rs. 100 and 2 years until expiration should be Rs. 6.61.

Q. 23. Suppose the current price of an underlying stock is Rs. 70 and that, over the next period, it will either move up to Rs. 100 or down to Rs. 50. It is also given that we can borrow money at an 11% rate of interest. How can we replicate the returns of a purchased call option with an exercise price of Rs. 50?

Answer 23.

We need to create a replicating portfolio same as that of the option which we want to find value i.e. call option. Before creating a replicating portfolio, let us see what will be the payoff of the given call option at the two prices given. We have X = 50, and at expiration, the call will be worth Rs. 50 (Rs. 100 – Rs. 50) if the stock price goes up, or zero if the stock price goes down (since we would then be indifferent to exercising it).

Our aim now is to create a replicating portfolio of stock (the asset) and borrow/lend in such a way that we get the same cash flows as that of the option under consideration. Our question would be; what mixture of stock and cash would produce these same returns? Suppose we let D stand for the number of shares we would need to buy and B for the number of rupees we would need to borrow. Then our problem is to find values of D and B such that the following two equations get satisfied simultaneously.

At expiry if the stock price goes to Rs. 100, we have:

$(100 \times D) - B.(1+0.11) = 50$

At expiry if the stock price goes to Rs. 50, we have:

$(50 \times D) - B.(1+0.11) = 0$

The first equation insures that our stock-cash portfolio has the same return as the option if the stock goes up and the second assures us the returns will also be euqal if the stock goes down.

Solving the two equations simultaneously, we get B and D as, B = Rs. 45.05 and D = 1

This would ensure that the portfolio of stock-cash position will deliver same returns as a call. The value of the call will then be :

Value = $DS - B = 1 \times 70 - 45.05$ = Rs. 24.95

Verification :

We now verify that cash flow position after the period is same as that of call option.

		Cash Flow at Expiry	
	Cash Flow – Now	**S = Rs. 100**	**S = Rs. 50**
A. Call Option	**– Rs. 24.95**	**+ Rs. 50**	**Rs. 0**
B. Replicating Portfolio			
Buy DS i.e. 1 share	– Rs. 70.00	+ Rs. 100	+ Rs. 50
Borrow Rs. 45.05	+ Rs. 45.05	– Rs. 50*	– Rs. 50*
Net	**– Rs. 24.95**	**+ Rs. 50**	**Rs. 0**

* – Rs. 45.05 × (1.11)

We can see that cash flow from replicating portfolio exactly matches with the cash flows or calll option.

Note : X = 50, S = 70, implying for a call option, Intrinsic Value = Rs. 20. From the above we can say that Time Value = Rs. 4.95

Arbitrage :

If market price of call is Rs. 27.95, then arbitrageur would Sell call and Buy replicating portfolio today and the resultant cash flows would be as follows :

		Cash Flow at Expiry	
	Cash Flow – Now	**S = Rs. 100**	**S = Rs. 50**
Sell Call Option	**+ Rs. 27.95**	**– Rs. 50**	**Rs. 0**
Buy Replicating Portfolio			
Buy Δ S i.e. 1 share	– Rs. 70.00	+ Rs. 100	+ Rs. 50
Borrow Rs. 45.05	+ Rs. 45.05	– Rs. 50*	– Rs. 50*
Net	**+ Rs. 3.00**	**+ Rs. 0**	**Rs. 0**

This arbitrageur pockets Rs. 3 today with nil exposure irrespective of any price at expiry.

If market price of call is Rs. 22.95, then arbitrageur would Buy call and Sell replicating portfolio today and the resultant cash flows would be as follows :

		Cash Flow at Expiry	
	Cash Flow – Now	**S = Rs. 100**	**S = Rs. 50**
Buy Call Option	**– Rs. 22.95**	**+ Rs. 50**	**Rs. 0**
Sell Replicating Portfolio			
Sell Δ S i.e. 1 share	+ Rs. 70.00	– Rs. 100	– Rs. 50
Deposit Rs. 45.05	– Rs. 45.05	+ Rs. 50*	+ Rs. 50*
Net	**+ Rs. 2.00**	**Rs. 0**	**Rs. 0**

Thus arbitrageur pockets Rs. 2 today with nil exposure irrespective of any price at expiry.

Q. 24. An investor is considering an investment in market portfolio to capitalize on the portable increase in the value of securities and earn the dividend yield. He has Rs. 10 lakh to invest. BSE Sensex is trading at 6,650 while 2-m futures contract with 60 days to maturity is selling for 6,670.

Assuming risk-free rate of interest of 8% and a dividend yield of 4%, find the fair value of 2-m future contract. Also analyse the investment strategies of: investing in sensex (Strategy I) and investing in T-bills and futures (Strategy II).

Compare the positions of Strategy I and II with (a) 10% increase, (b) 10% decrease, and (c) no change in Sensex after 2 months.

Answer 24.

The fair value of 2-m futures contract on Sensex :

$$F = S_0 \times e^{\frac{(r-d)t}{365}} = 6{,}693.87$$

The actual price of futures is 6,670 which is lower than the fair value. Hence, futures are underpriced.

Rather than buying the portfolio in the physical market, the investor can replicate the portfolio by buying futures contract and invest in T Bills. The strategy will have the same risk as that of the portfolio in the physical market. A comparison of pay off under the two strategies is presented below :

Strategy I	**: Invest in the portfolio of index**	
	Amount invested in securities	1,000,000
Strategy II	**: Invest in T Bills and go long on futures**	
	Amount invested in T Bills	1,000,000
Nos. of futures bought		
	Current value of 2-m futures	6,670
	Nos. of indices in a futures contract	50
	Value of one futures contract	Rs. 333,500
	Nos. of contracts bought (rounded off)	3.00

The pay off of the strategies are analysed for three different scenarios of 10% increase, no change, and a 10% decrease in the market from the current level of 6,650 :

Rs.

	Increase by 10%	***No change***	***Decrease by 10%***
Strategy I			
Have a portfolio of Rs. 10 lakh			
Value of the portfolio	1,100,000	1,000,000	900,000
Dividend yield 4% of 10,00,000 for 2 months	6,667	6,667	6,667
Total value of investment	**1,106,667**	**1,006,667**	**906,667**
Strategy II			
Investment in T Bills and buy 3 futures			
Value of T Bills	1,000,000	1,000,000	1,000,000
Interest on T-bills	13,333	13,333	13,333
Position on Futures			
Selling price of futures	7,315	6,650	5,985
Purchase price of futures	6,670	6,670	6,670
Profit/loss on index points	645	–20	–685
Profit/loss on futures	96,750	–3,000	–102,750
Total value of investment	**1,110,083**	**1,010,333**	**910,583**

As can be noticed, Strategy II is always superior to the Strategy I; and hence in case of mispricing of futures, the yields can be improved by investing in futures and T-bills.

Q. 25. Safety Mutual Fund is holding a portfolio of Rs 50 crore. Due to anticipated rise in the stock markets, they had an aggressive portfolio with a beta of 1.40. However, due to sudden political developments, the markets are not expected to have the rising trend. This political uncertainty is expected to be resolved in one month's time. The mutual fund is convinced of the fundamentals of the securities in the portfolio.

One possible way of overcoming the decline in the value of the portfolio is to sell now and buy after one month. However, this is ruled out in view of the transaction costs involved. Safety Mutual Fund is therefore considering to cover the risk through the futures market.

Current value of index in the Bombay Stock Exchange, is 17,550 while the 1-m futures contract is traded at 17,730.

(a) With 1 point of Sensex at Re 1.00 and contract size of 50 indices, find out how Safety Mutual Fund can protect against the expected fall in the stock market in next one month.

(b) Evaluate the position of the portfolio if Sensex falls to (i) 17,000 and (ii) 16,000 after 1 month.

(c) What conclusion do you draw from the results of (b)?

(d) What would be the position of the portfolio if market instead of falling actually rose to 18,500?

(e) What conclusion do you draw from the results of (d)?

Ignore marking-to-the-market and initial margin on the futures contracts.

Answer 25.

(a) Current value of BSE Sensex = 17,550

Price of 1-m futures on BSE Sensex = 17,730

Current value of the portfolio = Rs. 50.00 crore

Beta of the portfolio = 1.40

Safety Mutual Fund is long on the asset. They can protect the decline in the value of the asset by going short on the futures. Therefore, they must sell futures contract now equivalent to the exposure. The value that needs to be covered in the futures market is dependent upon the beta of the portfolio.

Value to be covered = Beta × Value of the portfolio

= 1.4 × 50 = Rs. 70.00 crore

Current value of 1 futures contract = 17,550

Nos. of Sensex in 1 futures contract = 50

Value of 1 futures contract = Rs 8.775 lakh

Nos. of futures contracts to be sold

= 7000/8.775 = 797.72 contracts

= 798.00 contracts (rounded off)

At the end of one month, the mutual fund would buy the futures.The price of futures would then be equal to the spot value of the Sensex.

(b) (i) Sensex moves to 17,000

New value of Sensex = 17,000

% change in the Sensex = – 3.13%

% change in the value of the portfolio

= 1.4 × – 3.13% = – 4,39%

New value of the portfolio = Rs. 47.81 crore

Gain in the futures market

Value of futures sold

= 798 × 17,730 × 50 = Rs. 70.74 crore

Value of futures bought

= 798 × 17,000 × 50 = Rs. 67.83 crore

Prafit/Loss in the futures market = Rs. 2.91 crore

Value of the portfolio

(at the end of hedge period) = Rs. 50.72 crore

(ii) *Sensex moves to 16,000*

New value of Sensex = 16000

% change in the Sensex = – 8.83%

% change in the value of the portfolio

= 1.4 × – 8.83% = – 12.36%

New value of the portfolio = Rs. 43.82 crore

Gain in the futures market

Value of futures sold

= 798 × 17,730 × 50 = Rs. 70.74 crore

Value of futures bought

= 798 × 16,000 × 50 = Rs. 63.84 crore

Prafit/Loss in the futures market = Rs. 6.90 crore

Value of the portfolio

(at the end of hedge period) = Rs. 50.72 crore

(c) The conclusion that can be drawn fram the value of the portfolio with the fall in the Sensex is that the portfolio is protected for any level of fall in the market. The value is Rs. 50.72 crore.

Had the position in the futures market been identical to that of the exposure, the portfolio would have the value of Rs 50 crore. The minor variation is due to slightly larger exposure in the futures market.

(d) Sensex moves to 18,500

New value of Sensex = 18,500

% change in the Sensex = 5.41 %

% change in the value of the portfolio

= 1.4 × 5.41% = 7.58%

New value of the portfolio = Rs. 53.79 crore

Gain in the futures market

Value of futures sold = 798 × 17,730 × 50 = Rs. 70.74 crore

Value of futures bought = 798 × 18,500 × 50 = Rs 73.82 crore

Prafit/Loss in the futures market = – Rs. 3.07 crore

Value of the portfolio

(at the end of hedge period) = Rs. 50.72 crore

(e) The value of the portfolio remains same even if the Sensex rises instead of falling. By taking the position in futures, Safety Mutual Fund has forgone the opportunity to increase the value of the portfolio to Rs. 53.79 crore if the Sensex rises to 18,500.

Q. 26. Solar Equipment Ltd (SEL) and Lunar Technologies Ltd (LTL) are in the same line of business and compete with each other. They both are in need of funds and are exploring the markets for raising money. The survey in the lending market has offered them the following rates with fixed and floating rate :

	Fixed rate	*Floating rate*
Solar Equipments Ltd	**T + 50 bp**	**M + 100 bp**
Lunar Technologies Ltd	**T + 100 bp**	**M + 200 bp**

Fixed rate markets are governed by the returns that are prevailing in the bonds market, while floating rates are based on MIBOR.

Prevailing yields in the fixed rate instruments of five year tenure, which is the contemplated tenure of loans sought, is 9.50%.

Answer the following:

(a) Can SEL and LTL benefit from the situation? If yes, by how much?

(b) What strategies should both the firms follow to avail the benefit?

(c) If SEL desires to share the benefit to the extent of 60% while letting LTL avail remaining 40%, what cost of funds each of the firm would have?

(d) Draw a schematic diagram to explain the strategy that you would implement to derive the benefit.

(e) Compute the cost of funds for STL and LTL after they enter into a swap arrangement.

Answer 26.

(a) From the data of the market, it can be seen that SEL has advantage over LTL in both the markets of fixed rate and floating rate.

In the fixed rate market, SEL can mobilize at 10% while LTL can do it at 10.50%, i.e., 50 bp cheaper than LTL.

In the floating rate market, SEL can mobilize at M + 1 % while LTL can do it at M + 2%, i.e., 100 bp cheaper than LTL.

	Fixed rate	**Floating rate**
Solar Equipments Ltd.	10.00%	M + 100 bp
Lunar Technologies Ltd.	10.50%	M + 200 bp
Advantage of SEL, bp	50	100

It is the comparative advantage that is crucial to the decisior making. The comparative advantage in favour of SEL is the difference of absolute advantage.

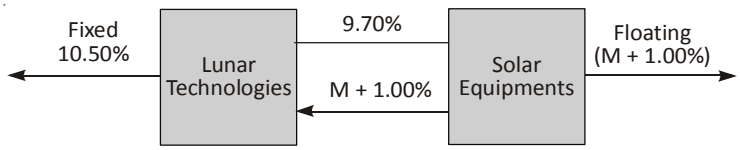
The present market scenario offers an advantage of 50 bp in the cost of funds for both the firms on an aggregate basis.

(b) SEL must access floating rate market at M + 100 bp and then enter into a swap with LTL.

Similarly LTL must access the fixed rate market to mobilize capital and then enter into a swap with SEL.

(c) The total benefit available is 50 bp that can be shared by SEL and LTL. Since SEL wants 60% of benefit, the cost of funds would be made lesser by 30 bp for SEL and the same swap would benefit LTL by 20 bp.

(d) SEL and LTL can enter into a swap arrangement after accessing the loan markets at floating rate and fixed rate respectively. Under the swap, SEL would pay 9.70% to LTL in exchange of receiving M + 1.00% as shown in the schematic diagram.



(e) After accessing the markets and entering into the swap arrangement, the cost of funds is worked out as follows:

	SEL	LTL
Payment to market	M + 1%	10.50%
Payment to counterparty	9.70%	(M + 1%)
Received from counter party	-(M + 1 %)	-9.70%
Total cost of funds	9.70%	M + 1.80%
Cost without the swap	10.00%	M + 2.00%
Benefit	30 bp	20 bp

Q. 27. The Fund Manager of Multicap Fund, which has a portfolio beta of 1.25 with the NIFTY, expects the market to go on a bullish binge over the next 3 months. Fearing erosion is Net Asset Value, he wants to lower his Fund Beta to reduce the impact of downfall.

He is contemplating replacing a part of his fund with risk free assets or using NIFTY Futures to reducing the beta levels to 1.

Advise the fund manager on the alternatives if —

- **The portfolio value is Rs. 5 Crores.**
- **NIFTY is quoted at Rs. 5,000 per unit with contract size of 100 units.**
- **The Fund Manager cannot load more than 10% of the Fund Value with risk free assets.**

Answer 27.

1. Using Risk Free Investments

(a) **Object :** Reduce Beta Value of the Portfolio

(b) **Activity :** Replace part of the portfolio with risk free investments

- Proportion of Existing Portfolio in the New Portfolio = W_1
- Proportion of Risk Free Investments in the New Portfolio = $W_1 = 1 - W_1$
- Beta of Existing Portfolio = $b_1 = 1.25$
- Beta of Risk Free Investment = $b_2 = 0$
- Desired Beta of the New Portfolio = $b_N = 1$

Beta of a Portfolio = Weight Average of the Beta of its Components

- $b_N = [b_1 \times W_1] + [b_2 \times (1 - W_1)]$
- $1 = [1.25 \times W_1] + [0 \times (1 - W_1)]$
- $1 = 1.25\ W_1$
- $W_1 = 1/1.25 = 0.80$ or 80%
- $W_2 = 1 - W_1 = 1 - 0.80 = 0.20$ or 20%

Evaluation : Value of the fund required to be replaced by risk free investments to obtain a beta of 1 is 20%. Since the Fund Manager cannot load more than 10% of fund value with risk free investments, **this alternative cannot be pursued.**

2. Using Index Futures

[This the same as Cross Hedging using Index Futures]

(a) **Object :** Reduce Beta Value of the Portfolio

(b) **Activity :** Sell Index Futures

- Beta of Existing Portfolio = $b_1 = 1.25$
- Desired Beta of the New Portfolio = $b_N = 1$
- 3-Months' Future Value per unit of NIFTY = Rs. 5000 per Unit
- Contract Size = 100 Units
- Value per Futures Contract in NIFTY = W_F = Rs. 5000 × 100 = Rs. 5 Lakhs
- Value of the Portfolio = V_P = Rs. 5 Crores
- No. of Futures Contract to be sold :

$$= \text{Portfolio Value} \times \frac{[\text{Beta of the Portfolio} - \text{Desired Value of Beta}]}{\text{Value of a Futures Contract}}$$

$$= V_P \times \frac{\beta_1 - \beta_N}{V_F}$$

= Rs. 5,00,00,000 × [(1.25 – 1.00) ÷ Rs. 5,00,000]

= 100 × 0.30

= **25 Contracts**

Evaluation :

- **Sell 25 Nifty Contracts :** The fund manager should sell 25 NIFTY Futures Contracts to reduce the Portfolio Beta to 1, thereby arresting the effect of pace of fall in a bearish market.
- **Logic for Selling Futures :** In a bearish market, when prices are falling, futures contract are entered into to freeze the sale price. This will ensure that whatever be the fall in price, sale price is fIxed. And therefore, any gain can be pocketed.
- **Operation in the instant case :**

Effect without Selling Index Futures

Particulars	NIFTY	Multicap Fund
Beta Value	**1**	**1.25**
Value at T_o [Now]	Rs.5000	Rs.500.00 Lakhs
Fall in Value over the next 3-Months at 10% for NIFTY [Assumed] = Loss	Rs.500 [Rs. 5,000 × 10%]	Rs.62.50 Lakhs [Rs. 500 Lakhs × 10% × Beta of 1.25]
Value at T_3 [3 Months later]	Rs. 4500	Rs. 437.50 Lakhs
Extent of Fall in %	10%	12.50%

If Beta of Multicap Fund had been at the desired level of 1, extent of fall in % would have been the same as that of NIFTY i.e. 10%.

Therefore, value of the portfolio would have been Rs. 450 Lakhs.

Hedging by Selling Index Futures

By selling 25 Contracts of NIFTY Futures at Rs.5000, the gain would be equal to the difference between actual value and desired value i.e.

	Actual Value	Rs. 437.50 Lakhs
Less:	Desired Value	Rs. 450.00 Lakhs
	Fall offset by gain in Index Futures	**Rs. 12.50 Lakhs**

Particulars	NIFTY
Value of Futures Contract	Rs. 5 Lakhs
No. of Contracts Sold	25
Total Value of Futures Contract sold	Rs. 125 Lakhs
If value of NIFTY had fallen by 10% to Rs. 4,500 per unit, the fund manager would still be able to sell the NIFTY Futures at Rs. 5000, thereby pocketing a gain of Rs. 500 per unit. Therefore, gain per unit of Nifty Future (in percentage) = Rs. 500 ÷ Rs. 5000	10%
Gain pocketed by entering into 25 Nifty Futures Sale Contract [Total Value of Contracts Sold × Gain in %]	**Rs. 12.50 Lakhs** [Rs. 125.00 Lakhs × 10%]

Gain of Rs. 12.50 Lakhs, when added to the actual Portfolio Value at T_3 of Rs. 437.50 Lakhs, gives Rs. 450.00 Lakhs, which is the desired value at T_3.

Q. 28. Rohan Enterprises, have exported goods to UAE for Arab Emirates Dirham (AED) 5,00,000 at a credit period of 90 days. Rupee is appreciating against the AED and Rohan Enterprises is exploring alternatives to mitigate loss due to AED Depreciation. From the following information, analyze the possibility of Money Market Hedge -

Foreign Exchange Rates		
	Bid	**Ask**
Spot	**Rs. 11.50**	**Rs. 11.80**
3-Month Forward	**Rs. 11.20**	**Rs. 11.40**

Money Market Rates		
	Deposit	**Borrowings**
AED	**9%**	**12%**
Rupees	**8%**	**10%**

Answer 28.

Facts : Rohan will sell AED 5,00,000 in 3 Months

Evaluation : Money Market Hedge is possible only if the 3-Month Forward Rate is lower than value of Spot Bid in the next three 3 Months (computed by applying AED Borrowing Rate and Rupee Deposit Rate).

$$\textbf{Value of Spot Bid in 3 Month's Time} = \text{Spot Bid Rate} \times \frac{(1+\text{Rupee Deposit Rate for 3 Month})}{1+\text{AED Borrowing Rate for 3 Month})}$$

$$= \text{Rs. } 11.50 \times \frac{(1+8\%\text{ p.a. for 3 Months})}{(1+12\%\text{ p.a. for 3 Months})}$$

$$= \text{Rs. } 11.50 \times [(1 + 0.02) \div (1 + 0.03)] = \textbf{Rs. 11.37}$$

Value of Spot Bid **Rs. 11.37** in 3 Month's time > Forward Bid Rate of Rs. 11.20

- Therefore, there is a possibility for Money Market Hedge

Inference :

- AED 5,00,000 Receivable is an Asset ® Under Money Market Hedge, liability in AED should be created ® Rohan should borrow AED for 3 Months, which along with interest would amount to AED 5,00,000 in 3 Months.

Action	Date	Activity
Borrow	Now	Borrow an amount of AED at 12% p.a. for 3 Months so that, the total liability including interest for 3 months, is AED 5,00,000. ® AED 5,00,000 ÷ (1 + Interest Rate for 3 Months) ® AED 5,00,000 ÷ (1 + 12% × 3 Months / 12 Months) ® AED 5,00,000 ÷ 1.03 = **AED 4,85,436.8932 should be borrowed.**
Convert	Now	Convert AED 98,765.4321 into Rupees at Spot Rate (Bid Rate since AED is sold) ® AED 4,85,436.8932 × Rs. 11.50 = **Rs. 55,82,524**
Invest	Now	Invest Rs. 55,82,824 in Rupee Deposit for 3 Months at 8% p.a.
Realize	3 Months Hence	Realize the maturity value of rupee deposit. Amount received will be - ® Rs. 55,82,524 × (1 + Interest Rate for 3 Months) ® Rs. 55,82,524 × (1 + 8% × 3 Months / 12 Months) ® Rs. 55,82,524 × (1 + 0.02) = Rs. 55,82,524 × 1.02 = **Rs. 56,94,175**
Receive	3 Months Hence	Receive the AED 5,00,000 from the customer abroad.
Repay	3 Months Hence	Repay the AED Loan using the money received from the customer abroad. Amount Payable = Amount Borrowed AED 4,85,436.8932 × (1 + 12% p.a. for 3 Months) = USD 4,85,436.8932 × 1.03 = **AED 5,00,000.**

Amount Saved by utilising Money Market Hedge

Action : Enter into a 3-Month Forward Sale Contract for sale of AED 5,00,000 at Rs. 11.20.
Sell AED 5,00,000 3 Months from now at Rs. 11.20

Effect : Amount in Rs. in hand in 3 Months = AED 5,00,000 × Rs. 11.20 = **Rs. 56,00,000**

Amount Saved under Money Market Hedge

	Under Money Market Hedge is	Rs. 56,94,175
Less :	Under Forward Contract is	Rs. 56,00,000
	Amount Saved	**Rs. 94,175**

Conclusion : Hedging risks using Money Market Operations will be advantageous to Rohan.

Q. 29. Better Ltd., London will have to make a payment of $ 3,64,897 in six month's time. It is currently 1st October. The company is considering the various choices it has in order to hedge its transaction exposure.

Exchange rates :

Spot rate	**$ 1.5617 – 1.5773**
Six month forward rate	**$ 1.5455 – 1.5609**

	Borrow (%)	Deposit (%)
US	**6**	**4.5**
UK	**7**	**5.5**

Foreign currency option prices (1 unit is £ 12,500) :

Exercise Price	Call option (March)	Put option (March)
$ 1.70	**$ 0.037**	**$ 0.096**

By making the appropriate calculations and going time value of money (in case of Premia) decide which of the following hedging

(a) Forward market;

(b) Cash (Money) market;

(c) Currency options.

Answer 29.

Relevant Rule for Conversion : Based on nature of Quote (Direct or Indirect)

Nature of Quote	Buying Foreign Currency (Converting Home Currency into Foreign Currency)	Selling Foreign Currency (Converting Foreign Currency into Home Currency)
Direct Quote, relevant rate is	Ask Rate	Bid Rate
Indirect Quote, relevant rate is	1 ÷ Bid Rate	1 ÷ Ask Rate

(a) Forward Market:

Particulars	Computation	Amount ($)
Amount Payable	Given	$ 3,64,897
Amount under Forward Contract	**$ 3,64,897 ÷ 1.5455 (Forward Bid Rate)**	**£ 2,36,103**

(b) Cash Money Market

1. **Requisite :** Money Market Hedge is possible only in case of difference in rates of interest for borrowing and investing.
2. **Activity Flow :**

   Borrow : Borrow Sterling equivalent of money at 7% p.a. for 6 Months for investing.

   Convert : Convert the money borrowed in Sterling to US $ at Spot Rate (Bid)

   Invest : Invest US $ so converted in Dollar Deposits at 4.5% p.a. for 6 Months

   Realize : Realize the Deposit including Interest and use the proceeds to settle the liability.
3. **Cash Flow :**

Particulars		Amount
Amount Payable	After 6 Months	US $ 3,64,897
Amount to be Invested	at 4.5% p.a. for realizing US $ 3,64,897 = US $ 3,64,897 ÷ (1 + Interest Rate of 4.5% p.a × 6/12) = $ 3,64,897 ÷ 1.0225	US $ 3,56,867
Amount be borrowed	Amount to be invested in US $ 3,64,897 ÷ 1.5617 (Spot Bid Rate)	£ 2,28,512
Interest payable	On money borrowed @ 7% p.a. for 6 Months = Rs. 2,28,512 × 7% × 6 Months / 12 Months	£ 7,998
Total Amount Payable	**Amount Borrowed £ 2,28,512 + Interest £ 7,998**	**£ 2,36,510**

(c) Currency Options

Payment is to be made in Pounds after 6 months, hence Put option to sell Pounds is relevant.

Number of Options **Contract**

- Value of one Options Contract = Value per unit × Exercise price = £ 12,500 × 1.70 = £ 21,250
- Number of Contracts to be purchased = Amount payable in 6 month's time ÷ Value per contract
  = 3,64,897 ÷ 21,250 **= 17.17 Contracts**

Alternative 1: 17 Options Contracts are undertaken and the balance through Forward Contract.

- Value covered under Options = 17 Contracts × $ 21,250 per Contract = $ 3,61,250
- Value under Forward Contract = Amount payable after 6 months – Value under Options
  = $ 3,64,897 – $ 3,61,250 = $ **3,647**

Cash Flows under Options

Particulars	Amount
Value of Forward Contract in £ = ($ 3,647 ÷ 1.5455)	£ 2360
Premium Payable [$ 0.096 × 17 × 12,500 = $ 20,400 ÷ 1.5617 (Spot Bid Rate)	£ 13,063
Value of the 17 Options Contract [17 × 12,500]	£ 2,12,500
Total Outflow under Options	**£ 2,27,923**

Alternative 2 : 18 Option Contracts are undertaken and the excess Dollars are sold in the Forward Market

- Value covered under Option = 18 Contracts × $ 21,250 per Contract = $ 3,82,500
- Value sold under Forward Contract = Amount payable after 6 months – Value under Options
  = $ 3,64,897 – $ 3,82,500 = **$ 17,603.**

Cash Flows under Options

Particulars	Amount
Value of Forward Contract in £ = ($ 17,063 ÷ 1.5609)	£ 11,277
Premium Payable [$ 0.096 × 18 × 12,500 = $ 21,400 ÷ 1.5617 (Spot Bid Rate)	£ 21,600
Value of the 18 Options Contract [18 × 12,500]	£ 2,25,000
Total Outflow under Options	**£ 2,27,554**

Calculation : The Cash outflow under Options is the lowest and hence it may be undertaken.

Q. 30. Compnay A and X have been offered the following rate per annum on a $ 200 million five year loan;

Company	Fixed Rate	Floating Rate
A	**12.0**	**LIBOR + 0.1%**
X	**13.4**	**LIBOR + 0.6%**

Company A requires a floating – rate loan; Company X rquires a fixed rate loan.

Design a swap that will net a bank acting as intermediary at 0.1 percent per annum and be equally attractive to both the companies.

Answer 30.

Computation of Share of Gain	Rs.
(a) Difference in Floating Rates [(LIBOR + 0.1%) – (LIBOR + 0.6%)]	0.5%
(b) Difference in Fixed Rates [13.4% – 12%]	1.4%
(c) Net Difference {[(a) – (b)] in Absolute Terms}	0.9%
(d) Amount paid for arrangement of Swap Option	(0.1%)
(e) **Net Gain [(c) – (d)]**	**0.8%**
(f) Company A's share of Gain [0.8% × 50%]	0.4%
(g) Company X's share of Gain [0.8% × 50%]	0.4%

A is the stronger Company (due to comparative interest advantage). A has an advantage of 1.40% in Fixed Rate and 0.50% in Floating Rate. Therefore, A enjoys a higher advantage in Fixed Rate loans. Therefore, A will opt for Fixed Rate Loans with its Bankers. Correspondingly X Ltd. will opt for Floating Rate Loans with its bankers.

Company A	Company X
1. Company A will borrow at Fixed Rate.	1. Company X will borrow at Floating Rate.
2. Pay interest to Bankers at Fixed Rate (i.e. 12.0%)	2. Pay interest to its Bankers at Floating Rate (i.e. LIBOR + 0.6%)
3. Will **collect from** Company X interest amount differential i.e. Interest computed at Fixed Rate (12.0%) **Less** Interest Comuted at Floating Rate of (LIBOR + 0.1%) = 11.9% – LIBOR	3. Will **pay to** Company A interest amount differential i.e. Interest computed at Fixed Rate (12.0%) **Less** Interest Computed at Floating Rate of (LIBOR + 0.1%) = 11.9% – LIBOR
4. Receive share of Gain from Company X (0.4%)	4. Pay Company A its share of Gain = 0.4%
5. **Effective Interest Rate : 2 – 3** = 12.0% – (11.90% – LIBOR) – 0.4% = **LIBOR – 0.3%**	5. Pay Commission Charges to the Financial Institution for arranging Interest Rate Swaps i.e. 0.1%
	6. **Effective Interest Rate : 2 + 3 + 4 + 5** = Floating Rate to Company X (LIBOR + 0.6%) + Interest Differential paid to Company A (11.9% – LIBOR) + Commission charges paid for arranging Swaps + Share of gain paid to Company A = LIBOR + 0.60% + 11.9% – LIBOR + 0.1% + 0.4% = **13.0%**