FINAL EXAMINATION

(REVISED SYLLABUS - 2008)

GROUP - III

Paper-12 : FINANCIAL MANAGEMENT & INTERNATIONAL FINANCE

Q. 1. (a) For each of the questions given below, one out of four answers is correct. Indicate the correct answer and give your workings/ reasons briefly.

(i) Money market hedge involves-

A. Borrowing in foreign currency in case of exports;

B. Investing in foreign currency in case of imports;

C. Both A and B.

D. Neither of the above

(ii) The value of a share of MN Ltd. after right issue was found to be ₹ 75/-. The theoretical value of the right is ₹ 5. The number of existing shares required for a rights share is 2. The subscription price at which the shares were issued were :

A. ₹ 22.50

B. ₹ 40.00

C. ₹ 65.00

D. ₹ 82.00

(iii) HP Leasing Company expects a minimum yield of 10% on its investment in the leasing business. It proposes to lease a machine costing ₹ 5,00,000 for ten years. If yearly lease payments are received in advance, the lease rental to be charged by the company for lease will be :

A. ₹ 81,372

B. ₹ 73,975

C. ₹ 72,370

D. None of (A) , (B) , (C).

(iv) The aim of foreign exchange risk management is :

A. To maximize profits.

B. To know with certainty the quantum of future cash flows.

C. To minimize losses.

D. To earn a minimum level of profit.

(v) The average daily sales of a company are ₹ 5 lac.The company normally keeps a cash balance of ₹ 80,000. If the weighted operating cycle of the company is 45 days, its working capital will be—

A. ₹ 112.9 lac.

B. ₹ 113.3 lac

C. ₹ 5.8 lac

D. ₹ 225.8 lac.

(vi) Which of the following is/are basic precondition/s for interest arbitrage theory?

A. Free capital mobility

B. No taxes

C. No government restrictions on borrowing in foreign currency

D. All of the above.

(vii) The following various currency quotes are available from a leading bank :

₹ /£ 75.31/75 .33

£ / $ 0.6391/0.6398

$ /¥ 0.01048/0.01052

The rate at which yen (¥) can be purchased with rupees will be—

A. Re. 0.5070

B. ₹ 1.5030

C. ₹ 1.7230

D. None of the above.

(viii) ABC Ltd. is selling its products on credit basis and its customers are associated with 5% credit risk. The annual turnover is expected at ₹ 5,00,000 if credit is extended with cost of sales at 75% of sale value. The cost of capital of the company is 15%. The net profit of the company is :

A. ₹ 1,25,000

B. ₹ 77,670

C. ₹ 88,430

D. ₹ 1,10,500

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

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

A. ₹ 35,000

B. ₹ 45,000

C. ₹ 60,000

D. ₹ 85,000

(x) Eurodollar deposit means :

A. Dollar deposit outside USA

B. Dollar deposit beyond the control of monetary authority

C. Dollar deposit in the US and outside US

D. None of the above.

Answer 1.

(i) C. Both A and B are correct. Importer will have FC liability and settle the same with maturity proceeds of FC asset created. Exporter will get the asset value from overseas customer and settle FC liability there itself.

(ii) C. ₹ 65.

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

or, P – S = 5(2+1)

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

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

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

or, 2P + S = 3*75

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

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

2 P + S = 225

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

or, 30 + 3S = 225

or, S = (225–30)/3

or, S = 65.

(iii) B. ₹ 73,975

Let, lease rental per annum be , x

₹ 5,00,000 $= x + x / (1+0.1) + x / (1+0.1)^2 + \ldots\ldots\ldots\ldots + x / (1+0.1)^9$

$= x + 5.759\ x = 6.759\ x$

or, x = ₹ 5,00,000/ 6.759 = ₹ 73,975.

(iv) B. To know with certainty the quantum of future cash flows.

(v) D. ₹ 225.8 lac.

The working capital requirement is for 45 days of the weighted operating cycle plus normal cash balance = Sales per day × weighted operating cycle+ cash balance requirement

= ₹ 5 lac × 45 + ₹ 0.80 lac = ₹ 225.80 lac.

(vi) D. All of the above

(vii) A. Re. 0.5070

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

ASK (₹ / ¥) = ASK (₹ / £) × ASK (£ /$) × ASK($/ ¥)

= 75.33 × 0.6398 × 0. 01052

= ₹ 0.5070 (approx.)

(viii) B. ₹ 77,670

			(₹)
Profitability of credit sales			
Credit sales			5,00,000
Less : Cost of sales	(₹ 5,00,000 × 75/100)		3,75,000
			1,25,000
Less : Cost of granting credit			
Default risk	(₹ 5,00,000 × 5/100)	25,000	
Opportunity cost	(₹ 5,00,000 × 60/365 × 15/100)	12,330	
Administration cost	(₹ 5,00,000 × 2/100)	10,000	47,330
Net profit			77,670

(ix) A. ₹ 35,000

Expected premium = (0.6 × ₹ 2,00,000) + [0.4 × (–) ₹ 1,50,000] – ₹ 25,000
= ₹ 1,20,000 – ₹ 60,000 – ₹ 25,000
= ₹ 35,000

(x) B. Dollar deposit beyond the control of monetary authority.

Q. 2. Write short notes on :

(i) Standard & Poor's Currency Indices

(ii) Financial Engineering

(iii) Seed capital assistance

(iv) Cross border leasing

(v) Foreign currency exchangeable bonds

Answer 2.

(i) **Standard & Poor's Currency Indices** – Standard & Poor's has launched two real-time currency indices on India and Chinese currency that provide investors with exposure to emerging economic superpowers that currently lack a liquid currency futures market. The S&P Indian Rupee Index and the S&P Chinese Renminbi Index are the first in what will be a series of real-time currency indices launched by Standard & Poor's in 2008. S&P is the first index provider to offer this type of index on a global basis. S&P is the first major index provider to venture into the Currency Beta space-another sign of S&P's breadth of asset class coverage. Neither market has liquid currency futures, so S&P has innovated by using non-deliverable forward contracts.

The indices will provide information on the currencies and the costs of hedging positions in a convenient and consistent form. Given the appreciation in currencies of these two trading powers, these indexes and index-linked products will provide a transparent hedging mechanism for trade participants in the local markets. A Chinese or Indian exporter sells services to US in dollars. If the rupee or yuan rises, they suffer. Now they can hedge in a exchange listed, transparent framework without worrying about futures market, liquidity of contracts, over-the-counter transactions etc. This is the first ever way for US retail investors to get access to currencies of two emerging economic superpowers- China and India.

(ii) **'Financial Engineering'** involves the design, development and implementation of innovative financial instruments and processes and the formulation of creative solutions to problems in finance. Financial Engineering lies in innovation and creativity to promote market efficiency. It involves construction of innovative asset-liability structures using a combination of basic instruments so as to obtain hybrid instruments which may either provide a risk-return configuration otherwise unviable or result in gain by heading efficiently, possibly by creating an arbitrage opportunity. It is of great help in corporate finance, investment management, money management, trading activities and risk management. In recent years, the rapidity with which corporate finance and investment finance have changed in practice has given birth to a new area of study known as financial engineering. It involves use of complex mathematical modeling and high speed computer solutions. It has been practiced by commercial banks in offering new and tailor-made products to different types of customers. Financial Engineering has been used in schemes of mergers and acquisitions. The term financial engineering is often used to refer to risk management also because it involves a strategic approach to risk management.

(iii) **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 ₹ 2 crores. The maximum assistance under the scheme will be – (a) 50% of the required Promoter's Contribution, or (b) ₹ 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 ₹ 2 crores, seed capital may be obtained from the Risk Capital and Technology Corporation Ltd. (RCTC). For small projects costing upto ₹ 5 lakhs, assistance under the National equity Fund of the SIDBI may be availed.

(iv) **Cross border leasing** – Cross-border leasing is a leasing agreement where lessor and lessee are situated in different countries. This raises significant additional issues relating to tax avoidance and tax shelters. It has been widely used in some European countries, to arbitrage the difference in the tax laws of different countries.

Cross-border leasing have been in practice as a means of financing infrastructure development in emerging nations. Cross-border leasing may have significant applications in financing infrastructure development in emerging nations – such as rail and air transport equipment, telephone and telecommunications, equipment, and assets incorporated into power generations and distribution systems – and other projects that have predictable revenue streams.

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

(vi) **The foreign currency exchangeable bonds (FCEBs)** are financial instruments similar to foreign currency convertible bonds (FCCBs) in nature. FCEBs will allow corporate to raise money from overseas by issuing bonds. In case of FCCBs, bonds can be converted into equity shares of the issuing company. But in case of FCEBs, the bonds can be converted into shares of a group company of the issuer. The issue of FCEBs in India is procedurally governed by the Companies Act, 1956;

FEMA, 1999; SEBI (Disclosure and Investor Protection) Guidelines, 2000; Issue of Foreign Currency Exchangeable Bonds scheme, 2008. The issuing company shall be part of the promoter group of the offered company. The offered company means an Indian company whose equity shares shall be offered in exchange of FCCB. The offered company shall be a listed company which is engaged in a sector eligible to receive Foreign Direct Investment (FDI) and eligible to issue or avail of FCCB or External Commercial Borrowing (ECBs). Wherever needed prior approval of Foreign Investment Promotion Board (FIPB) shall be obtained under Foreign Direct Investment Policy.

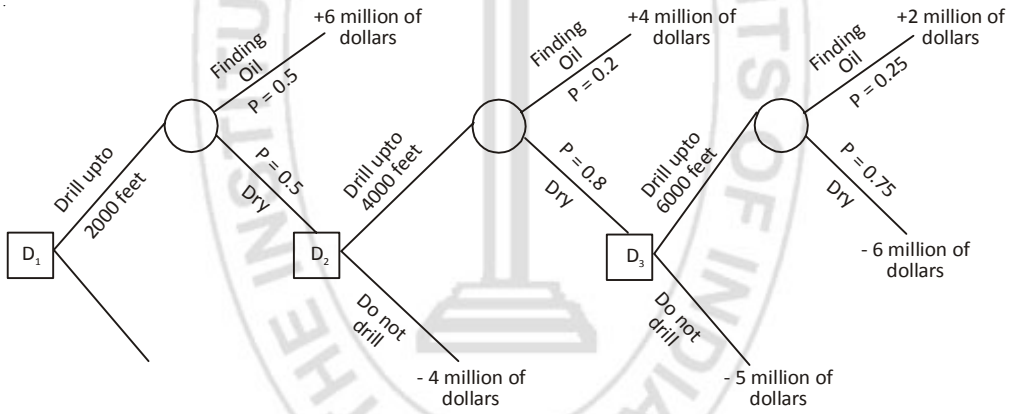
Q. 3. Super Oil is considering whether to drill for oil in Westchester Country. The prospects are as follows :

Depth of well (feet)	Total cost millions of dollars	Cumulative probability of finding oil	PV of oil (if found) millions of dollars
2,000	**4**	**0.5**	**10**
4,000	**5**	**0.6**	**9**
6,000	**6**	**0.7**	**8**

***Required* : Draw a decision tree showing the successive drilling decisions to be made by Super Oil. How should it be prepared to drill?**

Answer 3.

The given data is easily represented by the following decision tree diagram :



There are three decision points in the tree indicated by D_1, D_2 and D_3.

Using roll back technique, we shall take the decision at decision point D_3 first and then use it to arrive decision at a decision point D_2 and then use it to arrive decision at a decision point D_1.

Statement showing the evaluation of decision at Decision Point D_3

Decision	Event	Probability	P.V. of Oil (if found) (millions of dollars)	Expected P.V. of oil (if found) (millions of dollars)
Drill upto 6,000 feet	Finding oil	0.25	+ 2	0.50
	Dry	0.75	(6)	(4.50)
				(4.00)
Do not drill				(5.00)

Since the expected P.V. of oil (if found) on drilling upto 6,000 feet is (4) millions of dollars is greater than the cost of not drilling (5) millions dollars [total cost of drilling upto 4,000 feet]. Therefore, Super Oil should drill upto 6,000 feet.

Statement showing the evaluation of decision at Decision Point D_2

Decision	Event	Probability	P.V. of Oil (if found) (millions of dollars)	Expected P.V. of oil (if found) (millions of dollars)
Drill upto 4,000 feet	Finding oil	0.20	+ 4	0.80
	Dry	0.80	(4)	(3.20)
				(2.40)
Do not drill				(4.00)

Since the expected P.V. of oil (if found) on drilling upto 4,000 feet is (2.4) millions of dollars is greater than the cost of not drilling (4) millions dollars [total cost of drilling upto 2,000 feet]. Therefore, Super Oil should drill upto 4,000 feet.

Statement showing the evaluation of decision at Decision Point D_1

Decision	Event	Probability	P.V. of Oil (if found) (millions of dollars)	Expected P.V. of oil (if found) (millions of dollars)
Drill upto 2,000 feet	Finding oil	0.50	+ 6	3.00
	Dry	0.50	(2.4)	(1.20)
				1.80
Do not drill				NIL

Since the expected P.V. of oil (if found) on drilling upto 2,000 feet is 1.8 millions of dollars (positive), Super Oil should drill upto 2,000 feet.

Working note : Calculation of probability

(i) At initial drill of 2,000 feet

Probability of finding oil = 0.50 (given), probability of not finding oil = 1 – 0.50 = 0.50

(ii) Probability of finding and not finding oil at 4,000 feet if oil not found at 2,000 feet.

Cumulative probability of finding oil = 0.60 (given)

Cumulative probability of not finding oil = 1 – 0.60 = 0.40

Hence, probability of not finding oil at 4,000 feet if oil not found at 2,000 feet

$$= \frac{\text{Probability of not finding oil at 4,000 feet}}{\text{Probability of not finding oil at 2,000 feet}} = \frac{0.40}{0.50} = 0.80$$

Therefore, probability of finding oil at 4,000 feet if oil not found at 2,000 feet = 1 – 0.80 = 0.20

(iii) Probability of finding and not finding oil at 6,000 feet if oil not found at 4,000 feet

Cumulative probability of finding oil = 0.70

Cumulative probability of not finding oil = 1 – 0.70 = 0.30

Hence, probability of not finding oil at 6,000 feet if oil is not found at 2,000 and at 4,000 feet

$$= \frac{\text{Probability of not finding oil at 6,000 feet}}{\text{Probability of not finding oil at 4,000 feet}} = \frac{0.30}{0.40} = 0.75$$

Therefore, probability of finding oil at 6,000 feet if oil is not found at 2,000 and at 4,000 feet = 1 – 0.75 = 0.25.

Q. 4. CAMIB Limited is commencing a new project for manufacture of a plastic component. The following cost information has been ascertained for annual production of 12,000 units which is the full capacity :

	Cost per unit (₹)
Materials	40
Direct Labour and Variable expenses	20
Fixed Manufacturing expenses	6
Depreciation	10
Fixed Administration expenses	4
	80

The selling price per unit is expected to be ₹ 96 and the selling expenses ₹ 5 per units, 80% of which is variable.

In the first two years of operations, production and sales are expected to be as follows :

Year	Production (no. of units)	Sales (no. of units)
1	6,000	5,000
2	9,000	8,500

To assess the working capital requirements, the following additional information is available :

(a) Stock of materials	2.25 months' average consumption
(b) Work in process	Nil
(c) Debtors	1 month's average cost of sales
(d) Cash balance	₹ 10,000
(e) Creditors for supply of materials :	1 months average purchases during the year
(f) Creditors for expenses :	1 month's average of all expenses during the year
(g) Valuation of Finished Goods Stock	At average Cost

***Required* : Prepare, for the two years,**

(i) A project statement of Profit/Loss (ignoring taxation); and

(ii) A projected statement of working capital requirements.

Answer 4.

Projected Statement of Profit/Loss

Particulars	Year 1			Year 2		
	Units	*Per Unit* ₹	*Total* ₹	*Units*	*Per Unit* ₹	*Total* ₹
Normal Production (in units)	12,000			12,000		
Actual Production (in units)	6,000			9,000		
Sales (in units)	5,000			8,500		
A. Sales Revenue		96	4,80,000		96	8,16,000
B. *Less :* Cost of Sales						
(a) Direct Material Cost		40	2,40,000		40	3,60,000
(b) Direct Labour & Variable Exp.		20	1,20,000		20	1,80,000
(c) Fixed Manufacturing Exp. (excluding Depreciation)		12	72,000		8	72,000

(d) Depreciation		20	1,20,000			1,20,000
(e) Fixed Adm. Exp.		8	48,000			48,000
(f) Total Cost of Goods Produced	6,000	100	6,00,000	9,000		7,80,000
(g) *Add* : Opening Stock of Finished Goods	0		0	1,000	100	1,00,000
(h) Total Cost of Goods available	6,000	100	6,00,000	10,000	88	8,80,000
(i) *Less* : Closing Stock of Finished Goods	1,000	100	(1,00,000)	1,500	88	(1,32,000)
(j) Total Cost of Goods Sold	5,000	100	5,00,000	8,500	88	7,48,000
(k) *Add* : Variable Selling Exp.		4	20,000		4	34,000
(l) *Add* : Fixed Selling Exp.		2.40	12,000			12,000
Total Cost of Sales (j+k+l)			5,32,000			7,94,000
C. Profit (Loss) (A – B)			(52,000)			22,000

Note : Closing stock of finished goods has been valued Weighted Average cost.

Statement showing the requirements of Working Capital (on Cash Cost basis)

	Year 1		Year 2	
Particulars	**Computation**	₹	**Computation**	₹
A. Current Assets :				
Stock of Raw Material	2,40,000 × 2.25/12	45,000	3,60,000 × 2.25/12	67,500
Stock of Finished Goods		80,000		1,11,000
Debtors	4,32,000 × 1/12	36,000	6,75,000 × 1/12	56,250
Cash in hand		10,000		10,000
Total current assets		1,71,000		2,44,750
B. Current Liabilities :				
Creditors for raw materials	2,85,000 × 1/12	23,750	3,82,500 × 1/12	31,875
Creditors for wages & variable expenses	1,20,000 × 1/12	10,000	1,80,000 × 1/12	15,000
Creditors for mfg. exp.	72,000 × 1/12	6,000	72,000 × 1/12	6,000
Creditors for admn. Exp.	48,000 × 1/12	4,000	48,000 × 1/12	4,000
Creditors for selling exp.	32,000 × 1/12	2,667	46,000 × 1/12	3,833
Total current liabilities		46,417		60,708
C. Net working capital (A – B)		1,24,583		1,84,042

Working notes :

(i) Calculation of cash cost of closing stock and cash cost of sales

Particulars	Year 1			Year 2		
	Units	*Per Unit* ₹	*Total* ₹	*Units*	*Per Unit* ₹	*Total* ₹
Normal Production (in units)	12,000			12,000		
Actual Production (in units)	6,000			9,000		
Sales (in units)	5,000			8,500		
A. Direct material cost		40	2,40,000		40	3,60,000
B. Direct labour & Var. Exp. (excluding depreciation)		20	1,20,000		20	1,80,000
C. Fixed manufacturing exp.		12	72,000		8	72,000
D. Fixed admn. Exp.		8	48,000		5.33	48,000
E. Total cost of goods produced (A + B + C + D)	6,000	80	4,80,000	9,000	73.33	6,60,000
F. *Add* : Opening stock of finished goods		-		1,000	80	80,000
G. Total cost of goods available	6,000	80	4,80,000	10,000	74	7,40,000
H. *Less* : Closing stock of finished goods	1,000	80	(80,000)	1,500	74	(1,11,000)
I. Total cost of goods sold (G – H)	5,000	80	4,00,000	8,500	74	6,29,000
J. *Add* : Variable selling and distribution exp.		4	20,000		4	34,000
K. *Add* : Fixed selling and distribution exp.		2.40	12,000		1.41	12,000
L. Total cost of sales (I + J + K)			4,32,000			6,75,000

(ii) Calculation of credit purchases

Particulars	Year 1	Year 2
A. Raw material consumed	2,40,000	3,60,000
B. Add : Closing stock	45,000	67,500
C. Less : Opening stock	0	(45,000)
D. Purchases (A + B –C)	2,85,000	3,82,500

Q. 5. From the following information of A Ltd., calculate (a) Gross Operating Cycle, (b) Net Operating Cycle, and (c) No. of operating cycles in a year.

Particulars	₹
Raw material inventory consumed during the year	**60,00,000**
Average stock of raw material	**10,00,000**
Factory cost of goods produced	**1,05,00,000**
Average stock of work-in-progress	**4,37,500**

Cost of goods produced	**1,14,00,000**
Average stock of finished goods	**9,50,000**
Average trade debtors	**11,25,000**
Cost of credit sales	**90,00,000**
Average trade creditors	**5,00,000**
Expenses for the year	**30,00,000**
Average creditors for expenses	**5,00,000**
No. of working days in a year (Assume 360 days)	

Answer 5.

Raw material storage period $= \frac{\text{Average stock of raw material}}{\text{Average cost of raw material consumption per day}}$

$= \frac{₹\ 10,00,000}{₹\ 60,00,000/360} = 60$ days

Work-in-progress holding period $= \frac{\text{Average stock of work - in - progress}}{\text{Average cost in W.I.P. per day}}$

$= \frac{₹\ 4,37,500}{₹\ 1,05,00,000/360} = 15$ days

Finished goods storage period $= \frac{\text{Average stock of finished goods}}{\text{Average cost of goods produced per day}}$

$= \frac{₹\ 9,50,000}{₹\ 1,14,00,000/360} = 30$ days

Debtors collection period $= \frac{\text{Average trade debtors}}{\text{Average cost of credit sales per day}}$

$= \frac{₹\ 11,25,000}{₹\ 90,00,000/360} = 45$ days

Creditors' payment period $= \frac{\text{Average trade creditors}}{\text{Average credit purchases per day}}$

$= \frac{₹\ 5,00,000}{₹\ 60,00,000/360} = 30$ days

Average time lag in payment of expenses $= \frac{\text{Average creditors for expenses}}{\text{Average expenses per day}}$

$= \frac{₹\ 5,00,000}{₹\ 30,00,000/360} = 60$ days

Gross operating cycle = 60 + 15 + 30 + 45 = 150 days

Net operating cycle = 60 + 15 + 30 + 45 – 30 – 60 = 60 days

No. of operating cycle in a year $= \frac{\text{No. of days in a year}}{\text{Net operating cycle}} = \frac{360 \text{ days}}{60 \text{ days}} = 6$ operating cycles in a year.

Q. 6. A company has received 3 proposals for the acquisition of an asset on lease costing ₹ 1,50,000.

Option I **: The terms of offer envisaged payment of lease rentals for 96 months. During the first 72 months, the lease rentals were to be paid @ ₹ 30 p.m. per ₹ 1,000 and during the remaining 24 months @ ₹ 5 p.m. per ₹ 1,000. At the expiry of lease period, the lessor has offered to sale the assets at 5% of the original cost.**

Option II **: Lease agreement for a period of 72 months during which lease rentals to be paid per month per ₹ 1,000 are ₹ 35, ₹ 30, ₹ 26, ₹ 24, ₹ 22 and ₹ 20 for next 6 years. At the end of lease period the asset is proposed to be abandoned.**

Option III **: Under this offer a lease agreement is proposed to be signed for a period of 60 months wherein a initial lease deposit to the extent of 15% will be made at the time of signing of agreement. Lease rentals @ ₹ 35 per ₹ 1,000 per month will have to be paid for a period of 60 months on the expiry of leasing agreement, the assets shall be sold against the initial deposit and the asset is expected to last for a further period of three years.**

You are required to evaluate the proposals keeping in view the following parameters :

a. **Depreciation @ 25%**
b. **Discounting rate @ 5%**
c. **Tax rate applicable @ 35%**

The monthly and yearly discounting factors @ 15% discount rate are as follows :

Period	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Monthly	**0.923**	**0.795**	**0.685**	**0.590**	**0.509**	**0.438**	**0.377**	**0.325**
Yearly	**0.869**	**0.756**	**0.658**	**0.572**	**0.497**	**0.432**	**0.376**	**0.327**

Answer 6.

Note : We generally use annual discounting factors. However, if the loan/lease payments are made monthly and the annual rate is given, we find the monthly rate first. Thus, if the annual discounting rate is 15%, then the monthly discount rate is 15/12 = 1.25%. then we find the PV for each month. Thus the first month PV factor would be = $1/(1 + 0.0125)^1$; second month's would be = $1/(1 + 0.0125)^2$ and so on. However, it may not be necessary to do for each month, if the amount payable each month is same. We simply add the monthly PV factors of 12 months and multiply with the amount to get the yearly PV. In this problem the sum of monthly PV factor is directly given as 0.923. The amount for the first part of the problem is = 12 × 30 × 150 = ₹ 54,000. Therefore, first year PV = 54,000 × 0.923.

It is to be remembered that only lease/loan payments need to be applied with monthly discount factors. Tax benefits on depreciation etc. are available only once a year. Therefore, annual discount factor is relevant.

Option I

[Amount in ₹]

Year	Rentals	Monthly disc. Factor @ 15%	PV of (2)	Tax shelter (2) × 35%	Annual disc. Factor Factor @ 15%	PV of (5)	Net Cash Flow (4 – 7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	54,000	0.923	49,842	18,900	0.869	16,424	33,418
2	54,000	0.795	42,930	18,900	0.756	14,288	28,642
3	54,000	0.685	36,990	18,900	0.658	12,436	24,554
4	54,000	0.590	31,860	18,900	0.572	10,811	21,049
5	54,000	0.509	27,486	18,900	0.497	9,393	18,093
6	54,000	0.438	23,652	18,900	0.432	8,165	15,487
7	9,000	0.377	3,393	3,150	0.376	1,184	2,209
8	9,000	0.325	2,925	3,150	0.327	1,030	1,895
End	7,500	0.327	2,452	-			2,452
		0.327 is year ending discounting factor					1,47,799

Option II

[Amount in ₹]

Year	Rentals	Monthly disc. Factor @ 15%	PV of (2)	Tax shelter (2) × 35%	Annual disc. Factor Factor @ 15%	PV of (5)	Net Cash Flow (4 – 7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	63,000	0.923	58,149	22,050	0.869	19,161	38,988
2	54,000	0.795	42,930	18,900	0.756	14,288	28,642
3	46,800	0.685	32,058	16,380	0.658	10,778	21,280
4	43,200	0.590	25,488	15,120	0.572	8,649	16,839
5	39,600	0.509	20,156	13,860	0.497	6,888	13,268
6	36,000	0.438	15,768	12,600	0.432	5,443	10,325
							1,29,341

Option III

[Amount in ₹]

Year	Rentals	Monthly disc. Factor @ 15%	PV of (2)	Tax shelter (2) × 35%	Annual disc. Factor Factor @ 15%	PV of (5)	Net Cash Flow (4 – 7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
0	22,500	1.000	22,500	-	-	-	22,500
1	63,000	0.923	58,149	22,050	0.869	19,161	38,988
2	63,000	0.795	50,085	22,050	0.756	16,670	33,415
3	63,000	0.685	43,155	22,050	0.658	14,509	28,646
4	63,000	0.590	37,170	22,050	0.572	12,613	24,557
5	63,000	0.509	32,067	22,050	0.497	10,959	21,108
6			0	5,625*	0.432	2,430	-2,430
7			0	4,219*	0.376	1,586	-1,586
8			0	3,164*	0.327	1,035	-1,035
Terminal depreciation			0	9,492*	0.284	2,696	-2,696
							1,61,468

*Since the lessor is selling asset to lessee at the end of 5 years against deposit of 15% of ₹ 1,50,000 i.e. ₹ 22,500, lessee becomes the owner and starts claiming tax benefit on depreciation for the next three years. (assumed to be WDV at 25%)

Depreciation schedule :

[Amount in ₹]

Year	Original cost	Depreciation	Outstanding
1	22,500	5,625	16,875
2	16,875	4,219	12,656
3	12,656	3,164	9,492
4	9,492	9,492	0

Analyzing these tables it is concluded that :

Since the net effective cost of Option II is the least, it is advisable to choose the same.

Q. 7. The Kay Company has the following capital structure at 31st March 2012 which is considered to be optimum.

	₹
14% debentures	**3,00,000**
11% preference shares	**1,00,000**
Equity (1,00,000 shares)	**16,00,000**
	20,00,000

The company's share has a current market price of ₹ 23.60 per share. The expected dividend per share next year is 50% of the 2006 EPS. The following are the earnings per share figure for the company during the preceding 10 years. The past trends are expected to continue.

Year	*EPS* (₹)	*Year*	*EPS* (₹)
2002	**1.61**	**2008**	**1.00**
2003	**1.77**	**2009**	**1.10**
2004	**1.95**	**2010**	**1.21**
2005	**2.15**	**2011**	**1.33**
2006	**2.36**	**2012**	**1.46**

The company's can issue 16% new debentures. The company's debenture is currently selling at ₹ 96. The new preference issue can be sold at a net price of ₹ 9.20, paying a dividend of ₹ 1.1 per share. The company's marginal tax rate is 35%.

a. **Calculate the after-tax cost (i) of new debt, (ii) of new preference capital and (iii) of ordinary equity, assuming new equity comes from retained earnings.**

b. **Find the marginal cost of capital, again assuming no new ordinary shares are sold.**

c. **How much can be spent for capital investment before new ordinary shares must be sold ? Assume that retained earnings available for next year's investment are 50% of 2012 earnings.**

What is the marginal cost of capital (cost of funds raised in excess of the amount calculated in part (c), if the firm can sell new ordinary shares to net ₹ 20 a share? The cost of debt and of preference capital is constant.

Answer 7.

The existing capital structure of the firm is assumed to be optimum. Thus, the optimum proportions are :

Type of capital	Amount (₹)	Proportions
14% debentures	3,00,000	0.15
11% preference shares	1,00,000	0.05
Equity shares	16,00,000	0.80
	20,00,000	1.00

a. (i) After-tax cost of debt :

$$k_d = \frac{₹16}{₹96} = 0.1667$$

$k_d (1 - T) = (1 - 0.35)(0.1667) = 0.108355$

Note : the above formula is used since the maturity period of debenture is not given.

(ii) After-tax cost of preference capital :

$$k_p = \frac{₹1.1}{₹9.2} = 0.12$$

Note : Preference shares are assumed to be irredeemable.

(iii) After-tax cost of retained earnings :

$$k_e = \frac{D_1}{P_0} + g = \frac{₹1.18}{₹23.60} + 0.10 = 0.05 + 0.10 = 0.15$$

D_1 = 50% of 2006 EPS = 50% of ₹ 2.36 = ₹ 1.18

Calculation of g : It can be observed from the past trends of EPS that it is growing at an annual compound rate of 10%. E.g. – $E_t = E_0 (1 + g)^t$ = ₹ 2.36 = Re. 1 $(1 + g)^9$. We can find that the present value factor of 2.36 at the end of 9th year is obtained when the interest rate is 10%. The growth rate is, therefore, 10%.

Type of capital	Proportion	Specific cost	Product
(1)	**(2)**	**(3)**	**4 = (2) × (3)**
Debt	0.15	0.1084	0.0163
Preference share	0.05	0.1200	0.0060
Equity share	0.80	0.1500	0.1200
Marginal cost of capital			0.1423

b. The marginal cost of capital (MCC) is the weighted average cost of new capital. The firm would maintain its existing capital structure. Therefore, new capital would be raised in proportion to the existing capital structure.

c. The company can spend the following amount without increasing its MCC and without selling the new shares :

Retained earnings = (0.35)(₹ 2.36 × 1,00,000) = ₹ 82,600

The ordinary equity (retained earnings in this case) is 80% of the total capital. Thus,

Investment before issue of equity = $\frac{\text{Retained earnings}}{\text{Per cent equity}} = \frac{₹82,600}{0.80}$ = ₹ 1,03,250

d. If the company spends more than ₹ 1,03,250, it will have to issue new shares. The cost of new issue or ordinary shares is :

$$k_e = \frac{₹1.18}{₹20} + 0.10 = 0.059 + 0.10 = 0.159$$

The marginal cost of capital in excess of ₹ 1,03,250 is :

Type of capital	Proportion	Specific cost	Product
(1)	(2)	(3)	4 = (2) × (3)
Debt	0.15	0.1084	0.0163
Preference share	0.05	0.1200	0.0060
Equity share	0.80	0.1590	0.1272
Marginal cost of capital			0.1495

Q. 8. Following is the EPS record of A Ltd. over the past 10 years :

Year	EPS (₹)	Year	EPS (₹)
10	20	5	12
9	19	4	6
8	16	3	9
7	15	2	-2
6	16	1	1

(i) Determine the annual dividend paid each year in the following cases :

a. If the firm's dividend policy is based on a constant dividend payout ratio of 50% for all the years.

b. If the firm pays dividend at ₹ 8 per share, and increases it to ₹ 10 per share when earnings exceed ₹ 14 per share for the previous two consecutive years.

c. If the firm pays dividend at ₹ 7 per share each year except when EPS exceeds ₹ 14 per share, when an extra dividend equal to 80% of earnings beyond ₹ 14 would be paid.

(ii) Which type of dividend policy will you recommend to the company and why?

Answer 8.

(i) **a. Dividend per share paid in years 10 – 1**

Year	EPS (₹)	DPS (₹)	Year	EPS (₹)	DPS (₹)
10	20	10	5	12	6
9	19	9.5	4	6	3
8	16	8	3	9	4.5
7	15	7.5	2	-2	Nil
6	16	8	1	1	0.5

b. Dividend per share paid in years 10 – 1

Year	EPS (₹)	DPS (₹)	Year	EPS (₹)	DPS (₹)
10	20	10	5	12	8
9	19	10	4	6	8
8	16	10	3	9	8
7	15	8	2	-2	8*
6	16	8	1	1	8

*It is assumed that the company has past accumulated earnings which are not only enough to write-off current year's losses, but also can meet the dividend payment needs (number of equity shares outstanding × ₹ 8) of this year.

c. Dividend per share paid in year 10-1

Year	EPS (₹)	DPS (₹)	Year	EPS (₹)	DPS (₹)
10	20	11.80	5	12	7
9	19	11.00	4	6	7
8	16	8.60	3	9	7
7	15	7.80	2	-2	7
6	16	8.60	1	1	7

(ii) What the investor expect is that they should get an assured fixed amount as dividend which should gradually and consistently increase over the years, that is, a stable dividend.

Stable dividend policy [(i)(b) above] is recommended. There are several reasons why investors would prefer a stable dividend, and pay a higher price for firm's shares which observes stability in dividend payments.

Dividend policy on pattern [(i) (a)] involves uncertainty and irregularity in regard to the expected dividends. The policy of paying sporadic dividends may not find favour with them.

Likewise, dividend policy on pattern [(i) (c)] has some element of uncertainty. By calling the amount by which the dividends exceed the normal payments as extra, the firm, in effect, cautions the investors, both existing as well as prospective, that they should not consider it as a parameter increase in dividends. Obviously, such increase in dividends will not have much price-enhancing effect.

In the light of these facts, the dividend policy [(i)(b)] is the most appropriate among all the alternatives.

Q. 9. Q. 9. ABC Ltd. gives the following Balance Sheet as at 31st March, 2012 and its Projected Profit and Loss Account (Summarised) for 2012-2013 :

Liabilities	₹	Assets		₹
7% Redeemable preference share capital (₹ 100 each)	3,00,000	Goodwill		1,00,000
		Machinery at cost	10,00,000	
Equity share capital (₹ 100 each)	5,00,000	Less : Depreciation	2,50,000	7,50,000
General reserve	1,50,000	Stock in trade		3,00,000
Profit and loss account	50,000	Debtors		2,60,000
10% debentures	2,00,000	Cash at bank		1,10,000
Creditors for goods	1,40,000	Preliminary expenses		20,000
Outstanding expenses	10,000			
Provision for taxation	1,20,000			
Proposed dividend on equity shares	70,000			
	15,40,000			15,40,000

Projected Profit and Loss Account for the year ending 31st March 2013 :

Particulars	₹	Particulars	₹
Opening stock	3,00,000	Sales :	
Purchases	12,00,000	Cash	5,80,000
Wages	2,00,000	Credit	16,00,000
Manufacturing expenses	1,00,000	Stock	2,65,000
Depreciation	1,00,000	Miscellaneous income	20,000
Selling and distribution expenses	1,20,000	Profit on sale of machinery	5,000
Office and administrative expenses	79,000		
Interest on debentures	20,000		
Goodwill written off	30,000		
Provision for taxation	1,50,000		
Preference dividend	21,000		
Proposed dividend on equity shares	80,000		
Balance of profit	70,000		
	24,70,000		24,70,000

(a) Preference shares and debentures are due for redemption on 31st March, 2013. Half of the debenture holders in value will accept new 9% Redeemable Preference Shares. The Company proposes to issue equity shares with a nominal value of ₹ 3,00,000 at a premium of 10%.

(b) Fixed assets will be acquired for ₹ 1,50,000. The cost of assets to be sold in 2012-2013 was ₹ 80,000 with a depreciation provision of ₹ 45,000.

It is expected that :

(i) Sundry Debtors will be 10% more than warranted by the period of 73 days.

(ii) Creditors for purchase will continue to extend one month's credit and manufacturing expenses outstanding will be ₹ 20,000.

(iii) Tax liability upto 31.3.2012 will be settled at ₹ 1,30,000.

***You are required to* :**

(i) Draft the projected balance sheet as at 31st March , 2013.

(ii) Draft the projected cash flow statement for the year 2012-2013.

Answer 9.

Projected Balance Sheet of ABC Ltd. as at 31st March, 2013

Liabilities	₹	Assets		₹
Share capital :		**Fixed assets :**		
Issued, subscribed and paid-up :		Goodwill		70,000
8,000 Equity shares of ₹ 100 each	8,00,000	Machinery at cost	9,20,000	
fully paid		Addition during the year	1,50,000	
1,000 9% Redeemable preference	1,00,000		10,70,000	
shares of ₹ 100 each fully paid		Less : Provision for dep.	3,05,000	7,65,000

Reserves and surplus :			**Investment :**	
Securities premium		30,000	**Current assets, loans and advances**	
General reserve		1,50,000	**Current assets :**	
Profit and loss account		1,10,000	Stock in trade	2,65,000
Secured loan :		-	Sundry debtors	3,52,000
Unsecured loans :		-	Cash at bank	68,000
Current liabilities and provisions :			**Misc. expenses and losses not yet written off :**	
Sundry creditors			Preliminary expenses	20,000
For goods	1,00,000			
For expenses	20,000	1,20,000		
Provision for taxation		1,50,000		
Proposed dividend		80,000		
		15,40,000		15,40,000

Cash Flow Statement for the year ending 31.3.2013

Particulars			₹
I.	**Cash flows from Operating Activities :**		
	A.	Closing balance as per Profit and Loss A/c.	1,10,000
		Less : Opening balance as per profit and loss a/c.	(50,000)
		Add : Proposed dividend during the year	80,000
		Add : Preference dividend paid during the year	21,000
		Add : Provision for tax	1,60,000
	B.	Net profit before taxation, and extraordinary item	3,21,000
	C.	*Add* : Items to be added	
		Depreciation	1,00,000
		Interest on debentures	20,000
		Goodwill written off	30,000
	D.	*Less* : Profit on sale of machinery	(5,000)
	E.	Operating profit before working capital changes [B + C – D]	4,66,000
	F.	*Add* : Decrease in Current Assets and Increase in Current Liabilities	
		Decrease in stock	35,000
		Increase in outstanding expenses	10,000
	G.	*Less* : Increase in Current Assets and Decrease in Current Liabilities	
		Increase in debtors (Gross)	(92,000)
		Decrease in creditors for goods	(40,000)
	H.	Cash generated from operations [E + F – G]	3,79,000
	I.	*Less* : Income taxes paid	(1,30,000)
	J.	Net cash from operating activities	2,49,000

II.	**Cash flows from investing activities :**	
	Purchase of machinery	(1,50,000)
	Proceeds from sale of machinery	40,000
	Net cash used in investing activities	(1,10,000)
III.	**Cash flows from Financing Activities :**	
	Proceeds from issuance of share capital	3,30,000
	Proceeds from issue of 9% red. Pref. shares	1,00,000
	Redemption of preference shares	(3,00,000)
	Repayment of long-term borrowings	(2,00,000)
	Interest on debentures	(20,000)
	Preference dividend paid	(21,000)
	Final dividend paid	(70,000)
	Net cash used in Financing activities	(1,81,000)
IV.	**Net increase in Cash and Cash Equivalents [I + II + III]**	(42,000)
V.	**Cash and Cash Equivalents at beginning of period**	1,10,000
VI.	**Cash and Cash Equivalents at end of period [IV + V]**	68,000

Working notes :

Dr. **(i) Provision for Tax Account** *Cr.*

Particulars	₹	Particulars	₹
To Bank a/c.	1,30,000	By Balance c/d	1,20,000
To Balance c/d	1,50,000	By Profit and loss a/c (b.f.)	1,60,000
	2,80,000		2,80,000

(ii) Closing debtors = Credit sales for 73 days + 10% = (₹ 16,00,000 × 73/365) + 10%
= ₹ 3,20,000 + ₹ 32,000 = ₹ 3,52,000

(iii) Closing creditors = Credit purchases for 1 month = ₹ 12,00,000 × 1/12 = ₹ 1,00,000

(iv) Closing balance of profit and loss a/c.
= ₹ 50,000 + ₹ 60,000 [i.e., ₹ 70,000 – ₹ 10,000 (i.e. short provision for previous year)].
= ₹ 1,10,000.

Q. 10. In connection with a proposal to secure additional finance for meeting its expansion as well as the working capital requirements, the following figures have been projected to a bank by a borrower. The figures have been adjusted for borrowal, debt redemption and interest payments.

		1	2	3	4	5	6	7
Current ratio	**Borrower**	**2.0**	**2.0**	**2.5**	**2.2**	**2.0**	**2.5**	**2.0**
	Industry's average	**1.8**	**1.8**	**2.0**	**2.0**	**2.5**	**2.5**	**2.5**
Debt equity ratio	**Borrower**	**1.8**	**1.8**	**1.6**	**1.6**	**1.5**	**1.5**	**1.2**
	Industry's average	**1.5**	**1.5**	**1.8**	**1.8**	**1.8**	**1.6**	**1.8**
Return on investment	**Borrower**	**20**	**20**	**18**	**18**	**15**	**15**	**18**
	Industry's average	**18**	**18**	**20**	**20**	**18**	**18**	**18**

You are required to ascertain the trend (base year = 1) and interpret the result. Kindly indicate how the bank would react to the proposal of financing put forward by the borrower.

Answer 10.

Trend statement (base = year 1)

	Current ratio		Debt equity ratio		Return on investment	
Year	**Borrower**	**Industry**	**Borrower**	**Industry**	**Borrower**	**Industry**
1	100	100	100	100	100	100
2	100	100	100	100	100	100
3	125	111	89	120	90	111
4	110	111	89	120	90	111
5	100	139	83	120	75	100
6	125	139	83	107	75	100
7	100	139	67	120	90	100

Interpretation :

(i) **Current ratio :** While the projected industry trend is steadily upward (from 100 in base yr. 1 to 111 in years 3-4 and to 139 in years 5-7), it is likely to witness a fluctuating trend in the case of the borrower. In spite of oscillating position, however, the borrower's current ratio are not likely to decrease below 2:1. The borrower is not likely to encounter any major problems in meeting his short-term debt obligations.

(ii) **Debt – equity (D/E) ratio :** The D/E ratio of the borrower is likely to decrease at a steady pace by one-third over the projected 6-year period. In absolute terms also, D/E ratio of 1.5 or 1.2:1 is satisfactory. In contrast, the industry's D/E ratio is marked by an upward trend. The long term solvency position of the borrower is stronger vis-à-vis industry. The margin of safety to the bank seems to be adequate.

(iii) **Return on investment (ROI) :** As per the projected trend, the industry figures appear to be better. The ROI is the lowest in years 5 and 6 (15%) and is the highest in years 1 and 2 in the case of the borrower. In contrast, it is maximum (20%) for the industry in years 3-4 and 18% in all other years. The only positive feature for the borrower is that while industry trend reflects decline from year 4 onwards, it is upward for the former from year 7.

Thus, as the current ratios of the borrower are satisfactory in spite of decline, it is safe for the bank to lend for working capital requirements of the borrower. In the case of long-term (expansion) requirements, the bank can seek additional data to determine debt-service coverage ratio, (more appropriate measure), as the projected D/E ratios are satisfactory.

Q. 11. Cyber Solutions is Web Publishing firm involved in the design and hosting of websites for corporate and business houses. As the initial investment required to start web publishing is low, several new entrants have entered/ are planning to enter this business. There are also some established players who are willing to operate at low margins. Website publishing is highly competitive coupled with low market demand.

A website consists of a number of web pages. On average, any website would be made up of 50 web pages. The costs, revenues and time are calculated on the basis of production of one web page, that is 1 unit = 1 web page (selling at ₹ 1,000).

Besides, Sukanto Kar, the owner of Cyber Solutions, there are three permanent employees – a visualiser who does the conceptualizing and designing the graphics, a DTP operator to enter data

and make the design on the computer and an office boy. One contract programmer is also hired as and when it gets an order for developing a website. The total hours available in a month are (7.5 × 25 × 3) = 564 hours. The annual capacity is (564 × 12) = 6,768 hours. The total man-hours per web page to make 1 web page are 8 hours consisting of 3 hours each taken by visualiser and owner/ entrepreneur and 2 hours by the DTP operator.

The monthly man-power expenses are as follows :

Owner/ entrepreneur	**₹ 12,000**
Visualiser	**₹ 5,000**
DTP operator	**₹ 4,000**
Office boy	**₹ 1,500**

The investments and operational expenses are summarized below :

Particulars	₹	₹
Capital cost :		
Computers (2)	**80,000**	
Printer (1)	**12,000**	
Scanner (1)	**35,000**	
Internet connection per annum	**15,000**	**1,42,000**
Fixed cost per month :		
Rent	**3,000**	
Telephone	**600**	
Electricity	**1,000**	
Floppy disk, stationary and office expenses	**500**	
Books	**250**	
Magazines/ newspapers	**150**	
Conveyance	**1,000**	**6,500**

The variable costs are given below :

Cost	**Rate**	**Time taken per web page**
Additional labour	**₹ 30/hr**	**1 hour**
Telephone	**₹ 1.5/minute**	**10 minutes**
Electricity	**₹ 20 per web page**	

These costs are classified into fixed and variable as follows : **Amount in ₹**

		Variable cost per 100 web page		
Cost element	**Fixed cost (annual)**	**Direct labour**	**Direct expenses**	**Selling expenses**
Labour		3,000		
Owner/ entrepreneur	1,44,000			
Visualiser	60,000			
DTP operator	48,000			
Office boy	18,000			
	2,70,000			
Rent	36,000			
Telephone	7,200		1,500	
Electricity	12,000		2,000	
Internet connection	15,000			
Floppy disks, stationary and office expenses	6,000		1,000	200
Depreciation (10%)*	12,700			
Interest (13%)**	16,510			
Conveyance	12,000			500
Magazine/ newspaper	1,800			
Books	3,000			
Total	3,92,210	3,000	4,500	700

***₹ 1,27,000 (₹ 80,000 + ₹ 12,000 + ₹ 35,000) × 0.10**

**** ₹ 1,27,000 × 0.13 (This is the opportunity cost of interest lost on owners funds used to buy computer, scanner and printer).**

Required **:**

a. **Compute break-even sales revenue to establish viability of business**
b. **Compute number of orders to make operating profit of ₹ 15,000 per month.**
c. **Determine sales volume required to offset reduction in sale price from ₹ 1,000 to ₹ 700 to maintain operating profit of ₹ 15,000 per month.**
d. **Determine selling price at which Cyber Solutions would not suffer cash losses.**

Answer 11.

a. **Viability of business :**

Breakeven point (Amount) : Fixed cost ÷ CV ratio = ₹ 3,92,210 ÷ 0.918* = ₹ 4,27,244

*sales price, ₹ 1,000 – ₹ 82, variable cost per unit (₹ 8,200 ÷ 100) = ₹ 918 ÷ ₹ 1,000 = 91.8% = 0.918

Breakeven point (units) ₹ 4,27,244 ÷ ₹ 1,000 = 427.24 (427) pages

Number of orders for website to break-even in one year = 427 pages ÷ 50 pages for an order on website = 8.54 (9) orders.

Man-hours required = 427 × 8 = 3,416

Total capacity = 6,768 man-hours

Capacity utilization = 6,768 ÷ 3,416 = 50%

b. Number of orders to get a desired profit of ₹ 15,000 per month (₹ 1,80,000 annual)

= [Fixed expenses + Desired profit] ÷ C/V ratio

= [₹ 3,92,210 + ₹ 1,80,000] ÷ 0.918 = ₹ 6,23,322 ÷ ₹ 1,000 = 623 pages

Number of website sale to make classified profit = 623 pages ÷ 50 pages = 12.46 (13) orders per year to get the desired profit of ₹ 15,000 per month.

c. Additional sales volume required to offset a reduction in selling price from ₹ 1,000 to ₹ 700

Contribution (₹ 700 – ₹ 82) = ₹ 618 (revised)

C/V ratio = 618 ÷ ₹ 700 = 88%

Sales volume to required to offset reduced selling price

= [Desired profit + Fixed expenses] ÷ Revised C/V ratio

= ₹ 5,72,210 ÷ 0.8800 = ₹ 6,50,238 ÷ 1000 = 650 web pages to be sold

Number of orders per year = 650 pages ÷ 50 pages = 13 orders

d. Lowest selling price at which Cyber Solutions would not suffer cash losses :

Cash fixed cost = ₹ 3,92,210 – ₹ 12,700 Depreciation = ₹ 3,79,510

Desired contribution per page = ₹ 3,79,510/427 BEP = ₹ 888.78

Desired selling price per page = Desired contribution (₹ 888.78) per page + Variable cost (₹ 82) per page = ₹ 970.78

Thus, the minimum price per web page should be ₹ 970.78 to avoid any cash losses.

Q. 12. ABC Manufacturing company is an important producer of lawn furniture and decorative objectives for the patio and garden. The last year's income statement and balance sheet are as follows :

Income statement

Particulars	₹
Sales	**75,00,000**
Variable costs	**46,90,000**
Contribution	**28,10,000**
Fixed costs	**14,00,000**
Earnings before interest and tax (EBIT)	**14,10,000**
Interest	**2,00,000**
Earnings before tax (EBT)	**12,10,000**
Taxation	**4,23,500**
Net income after tax	**7,86,500**

Balance sheet

Liabilities	Amount (₹)	Assets	Amount (₹)
Equity capital	10,00,000	Fixed assets	60,00,000
Reserves and surplus	42,00,000	Inventory	6,00,000
Long-term debt (10%)	20,00,000	Receivables	7,00,000
Current liabilities	5,00,000	Cash	4,00,000
	77,00,000		77,00,000

Figures for industry comparison :

Normal asset turnover 1.2:1. Normal profit margin 20%.

For the current year, the forecasted sales are ₹ 80,00,000 and it is likely that variable costs will remain at approximately the same percentage of sales as was in the last year. (Figures could be rounded off). Fixed costs will rise by 10%.

ABC has short-listed the following two product lines to be sold through its existing distribution channels :

a. Production and sale of metal table and chair unit that will be sold for issue around swimming pools. This will require an investment of ₹ 20,00,000, which would involve installation of manufacturing and packaging machinery. Sales forecast are ₹ 15,00,000 per annum, variable costs account for 2/3rd of sales value, fixed costs are ₹ 2,00,000 and no additional working capital is needed.

b. Hardwood planter with three separate components, will be appropriate for medium sized shrubs. This will require an investment of ₹ 30,00,000 with forecasted sales per annum of ₹ 25,00,000, variable costs 64% of sales value and fixed costs of ₹ 5,00,000.

Two financial plans are available :

(i) It could borrow on a 10 years note at 9% for either or both of the projects of an amount not to exceed ₹ 60,00,000.

(ii) Cumulative preference shares with a 10% dividend upto an amount of ₹ 30,00,000.

Financing through the issue of equity shares would not be possible at the present time.

***Required* :**

(i) Without the new proposals, what would be the company's operating, fixed charges and combined leverages next year? Would the company have favourable financial leverage?

(ii) How does the acceptance of each project affect the differing leverages including asset leverages?

(iii) With each financing alternatives, do the company's future earnings per share increase or decrease, why?

Answer 12.

(i) Income statement at projected sales of ₹ 80 lakhs in current year

Particulars	₹
Sales revenue	80,00,000
Less : Variable costs (₹ 80 lakhs × 62%)	50,00,000
Contribution	30,00,000
Less : fixed costs (₹ 14 lakh + 10%)	15,40,000
Earnings before interest and taxes (EBIT)	14,60,000
Less : Interest	2,00,000
Earnings before taxes (EBT)	12,60,000
Less : Taxes (0.35)	4,41,000
Earnings after taxes	8,19,000

Determination of leverages (without the new proposals)

DOL = Contribution /EBIT (₹ 30,00,000/ ₹ 14,60,000)	2.05
DFL = EBIT/ EBT (₹ 14,60,000/ ₹ 12,60,000)	1.15
DCL = Contribution/ EBT (₹ 30,00,000/ ₹ 12,60,000) or 2.05 × 1.15	2.38

The company is said to have favourable financial leverage if it earns more on the assets purchased (with debt funds) than the interest it pays on debt. For the purpose, rate of return on capital employed is computed. It is (₹ 14,60,000/ ₹ 72,00,000) = 20%. This return is higher than 10% interest payable on long-term debt. Evidently, the firm is having positive financial leverage.

Income statement showing earnings of two projects, DOL and assets leverage (Amt. in ₹)

	Projects	
Particulars	**Metal table and chair unit (investment ₹ 20 lakhs)**	**Hardwood planter (investment ₹ 30 lakh)**
Sales revenue	15,00,000	25,00,000
Less : Variable costs	10,00,000	16,00,000
Contribution	5,00,000	9,00,000
Less : Fixed costs	2,00,000	5,00,000
EBIT	3,00,000	4,00,000
DOL (Contribution/ EBIT)	1.667	2.25
Assets leverage (Sales/ Total assets)	0.75	0.83

To determine other leverages, it will be useful to extend income statement to include the impact of financing costs.

Income statement showing other leverages (DFL and DCL) and other ratios (Amt. in ₹)

	Projects	
Particulars	**Metal table and chair unit (investment ₹ 20 lakhs)**	**Hardwood planter (investment ₹ 30 lakh)**
i. Financed through debt plan :		
EBIT	3,00,000	4,00,000
Less : Interest	1,80,000	2,70,000
Earnings before taxes (EBT)	1,20,000	1,30,000
Less : Taxes (0.35)	42,000	45,500
Earnings after taxes	78,000	84,500
DFL (EBIT/EBT)	2.5	3.07
DCL (DOL × DFL)	4.1675	6.90
Rate of return on capital employed (%)	15	13
ii. Financed through cumulative preference share (₹ 30 lakh) + ₹ 20 lakh (debt for two combined projects EBIT)		
EBIT		7,00,000
Less : Interest (₹ 20 lakh × 9%)		1,80,000
Earnings before taxes		5,20,000
Less : Taxes (0.35)		1,82,000
Earnings after taxes		3,38,000
Less : Dividends to preference share holders (₹ 30 lakh × 10%)		3,00,000
EAT		(38,000)
DFL (EBIT/EBT)		1.34
DOL (Contr./EBIT)		2.00
DCL (DOL × DFL)		2.68

It is apparent that acceptance of the Hardwood Planter project will adversely affect risk level (reflected in higher DOL, DFL and DCL). While the acceptance of Metal table project decreases operating risk (lower DOL), it increases total risk (as DCL is 4.15). The asset leverages are also very low.

Though the ROR on capital employed is higher for both the projects than the interest rate paid, the acceptance of these projects will decrease the firm's overall rate of return on capital employed (the existing ROR on capital employed is 20,28 %).

(iii) The impact of financing alternatives on company's future EPS :

Financial Plan (i) : Since the rate of return on capital employed is higher (for both the projects) than the rate of interest (9%) payable on funds borrowed, the projects will increase EPS.

Financing plan (ii) : Under this plan, funds are to be raised by the issue of ₹ 30 lakh cumulative 10% preference shares, the EPS will decrease as payment of 10% preference dividend requires 20% pre-tax return on ₹ 30 lakh; the projected pre-tax return is 17.33% (₹ 5,20,000/Rs. 30,00,000). In fact, taking two projects in a combined manner, the firm has lesser returns for equity holders. As a result, this financial plan will have depressing effect on the EPS and is not desirable.

In sum, the firm should go for both projects only when debt financing is possible for both such projects.

Q. 13. The paid-up capital of a company is ₹ 100 lakh. It has been declaring 20% dividend for the last 5 years.

It has under consideration an expansion programme involving an investment of ₹ 100 lakh and its board of directors desires to raise the dividend to 25%. The expansion programme can be financed by four alternatives – A) 100% equity; B) 18% institutional loan (debt) and equity 50:50; C) Equity and debt, 70:30; and D) 100% debt. Income tax and dividend tax rate are 35% and 10% respectively.

Assuming rate of return as X, analyse the various financing alternatives from the point of view of taxes.

Answer 13.

Effect of taxes on Financing Alternatives

(₹ In lakhs)

Particulars	**A**	**B**	**C**	**D**
Return on ₹ 100 lakh	100X	100X	100X	100X
Less : Interest (0.18)	-	9	5.4	18
Balance	100X	100X -9	100X – 5.4	100X – 18
Less : Tax (0.35)	35X	35X – 3.15	35X – 1.9	35X – 6.30
Balance	65X	65X – 5.85	65X – 3.50	65X – 11.70
Add : Distributable profit before expansion (0.20 × ₹ 100 lakh)	20	20	20	20
Total profits available for distribution (a)	20 + 65X	14.15 + 65X	16.50 + 65X	8.30 + 65X
Expected rate of dividend (%)	25	25	25	25
Expected dividend [0.25 × (₹ 100 lakh + new capital)]	50	37.50	42.50	25
Dividend tax (0.10)	5	3.75	4.25	2.50
Total of dividend and dividend tax (b)	55	41.25	46.75	27.50
Rate of return (value of X) to pay dividend and dividend tax [value of X if (a) = (b)]%	53*	41	46	29

* 20 + 65X = 55 or, X = 35/65 = 53%; other values are also determined like this.

Q. 14. The Best Ltd., which has a satisfactory preventive maintenance system in its plant, has installed a new Hot Air Generator based on electricity instead of fuel oil for drying its finished products. The Hot Air Generator requires periodicity shutdown maintenance. If the shutdown is scheduled yearly, the cost of maintenance will be as under :

Maintenance cost (₹)	15,000	20,000	25,000
Probability	0.3	0.4	0.3

The costs are expected to be almost liner i.e. if the shutdown is scheduled twice a year the maintenance cost will be double.

There is no previous experience regarding the time taken between breakdowns. Costs associated with breakdown will vary depending upon the periodicity of maintenance. The probability distribution of breakdown cost is estimated as under :

Breakdown cost (₹ p.a.)	Shutdown once a year	Shutdown twice a year
75,000	0.2	0.5
80,000	0.5	0.3
1,00,000	0.3	0.2

Simulate the total costs (Maintenance and breakdown costs)and recommend whether shutdown overhauling should be restored to once a year or twice a year?

Answer 14.

Alternative I

Assuming Random Numbers to maintenance costs once a year basis :

Cost (₹)	Probability	Random number
15,000	0.30	00 – 29
20,000	0.40	30 – 69
25,000	0.30	70 - 99

Assuming random numbers to breakdown costs when overhauling is once a year :

Cost (₹)	Probability	Random number
75,000	0.20	00 – 19
80,000	0.50	20 – 69
1,00,000	0.30	70 - 99

Calculation of average annual total cost

Year	Random numbers	Maintenance cost (₹)	Random numbers	Breakdown cost (₹)	Total cost (₹)
1	27	15,000	03	75,000	90,000
2	44	20,000	50	80,000	1,00,000
3	22	15,000	73	1,00,000	1,15,000
4	32	20,000	87	1,00,000	1,20,000
5	97	25,000	59	80,000	1,05,000
Average annual cost					1,06,000

Alternative II

Assuming random numbers to maintenance cost, on twice a year basis :

Cost (₹)	Probability	Random number
30,000	0.30	00 – 29
40,000	0.40	30 – 69
50,000	0.30	70 - 99

Assuming random numbers to breakdown costs :

Cost (₹)	Probability	Random number
75,000	0.50	00 – 49
80,000	0.30	50 – 79
1,00,000	0.20	80 - 99

Calculation of average annual total cost

Year	Random numbers	Maintenance cost (₹)	Random numbers	Breakdown cost (₹)	Total cost (₹)
1	42	40,000	54	80,000	1,20,000
2	04	30,000	65	80,000	1,10,000
3	82	50,000	49	75,000	1,25,000
4	38	40,000	03	75,000	1,15,000
5	91	50,000	56	80,000	1,30,000
Average annual cost					1,20,000

Analysis – From the above it may be seen that shutdown maintenance/ overhauling once a year will be more economical. The average annual cost will only be ₹ 1.06 lakhs as against ₹ 1.20 lakhs when shutdown is twice a year.

Q. 15. Fun Ltd. has a new project for the manufacture of remote controlled toy car. The product is a novelty in the toy market. The company had already spent an amount of ₹ 7,20,000 in developing the product and is eager to place it in the market as quickly as possible. The company estimates a five-year market life for the product. The maximum number it can produce in any given year is limited to 36 lakh units. The expected market scenario will support a sale equivalent of 20%, 50%, 100% and 30% of the capacity in 1st year, 2nd year, 3rd year, 4th year and 5th year respectively.

Investment in the project is expected to be completed in one year and will have the following major components :

(₹ Lakhs)

Land, buildings and civil works	**12.50**
Machinery and equipments	**87.50**
Interest during construction	**8.00**

Cost structure of the toy is as given below :

Materials	**₹ 2.00**
Conversion cost excluding depreciation	**₹ 1.00**

Materials are required to be held in stock for 15 days at an average while finished goods may be held for up to 60 days. Production cycle is 12 days. Credit expectancy of the market is 30 days both on sale and purchases. It is the usual practice of the company to keep a cash-in-hand reserve for 15 days expenses not provided for specifically elsewhere in the working capital estimates.

Working capital requirements should be worked out on the above basis for the first year. Same level in terms of money will be maintained in the subsequent years, though composition may change.

The following assumptions are made :

(i) The project will be financed by a combination of equity and term loans in a ratio as close to 30:70 as practicable.

(ii) Loans will carry an interest of 20% p.a.

(iii) Loan disbursement will be uniform throughout the period of construction, simple interest at the same rate will be applied.

(iv) Selling price per unit will be ₹ 6.

(v) One year moratorium on the principal will be available.

(vi) Product promotion expenses for the first three years will be ₹ 2.00 lakhs, ₹ 1.00 lakh and ₹ 0.50 lakh respectively.

(vii) Production is prorated every month equally.

(viii) The factory operates one shift for 360 days in a year.

(ix) Ignore interest on overdraft.

(x) Working capital requirement will not increase after the initial first year.

***Calculate* :**

a. Initial working capital required.

b. Total financial investment in the project and its financing.

c. Profit before depreciation and interest charges for 5 years.

d. Debt service coverage ratio.

Answer 15.

(a) Computation of Initial working capital required :

1st year production and sales = 36,00,000 units × 20/100 = 7,20,000 units.

Particulars	Norm	Computation	Amount (₹)
Materials	15 days	(7,20,000 × 2 × 15/360)	60,000
Work-in-progress	12 days	(7,20,000 × 1.5 × 12/360)	36,000
Finished goods	60 days	(7,20,000 × 3 × 60/360)	3,60,000
Debtors	30 days	(7,20,000 × 3 × 30/360)	1,80,000
Cash	15 days	(7,20,000 × 1 × 15/360)	30,000
			6,66,000

Assumption – 360 days in a year and 30 days in a month.

(b) Statement showing investment in the project and its financing :

Particulars	Amount (₹)
Cost of project	
Land, building and civil works	12,50,000
Machinery and equipment	87,50,000
Product development	7,20,000
Interest during construction	8,00,000
Initial working capital	6,66,000
	1,21,86,000
Means of finance	
Equity capital	33,86,000
Loans	80,00,000
Overdraft for interest	8,00,000
	1,21,86,000

(c) Statement showing profit before depreciation and interest charges for 5 years (₹ Lakhs)

Year		1	2	3	4	5
Sales (units in lakhs)		**7.20**	**18.00**	**36.00**	**36.00**	**10.80**
Sales revenue	(a)	43.20	108.00	216.00	216.00	64.80
Expenses :						
Materials		14.40	36.00	72.00	72.00	21.60
Conversion expenses		7.20	18.00	36.00	36.00	10.80
Promotion		2.00	1.00	0.50	-	-
	(b)	23.60	55.00	108.50	108.00	32.40
Profit before depreciation and interest	(a)–(b)	19.60	53.00	107.50	108.00	32.40

(d) Statement showing debt service coverage ratio (DSCR) (₹ Lakhs)

Year		1	2	3	4	5
Profit before interest and depreciation	(a)	19.60	53.00	107.50	108.00	32.40
Finance charges :						
Interest		16.00	16.00	12.00	8.00	4.00
Principal repayment		-	20.00	20.00	20.00	20.00
	(b)	16.00	36.00	32.00	28.00	24.00
DSCR	(a)/(b)	1.225	1.472	3.359	3.857	1.350

Q. 16. **Spot rate (1 US$)** **₹ 48.0123**

180 days forward rate for 1 US $ **₹ 48.8190**

Annualized interest rate for 6 months – Rupee **12%**

Annualized interest rate for 6 months – US $ **8%**

Is there any arbitrage possibility? If yes how an arbitrager can take advantage of the situation, if he is willing to borrow ₹ 40,00,000 or US$ 83,312.

Answer 16.

Spot rate	= ₹ 40,00,000/ $ 83,312	= ₹ 48.0123
Forward premium	$= \frac{48.8190-48.0123}{48.0123} \times \frac{12}{6} \times 100$	= 2%
Annualized interest rate for 6 months – Rupee		= 12%
Annualized interest rate for 6 months – US $		= 8%
Interest rate differential	= 12% – 8%	= 4%

Since the interest rate differential is greater than forward premium, there is a possibility of arbitrage inflow into India.

The advantage by using arbitrage possibility can be analyzed as follows :

Option I – Borrow $ 83,312 for 6 months

Amount repayable after 6 months along with interest

= $ 83,312 + ($ 83,312 × 8/100 × 6/12) = $ 86,644.48

Option 2 – Convert $ 83,312 into Rupees and get the principal amount of ₹ 40,00,000

Interest on investments for 6 months	= ₹ 40,00,000 × 6/100	=	₹ 2,40,000
Total amount at the end of 6 months	= ₹ 40,00,000 + ₹ 2,40,000	=	₹ 42,40,000
Converting the total amount at forward rate	= ₹ 42,40,000 / ₹ 48.8190	=	$ 86,851.43
Net gain by selecting Option II	= ($ 86,851.43 – $ 86,644.48) × ₹ 48.8190	=	₹ 10,103

Q. 17. ABC Ltd. is operating in Japan has today effected sales to an Indian company, the payment being due 3 months from the date of invoice. The invoice amount is 108 lakhs yen. At today's spot rate, it is equivalent to ₹ 30 lakhs. It is anticipated that the exchange rate will decline by 10% over the 3 months period and in order to protect the yen payments the importer proposes to take appropriate action in the foreign exchange market. The 3 month forward rate is presently quoted as 3.3 yen per rupee. You are required to calculate the expected loss and to show how it can be hedged by a forward contract.

Answer 17.

Spot rate of Re 1 against Yen	=	108 lakhs
Yen/₹ 30 lakhs	=	3.6 Yen
3 months forward rate of Re. 1 against Yen	=	3.3 Yen
Anticipated decline in exchange rate	=	10%
Expected spot rate after 3 months	=	3.6 yen – 10% of 3.6 = 3.6 – 0.36 = 3.24 Yen per Rupee

Particulars	**₹ (lakhs)**
Present cost of 108 lakhs Yen	30.00
Cost after 3 months (108 lakhs Yen/3.24 Yen)	33.33
Expected exchange loss	3.33

If the expected exchange rate risk is hedged by a forward contract

Particulars	₹ (lakhs)
Present cost	30.00
Cost after 3 months if forward contract is taken (108 lakhs Yen/3.3 Yen)	32.73
Expected exchange loss	2.73

Suggestion - If the exchange rate risk is not covered with forward contract, the expected exchange loss is ₹ 3.33 lakhs. This could be reduced to ₹ 2.73 lakhs if it is covered with Forward contract. Hence, taking forward contract is suggested.

Q. 18. A Ltd., an Indian Company has an export exposure of 10 million (100 lakhs) yen, payable September end. Yen is not directly quoted against Rupee. The current spot rates are INR/USD = ₹ 41.79 and JPY/USD = 129.75. It is estimated that yen will depreciate to 144 level and Rupees to depreciate against $ to ₹ 43. Forward rates for September 2011 are INR/USD = ₹ 42.89 and JPY/USD = 137.35.

You are required to :

(i) Calculate the expected loss if hedging is not done. How the position will change if the firm taken forward cover?

(ii) If the spot rate on 30th September, 2011 was eventually INR/USD = ₹ 42.78 and JPY/USD =137.85, is the decision to take forward cover justified?

Answer 18.

In the given situation, the direct quote of INR/USD and JPY/USD are given. However, the Indian exporter is interested in the direct quote of INR/JPY which is, in fact, the cross rate of the two given quotes. So, in order to find out the benefit of hedge etc., one must calculate the different cross rates as follows :

Current cross rate : The JPY/USD is given as 129.75. Now, the USD/JPY is the inverse of JPY/USD i.e., 1/(JPY/USD).

So,

USD/JPY = 1/(JPY/USD)

= 0.007707

Now, $\frac{INR}{JPY} = \frac{INR}{USD} \times \frac{USD}{JPY} = \frac{41.79}{1} \times \frac{0.007707}{1} = 0.32207$

Current forward rate : The JPY/USD is given as 137.35. Now, the USD/JPY is the inverse of JPY/USD i.e., 1/(JPY/USD).

So,

USD/JPY = 1/(JPY/USD) = 0.007281

Now, $\frac{INR}{JPY} = \frac{INR}{USD} \times \frac{USD}{JPY} = \frac{42.89}{1} \times \frac{0.007281}{1} = 0.31224$

Expected cross spot rate : The JPY/USD is given as 144.00. Now, the USD/JPY is the inverse of JPY/USD i.e., 1/(JPY/USD).

So,

USD/JPY = 1/(JPY/USD) = 0.006944

Now, $\frac{INR}{JPY} = \frac{INR}{USD} \times \frac{USD}{JPY} = \frac{INR}{JPY} = \frac{43.00}{1} \times \frac{0.006944}{1} = 0.29859$

Calculation of exchange loss :

(i) If hedging is not done :	₹
Receipt at current rate (1,00,00,000 × 0.32207)	32,20,700
Actual receipt September end (1,00,00,000 × 0.29859)	29,85,900
Therefore, loss is	2,34,800

If hedging is done :

Receipt at current rate (1,00,00,000 × 0.32207)	32,20,700
Actual receipt September end (1,00,00,000 × 0.31224)	31,22,400
Therefore, loss is	98,300

So, the loss can be reduced by an amount of ₹ 1,36,500 (i.e., 2,34,800 – 98,300), if the hedging is done by the exporter.

(i) If the eventual spot rates September end are ₹ 42.78 and 137.85, then the loss may be ascertained as follows : The JPY/USD is given as 137.85.

Now, the USD/JPY is the is the inverse of JPY/USD i.e., 1/(JPY/USD).

So,

USD/JPY = 1/(JPY/USD) = 0.007254

Now, $\frac{INR}{JPY} = \frac{INR}{USD} \times \frac{USD}{JPY} = \frac{42.78}{1} \times \frac{0.007254}{1} = 0.31032$

Now, the loss may be ascertained as follows :

Current receipt (1,00,00,000 × 0.32207)	₹ 32,20,700
Actual receipt September end (1,00,00,000 × 0.31032)	₹ 31,03,200
Therefore, loss is	₹ 1,17,500

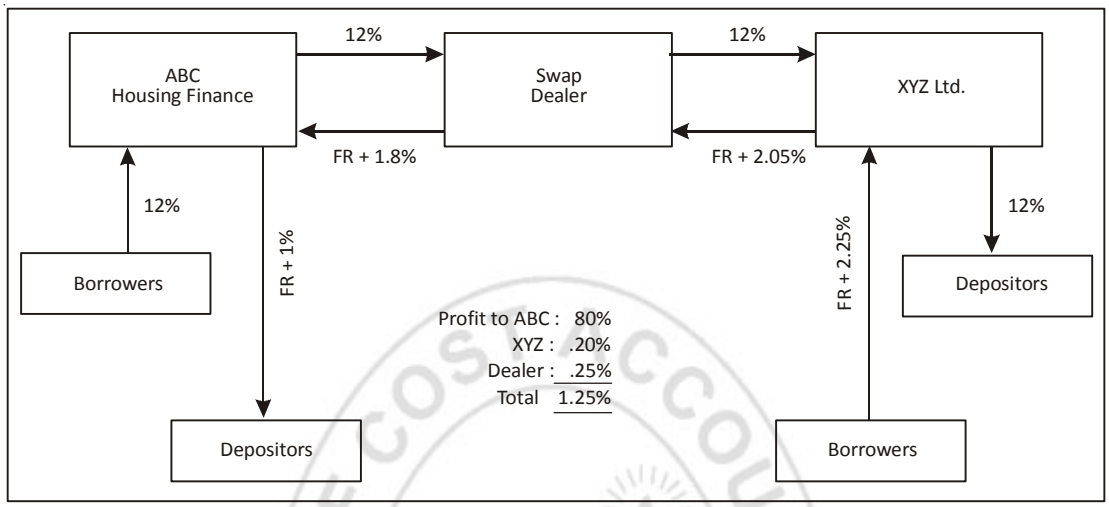
So, the hedging is still justified.

Q. 19. HDFC Ltd. lends money to individuals @ 12% p.a. and accepts deposits from investors at FR + 1% (where FR is a floating rate). As the interest payment to investors is floating, it wants to hedge its risk, and has approached a swap dealer.

Another company ABC Ltd., has also approached the swap dealer. ABC Ltd. has to pay 12% to the depositors but charges FR + 2.25% from its borrowers. You are required to devise a swap so that HDFC Ltd., ABC Ltd. and the dealer, all the three participants are benefited.

Answer 19.

HDFC Ltd. wants to hedge against the floating rate liability and ABC Ltd. wants to hedge against 12% payable to the depositors. So, HDFC Ltd. would be ready to swap its 12% income against the interest liability plus some profit, say 80%. Similarly, ABC Ltd. would be ready to swap its floating income of FR + 2.25% against the receipt of 12% from the dealer. It also wants to gain, say 20% out of swap. The swap arrangement can be structured as shown below :



Q. 20. A leather bag is priced at $ 105.00 at New York. The same bag is priced at ₹ 4,250 in Delhi. Determine exchange rate in Delhi.

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

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

Answer 20.

Exchange rate in Delhi (Purchasing Power Parity Theory)

Exchange rate in Delhi per $ = Bag price in ₹ at Delhi/ Bag price in $ at New York

= ₹ 4,250 ÷ USD 105 = ₹ 40.4762

Price in a year's time

Delhi = Prevailing price × (1 + Increase in rate) = ₹ 4,250 × (1 + 7%) = ₹ 4,250 × 1.07 = ₹ 4,547.50

New York = Prevailing price × (1 + Increase in rate) = USD 105 × (1 + 4%) = USD 105 × 1.04 = USD 109.20

Exchange rate in New York (After one year)

Exchange rate in New York per ₹ 100 = Bag price in $ at New York / Bag price in ₹ at Delhi × ₹ 100

= (USD 109.20 ÷ ₹ 4,547.50) × ₹ 100 = USD 2.4013

Depreciation (in %) of ₹ over the year

Depreciation = [(1 + Indian Inflation Rate)/(1 + New York Inflation Rate)] – 1

= [(1 + 7%)/(1 + 4%)] – 1 = 1.07/1.04 – 1 = 2.88%

Alternatively = (Future spot rate Re./$ – Spot rate of ₹ /$) ÷ Spot rate × 100

Future Spot = Bag price in Delhi/ Bag price in New York in one year = ₹ 4,547.50/USD 109.20

= ₹ 41.6438

Depreciation = (Future spot ₹ 41.6438 – Spot rate ₹ 40.4762) ÷ Spot rate ₹ 40.4762 × 100

= ₹ 1.1676 ÷ ₹ 40.4762 × 100 = 2.88%

Q. 21. An Indian Company has availed the services of two London based Interior Decorator and are required to pay GBP 50,000 in 3 months. From the following information, advice the course of action to minimize rupee outflow –

Foreign exchange rates (₹ / GBP)		
	Bid	**Ask**
Spot	**₹ 81.60**	**₹ 81.90**
3-month forward	**₹ 82.70**	**₹ 83.00**

Money market rates (p.a.)		
	Deposit	**Borrowings**
GBP	**6%**	**9%**
Rupees	**8%**	**12%**

Answer 21.

Money market hedge vs. Hedging under forward contract

Facts : The Indian Company will buy GBP 50,000 in 3 months

Evaluation : Money market hedge is possible only if –

Net amount repayable for Rupee borrowings for every GBP Invested [Based on Spot Ask Rate] $\langle$ Rupee payable per GBP under forward [forward ask rate]

Outflow per GBP in 3 month's time = Spot Ask Rate ×

$$= ₹\ 81.90 \times \frac{(1 + 12\%\ \text{for 3 months})}{(1 + 6\%\ \text{p.a. for 3 months})}$$

$$= ₹\ 81.90 \times (1 + 0.03) \div (1 + 0.015) = ₹\ \mathbf{83.11}$$

Liability per GBP invested (Rupee equivalent borrowed) in 3 month's time ₹ **83.11** is greater than forward ask rate of ₹ **83.00.**

Therefore, there is no possibility for money market hedge.

Effective cost under money market hedge

Rate of Interest on borrowing (after adjusting for interest on deposits) :

$$= \left[\frac{(1 + \text{Rupee borrowing rate for 3 months})}{(1 + \text{GBP deposit rate for 3 months})} - 1\right] \times 100 \times \frac{12\ \text{months}}{\text{No. of months}}$$

$$= \left[\frac{(1 + 12\% \times 3/12\ \text{months})}{(1 + 6\% \times 3/12\ \text{months})} - 1\right] \times 100 \times \frac{12\ \text{months}}{3\ \text{months}}$$

= [(1.03 / 1.015) – 1] × 100 × 4 = **5.91%**

Inference : Net rupee outflow under forward contract will be lesser than outflow under money market hedge. Therefore, forward contract should be preferred.

Forward market hedge vs. Spot payment by borrowing in rupee

Logic : Spot payment by borrowing in rupee is beneficial only if –

Appreciation rate for forward rate (i.e., premium % on forward quote) > Rate of interest for borrowing (borrowing cost)

Evaluation

Particulars	%
Premium on forward quote (ask rate) [Annualised] [(Forward rate – Spot rate)/ Spot rate] × 100 × 12/No. of months forward [(₹ 83.00 – ₹ 81.90)/ ₹ 81.90] × 100 × 12/3 months	**5.37%**
Rate of interest for rupee borrowings [annualized given]	**12%**

Inference : GBP appreciation rate is lower than the interest on rupee borrowings. Therefore, servicing cost of borrowing is more than cost of waiting. It is better to wait, utilize the credit period and make the payment GBP at Forward ask rate of ₹ 83.00. Forward contract hedge should be preferred.

Summary - Cost in % under different alternatives

Alternatives	Forward rate	Money market hedge	Spot settlement
Nature of cost	Annualized premium	Cost of rupee borrowing, adjusted for inflows from GBP deposits	Cost of borrowing in rupees
Cost in % (of spot settlement)	5.37%	5.91%	12%

Conclusion : Cost of settlement under Forward rate is the least. Hence, the Indian Company should prefer the Forward Contract route.

Cash flow approach :

Present value of cash flow under Money market hedge, Spot settlement and Forward market hedge can be compared.

Forward rate

Particulars	₹
Amount to be settled (₹) = GBP 50,000 × 3 months forward rate ₹ 83.00	41,50,000
Present value (based on cost of debt) (see note) = Amount to be settled ÷ (1 + 3 months interest rate for rupee borrowings) ₹ 41,50,000 ÷ (1 + 12% × 3 months/12) ₹ 41,50,000 ÷ (1 + 0.03) = ₹ 41,50,000 ÷ 1.03	**40,29,126**

Note : Generally, the cash flows are to be discounted at the cost of capital. In the absence of cost of capital, cash flow is discounted using borrowing rate, as that is the minimum return required to meet the borrowing cost.

Money market hedge

Facts : The Indian company will buy GBP 1,00,000 in 3 months

Inference : GBP 50,000 is a liability ⇒ Under money market hedge, asset in GBP should be created ⇒ The company should invest in GBP for 3 months, which along with interest would yield GBP 50,000 in 3 months ⇒ It should borrow in ₹ for investing in GBP.

Action	Date	Activity
Borrow	01.04.2011	Borrow in rupee at 12% an amount equivalent to GBP, which if invested at 6% p.a., will yield GBP 50,000 in 3 months.Therefore, GBP required to be invested GBP 50,000 ÷ (1 + GBP deposit interest rate for 3 months)= GBP 50,000 ÷ (1 + 6% p.a. × 3 months/ 12 months)= GBP 50,000 ÷ (1 + 1.5%) = GBP 50,000 ÷ 1.015 = **GBP 49,261.0837**. Amount to be borrowed = GBP to be invested × Spot rate (Ask rate) = GBP 49,261.0837 × ₹ 81.90 / GBP = ₹ **40,34,483**
Convert	01.04.2011	Convert ₹ 40,34,483 into GBP at Spot rate (Ask rate since GBP is bought) ₹ 40,34,483 ÷ ₹ 81.90/ GBP = **GBP 49,261.0837**
Invest	01.04.2011	Invested GBP 49,261.0837 in GBP deposit for 3 months at 6%
Realize	01.07.2011	Realize the maturity value of GBP deposit. Amount received will be GBP 50,000
Settle	01.07.2011	Settle the GBP 50,000 liability to the Interior decorators, using the maturity proceeds of the GBP deposits.
Repay	01.07.2011	Repay the rupee loan. Amount payable = Amount borrowed ₹ 40,34,483 × (1 + 12% p.a. for 3 months) = ₹ 40,34,483 × 1.03 = ₹ **41,55,517**.

Settle Now

If the company settles now, rupee outflow will be GBP 50,000 × 81.90 = ₹ **40,95,000.**

Analysis and conclusion

Alternatives	Forward rate	Money market hedge	Spot settlement
Present value of outflow in rupees	₹ 40,29,126 (Present value)	₹ 40,34,483 (Rupee borrowing in the beginning)	₹ 40,95,000

Conclusion : Cash outflow under forward rate is the lowest. Therefore, the same should be preferred.

Q. 22. The shares of ITC Ltd., are currently priced at ₹ 415 and call option exercisable in three month's time has an exercise rate of ₹ 400. Risk free interest rate is 5% p.a. and standard deviation (volatility) of share price is 22%. Based on the assumption that ITC Ltd., is not going to declare any dividend over the next three months, is the option worth buying for ₹ 25?

(i) Calculate value of aforesaid call option based on Black Scholes valuation model if the current price is considered as ₹ 380.

(ii) What would be the worth of put option if current price is considered ₹ 380.

(iii) If ITC Ltd., share price at present is taken as ₹ 408 and a dividend of ₹ 10 is expected to be paid in the two months time, then calculate value of the call option.

Answer 22.

Computation of value of option if current price is ₹ 415

Basic data

Factor	Notation	Value
Current stock price	SP_0	₹ 415
Exercise price	EP	₹ 400
Time	T	0.25
Risk-free rate of return	r	5% or 0.05
Standard deviation of return	σ	0.22
Variance	σ^2	0.0484

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

$= [Ln(415/400) + (0.05 + 0.50 \times 0.0484) \times 0.25]/ [0.22 \times \sqrt{0.25}\ ]$

$= [Ln\ 1.0375 + (0.05 + 0.0242) \times 0.25]/ [0.22 \times 0.5]$

$= [Ln\ 1.0375 + 0.01855] / [0.11]$

$= (0.03922 + 0.01855) / 0.11 = 0.05777/0.11 =$ **0.5252**

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

$= 0.5252 - 0.22 \times \sqrt{0.25} = 0.5252 - 0.11 =$ **0.4152**

Computation of probability factors

$N(D_1) = N(0.5252) = 0.50 + 0.2019 =$ **0.7019**

$N(D_2) = N(0.4152) = 0.50 + 0.1628 =$ **0.6628**

Computation of value of call

Value of call $= SP_0 \times N(D_1) - [EP \times e^{-rt} \times N(D_2)]$

$= [₹\ 415 \times 0.7019] - [₹\ 400 \times e^{-0.05 \times 0.25} \times 0.6628]$

$= ₹\ 291.2885 - ₹\ 400 \div 1.01308 \times 0.6628$

$= ₹\ 291.2885 - ₹\ 261.697 =$ **₹ 29.5915**

Inference – Since the price of the call is ₹ 25 which is less than the value of call under Black and Scholes Model, it is under priced. Hence, Buy.

(i) Computation of value of call if the current market price is ₹ 380

Factor	Notation	Value
Current stock price	SP_0	₹ 380
Exercise price	EP	Rs. 400
Time	T	0.25
Risk-free rate of return	r	5% or 0.05
Standard deviation of return	σ	0.22
Variance	σ^2	0.0484

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

$= [Ln(380/400) + (0.05 + 0.50 \times 0.0484) \times 0.25]/ [0.22 \times \sqrt{0.25}\ ]$

$= [Ln\ 0.95 + (0.05 + 0.0242) \times 0.25]/ [0.22 \times 0.5]$

$= [Ln\ 0.95 + 0.01855] / [0.11]$

$= (-0.05129 + 0.01855) / 0.11 = -0.03274/0.11 = -0.2976$

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

$= -0.2976 - 0.22 \times \sqrt{0.25} = -0.2976 - 0.11 =$ **– 0.4076**

Computation of probability factors

$N(D_1)$ = N(-0.2976) = 0.50 - 0.1141 = **0.3859**

$N(D_2)$ = N(-0.4076) = 0.50 - 0.1591 = **0.3409**

Computation of value of call

Value of call = $SP_0 \times N(D_1) - [EP \times e^{-rt} \times N(D_2)]$

= [₹ 380 × 0.3859] – [₹ 400 × $e^{-0.05\times0.25}$ × 0.3409]

= ₹ 146.642 – ₹ 400 ÷ 1.01308 × 0.3409

= ₹ 146.642 – ₹ 134.60 = **₹ 12.042**

(ii) Value of put if the current market price is ₹ 380

Value of call option = ₹ 12.042

Current market value = ₹ 380

Present value of exercise price = 400 × $e^{-0.05\times0.25}$

= 400 ÷ $e^{0.05\times0.25}$

= 400 ÷ 1.01308

= **₹ 394.84**

Using the Put Call parity theory,

Value of put = Value of call + Present value of exercise price – Spot price

V_P = 12.042 + 394.84 – 380.00 = **₹ 26.88**

(iii) Value of call option if share price is ₹ 408 and dividend of ₹ 10 is expected in 2 months

Computation of adjusted stock price

Since dividend is expected to be paid in two months time, the share price has to be adjusted for dividend and thereafter the Black Scholes model is applied to value the option:

Present value of dividend = Dividend × e^{-rt}

= ₹ 10 × $e^{-0.05\times0.1666}$

= ₹ 10 ÷ $e^{0.008333}$

= ₹ 10 ÷ 1.00803

= **₹ 9.92**

Adjusted spot price = Spot price – Present value of dividend

= 408.00 – 9.92

= **₹ 398.08**

Basic data

Factor	Notation	Value
Current stock price	SP_0	₹ 398.08
Exercise price	EP	₹ 400
Time	T	0.25
Risk-free rate of return	r	5% or 0.05
Standard deviation of return	σ	0.22
Variance	σ^2	0.0484

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

= [Ln (398.08/400) + (0.05 + 0.50 × 0.0484) × 0.25]/ [0.22 × $\sqrt{0.25}$]

= [Ln 0.9952 + (0.05 + 0.0242) × 0.25]/ [0.22 × 0.5]

= [Ln 0.9952 + 0.01855] / [0.11]

= (– 0.01005 + 0.01855) / 0.11 = 0.0085/0.11 = **0.0773**

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

= 0.0773 – 0.22 × $\sqrt{0.25}$ = 0.0773 – 0.11 = **– 0.0327**

Computation of probability factors

$N(D_1)$ = N(0.0773) = 0.50 + 0.0319 = **0.5319**

$N(D_2)$ = N(-0.4076) = 0.50 - 0.0120 = **0.4880**

Computation of value of call

Value of call = $SP_0 \times N(D_1) - [EP \times e^{-rt} \times N(D_2)$

= [₹ 398.08 x 0.5319] – [₹ 400 × $e^{-0.05\times0.25}$ × 0.488]

= ₹ 211.7388 – ₹ 400 ÷ 1.01308 × 0.488

= ₹ 211.7388 – ₹ 192.6797 = ₹ **19.06**

Q. 23. Fill up the blanks in the following matrix –

Case	*Portfolio value*	*Existing beta*	*Outlook*	*Activity*	*Desired beta*	*No. of futures contracts*
A	**?**	**1.20**	**Bullish**	**?**	**1.8**	**75**
B	**₹ 3,60,00,000**	**?**	**?**	**Buy Index-futures**	**2.3**	**45**
C	**₹ 1,00,00,000**	**1.60**	**?**	**?**	**1.2**	**?**
D	**₹ 6,40,00,000**	**1.10**	**Bullish**	**?**	**?**	**48**
E	**₹ 2,50,00,000**	**1.40**	**Bearish**	**?**	**1**	**?**
F	**₹ 4,50,00,000**	**?**	**Bearish**	**Sell Index futures**	**1.25**	**45**

S&P Index is quoted at 4000 and the lot size is 100.

Answer 23.

Case	Portfolio value	Existing beta	Outlook	Activity	Desired beta	No. of futures contracts
A	₹ 5,00,00,000	1.20	Bullish	Buy Index-futures	1.8	75
B	₹ 3,60,00,000	1.80	Bullish	Buy Index-futures	2.3	45
C	₹ 1,00,00,000	1.60	Bearish	Sell Index futures	1.2	10
D	₹ 6,40,00,000	1.10	Bullish	Buy Index-futures	1.4	48
E	₹ 2,50,00,000	1.40	Bearish	Sell Index futures	1	25
F	₹ 4,50,00,000	1.65	Bearish	Sell Index futures	1.25	45

Value per futures contract = Index price per unit × Lot size per futures contract
= ₹ 4000 × 100 = ₹ **4 lakhs**

Case A :

Inference : Outlook is Bullish and the desired beta is more than the existing beta. Therefore, Index futures contract should be bought.

Number of futures contract = Portfolio value $\times \frac{\text{Desired value of beta} - \text{Beta of the portfolio}}{\text{Value of a futures contract}}$

$\Rightarrow N_F = V_p \times \frac{\beta_N - \beta_E}{V_F}$

$\Rightarrow$ 75 = V_P × (1.80 – 1.20)/ ₹ 4 lakhs

$\Rightarrow$ 0.60 V_P = 75 × ₹ 4 lakhs

$\Rightarrow$ V_P = ₹ 3 crores ÷ 0.60 = ₹ **500 lakhs**

Case B :

Inference : Activity is to buy Index futures. Therefore, outlook is Bullish. Therefore, existing beta should be lower.

Number of futures contract = Portfolio value $\times \frac{\text{Desired value of beta} - \text{Beta of the portfolio}}{\text{Value of a futures contract}}$

$\Rightarrow N_F = V_p \times \frac{\beta_N - \beta_E}{V_F}$

$\Rightarrow$ 45 = ₹ 3.60 cr. × (2.30 – β_E)/ ₹ 4 lakhs

$\Rightarrow$ 45 × ₹ 4 lakhs = ₹ 3.60 cr. × (2.30 – β_E)

$\Rightarrow$ 2.30 – β_E = ₹ 1.80 cr. ÷ ₹ 3.60 cr.

$\Rightarrow$ 2.30 – β_E = 0.50

$\Rightarrow$ β_E = 2.30 – 0.50 = 1.80

Case C :

Inference : Desired beta is lower than existing beta. Therefore, outlook is bearish and apt activity is to sell index futures.

Number of futures contract = Portfolio value $\times \frac{\text{Beta of the portfolio} - \text{Desired value of beta}}{\text{Value of a futures contract}}$

$\Rightarrow N_F = V_p \times \frac{\beta_E - \beta_N}{V_F}$

$\Rightarrow N_F$ = ₹ 1.00 cr. × (1.60 – 1.20)/ ₹ 4 lakhs

$\Rightarrow N_F$ = ₹ 1.00 cr. × 0.40/₹ 4 lakhs

$\Rightarrow N_F$ = ₹ 40 lakhs/ ₹ 4 lakhs = **10 contracts**

Case D :

Inference = Desired beta is higher than existing beta. Therefore, outlook is bullish and apt activity is to buy index futures.

$$\text{Number of futures contract} = \text{Portfolio value} \times \frac{\text{Desired value of beta} - \text{Beta of the portfolio}}{\text{Value of a futures contract}}$$

$\Rightarrow N_F = V_p \times \frac{\beta_N - \beta_E}{V_F}$

$\Rightarrow$ 48 = ₹ 6.40 cr. × (β_N – 1.10)/ ₹ 4 lakhs

$\Rightarrow$ 48 × ₹ 4 lakhs = ₹ 6.40 cr. (β_N – 1.10)

$\Rightarrow$ ₹ 1.92 cr. = ₹ 6.40 cr. (β_N – 1.10)

$\Rightarrow 0.30 = \beta_N - 1.10$

$\Rightarrow \beta_N = 1.10 + 030 =$ **1.40**

Case E :

Inference : Desired beta is lower than existing beta and outlook is bearish. Therefore, apt activity is to sell index futures.

$$\textbf{Number of futures contract} = \text{Portfolio value} \times \frac{\text{Beta of the portfolio} - \text{Desired value of beta}}{\text{Value of a futures contract}}$$

$\Rightarrow N_F = V_p \times \frac{\beta_E - \beta_N}{V_F}$

$\Rightarrow$ = ₹ 2.50 cr. × (1.40 – 1.00)/ ₹ 4 lakhs

$\Rightarrow$ = ₹ 2.50 cr. × 0.40/₹ 4 lakhs

$\Rightarrow$ = ₹ 1cr./ ₹ 4 lakhs= **25 contracts**

Case F :

Inference : Outlook is bearish and the activity is to sell Index Futures. Therefore, existing beta should be higher than desired beta.

$$\textbf{Number of futures contract} = \text{Portfolio value} \times \frac{\text{Beta of the portfolio} - \text{Desired value of beta}}{\text{Value of a futures contract}}$$

$\Rightarrow N_F = V_p \times \frac{\beta_E - \beta_N}{V_F}$

$\Rightarrow$ 45 = ₹ 4.50 cr. × (β_E – 1.25)/ ₹ 4 lakhs

$\Rightarrow$ 45 = ₹ 112.50 × (β_E – 1.25)

$\Rightarrow$ (β_E – 1.25) = 45/ 112.50

$\Rightarrow$ (β_E – 1.25) = 0.40

$\Rightarrow$ (β_E = 0.40 + 1.25 = **1.65**

Q. 24. Suppose a dealer quotes "All-in-cost" for a generic swap at 8% against six month LIBOR flat. If the notional principal amount of swap is ₹ 5,00,000.

(i) Calculate semi-annual fixed payment.

(ii) Find the first floating rate payment for (i) above if the six month period from the effective date of swap to the settlement date comprises 181 days and that the corresponding LIBOR was 6% on the effective date of swap.

(iii) In (ii) above, if settlement is on 'net' basis, how much the fixed rate payer would pay to the floating rate payer?

(iv) Generic swap is based on 30/360 days basis.

Answer 24.

Computation of factors

Factor	Notation	Value
Notional principal	P	5,00,000
Time	N	180 days
All in cost rate	R	0.08

(i) Computation of semi annual fixed rate payment

Semi annual fixed rate payment = P × (N ÷ 360) × R
= 5,00,000 × (180 ÷ 360) × 0.08
= 5,00,000 × 0.5 × 0.08 = ₹ 20,000

(ii) Computation of floating rate payment

Floating rate payment = P (N_t ÷ 360) × LIBOR
Where N_t = Period from the effective date of swap to the date of settlement
= 5,00,000 × (181 ÷ 360) × 0.06
= 5,00,000 × (0.5027) × 0.06
= ₹ 15,083

(iii) Computation of net amount

Net amount to be paid by the person requiring fixed rate payment = Fixed rate payment less Floating rate payment = ₹ 20,000 – ₹ 15,083 = ₹ 4,917.

Q. 25. A USA based company is planning to set up a software development unit in India. Software development at the Indian unit will be bough back by the US parent at a transfer price of US $ 10 millions. The unit will remain in existence in India for one year; the software is expected to get developed within this time frame.

The US based company will be subject to corporate tax of 35% and a withholding tax of 10% in India and will not be eligible for tax credit in the US.

The software developed will be sold in the US market for US $ 12.0 millions. Other estimates are as follows :

Rent for fully furnished unit with necessary hardware in India	**₹ 15,00,000**
Man power cost (80 software professional will be working for 10 hours each day)	**₹ 400 per man hour**
Administrative and other costs	**₹ 12,00,000**

Advise the US company on financial viability of the project. The rupee-dollar rate is ₹ 48/$.

Answer 25.

Cost of operating the Indian unit for 1 year

Particulars	Value
Rental cost [assumed to be annual]	₹ 15.00 lakhs
Man power cost [80 professionals × 365 days ×10 hours per day × ₹ 400 per man hour]	₹ 1,168.00 lakhs
Administrative and other costs [assumed to be annual]	₹ 12.00 lakhs
Total amount of cost of operation	₹ 1,195.00 lakhs
Exchange rate per USD	₹ 48.00
Total annual cost of operation in USD [₹ 1195 lakhs ÷ ₹ 48.00]	USD 24.90 lakhs

Computation of Indian withholding tax

Particulars	Value
Transfer price for the software	USD 100.00 lakhs
Withholding tax rate in India	10%
Tax withholding in India [USD 100.00 lakhs × 10%]	USD 10.00 lakhs

Computation of gain to Indian business unit

Particulars	Value
Transfer price for the software	USD 100.00 lakhs
Cost of operation for one year	USD 24.90 lakhs
Gain of Indian business unit [transferred to US parent]	USD 75.10. lakhs

Computation of tax liability for US parent company (in US)

Particulars	Value
Sale price of the software in US market	USD 120.00 lakhs
Less : Price at which transferred from India to US	USD 100.00 lakhs
Profit on sale (taxable at 35% in the US market)	USD 20.00 lakhs
Add : Share of gain of Indian business unit	USD 75.10 lakhs
Total taxable income of the US parent company	USD 95.10 lakhs
Tax liability at 35%	USD 33.29 lakhs

Cost benefit analysis

Particulars		Value
Inflow on sale of software in US market	[A]	USD 120.00 lakhs
Summary of outflows :		
Annual operation cost of Indian software development unit		USD 24.90 lakhs
Tax withheld in India for which credit is not available		USD 10.00 lakhs
Tax liability in US for total profits of the US company		USD 33.29 lakhs
Total cash outflow to the company	[B]	USD 68.19 lakhs
Net benefit/ cash inflow	[A – B]	USD 51.81 lakhs

Recommendation : The project yields a net surplus of USD 51.81 lakhs or USD 5.181 millions (approximately). Therefore, the project is financially viable and the US company may go ahead with the project.

Q. 26. A dealer in foreign exchange have the following position in Swiss Francs on 31.03.2012-

Particulars	*SFr.*	*Particulars*	*SFr.*
Balance in the Nostro A/c credit	**1,00,000**	**Forward purchase contract cancelled**	**30,000**
Opening position over bought	**50,000**	**Remitted by TT**	**75,000**
Purchased a bill on Zurich	**80,000**	**Draft on Zurich cancelled**	**30,000**
Sold forward TT	**60,000**		

What steps would you take, if you are required to maintain a credit balance of SFr. 30,000 in the Nostro A/c. and keep as over bought position on SFr. 10,000?

Answer 26.

Overbought A/c.

Dr. *Cr.*

Particulars	SFr.	Particulars	SFr.
To Balance b/d	50,000	By Sales of forward TT	60,000
To Purchase of bill on Zurich	80,000	By Forward purchase contract cancellation	30,000
To Cancellation of draft	30,000	By Remittance by TT (Nostro)	75,000
To Buy spot TT (Nostro)	5,000	By Balance c/d (given)	10,000
To Buy forward (to maintain balance)	10,000		
	1,75,000		1,75,000

Nostro A/c.

Dr. *Cr.*

Particulars	SFr.	Particulars	SFr.
To Overbought remittance	75,000	By Balance b/d	1,00,000
To Balance c/d	30,000	By Buy spot TT (to maintain balance)	5,000
	1,05,000		1,05,000

Course of action :

The bank has to buy spot TT Sw. Fcs. 5,000 to increase the balance in Nostro account to Sw. Fcs. 30,000. Since the bank requires an overbought position of Sw/ Fcs. 10,000, it has to buy forward Sw. Fcs. 10,000.

Q. 27. A UK Company expects to receive 500,000 Canadian Dollars. The actual due date, falls exactly six months from now. The finance manager decides to hedge the transaction, using forward contracts. Interest rate in Canada is 15%, while that in UK is 12%. Current spot rate is Pd. Sterling 1 = Can $ 2.5. Evaluate the situation after UK Company hedged its transaction, and if sterling was to :

(i) Gain 4%

(ii) Lose 2% or

(iii) Remain stable at present level

Assume that the forward exchange rate differential reflects the Interest Rate Parity analysis of forward rates.

Answer 27.

From Interest Rate Parity theory we have,

£ 1 = CD 2.5. Therefore Home currency is CD (interest rate = r_h = 15%) & r_f = 12%

Therefore we have Forward Exchange Rate F = $2.5 \times \left(\frac{1+\frac{0.15}{2}}{1+\frac{0.12}{2}} \right)$ = 2.5354

Thus the company would get £ = 5,00,000/2.5354 = £ 1,97,207.54

(i) If the pound gains 4%, the exchange rate will be CD 2.5 * 1.04 = CD 2.60

Originally £ 1 = CD 2.50 and now £ 1 = CD 2.60. At this rate the firm would be able to buy 5,00,000 / 2.6 = £ 1,92,307.69

i.e., it would have received £ 1,97,207.54 - £ 1,92,307.69 = £ 4,900 less.

Therefore, hedging has saved the company £ 4,900 approximately.

(ii) If the pound loses 2%, the exchange rate will be CD 2.5 * 0.98 = CD 2.45

Originally £ 1 = CD 2.50 and now £ 1 = CD 2.45. At this rate the firm would be able to buy 5,00,000/ 2.45 = £ 2,04,081.63

i.e., it would have received £ 2,04,081.63 – £ 1,97,207.54 = £ 6,874.09 more.

Therefore, hedging has cost the company £ 6,874.09.

(iii) If the pound remains at 2.5%.

$\frac{F}{S_0} = \left(\frac{1+r_h}{1+r_f} \right)$

Originally £ 1 = CD 2.50 and now £ 1 = CD 2.50. At this rate the firm would be able to buy 5,00,000/ 2.5 = £ 2,00,000.

i.e., it would have received £ 2,00,000 – £ 1,97,207.54 = £ 2,792.46 more.

Therefore, hedging has cost the company £ 2,792.46

Q. 28. A U.S. firm Richard agrees to buy Thomas Inc., a European firm for €100 million. The deal is set to close in late October if it passes the vote of the Board of Directors of Thomas Inc. The deal is priced in €, but Richard's books and financing are in USD. The company is prepared for some variability in the USD cost of the deal, but has an internal break-even point beyond which the acquisition becomes unattractive. Therefore, Richard faces a currency risk, Richard can easily hedge the currency risk by buying € forward. But if the deal fails because of opposition among the board of Directors Richard would have to buy € and if the USD strengthened in the interim. Richard would lose money in the conversion. The stronger the USD, the greater would be the loss.

There are two risks : changes in exchange risk and the uncertainty of the deal's closure. Clearly, buying dollars forward covers one, but may not protect the other. The development team in the company gave Richard a choice of strategies.

(i) Buy at the money call option

(ii) Buy out of the money call option

(iii) Sell a collar i.e. sell one put and buy one call at out of the money strike prices

The relevant rates are provided with premium payable in dollar terms.

Spot	**July (Today)**	**$/€**	**1.2606/1.2610**
3 m forward	**October**	**$/€**	**1.2682/1.2685**

3 m Call option on Euro strike 1.2693 Premium 1.5895%

3 m Call option on Euro strike 1.2606 Premium 1.9398%

3 m Call option on Euro strike 1.2524 Premium 2.4690%

3 m Put option on Euro strike 1.2521 Premium 1.0000%

Each Euro contract = 1,25,000 units

The expected payoff at expiry is $/€ = 1.2650

Choose the best opinion for the company, clearly narrating the advantages.

Answer 28.

(i) Buy at-the-money call option

Buy : Oct 1.2606 € American Call for € 100 million (800 contracts)

Cost :

Premium USD 1.9398% = USD 1,939,800

The strategy is simple and effective. If the deal goes through, then Richard buys € at USD 1.2606. If it fails and the € has appreciated to, say, USD 1.2700, it may still exercise the option and make a profit of USD 0.44 million. If the deal fails and the € has depreciated, the call option is not exercised. The strategy's major drawback is its cost.

(ii) Buy out-of-money call option

Buy : Oct 1.2693 € American Call for € 100 million (800 contracts)

Cost :

Premium USD 1.5895% = USD 1,589,500

This strategy is a form of disaster insurance. If the deal goes through, Richard knows it will pay no more than 1.2693/ €- it is capping its payment to USD 126.93 million. If the deal fails, it is unlikely to profit from the option, since the odds against the spot rate going up to 1.2693 USD/€ in three months are low. The major drawback is that Richard is uncovered for currency movements between the spot (1.2606 USD/€) and the option price of 1.2693 USD/€.

(iii) Collar (one put and one call with different strike prices)

Buy : Oct 1.2606 USD/€ Call for € 100 million (800 contracts

Sell : Oct 1.2521 USD/€ Put for € 100 million (800 contracts)

Cost :

Premium paid : USD 1.9398% = USD 1,939,800

Premium received : USD 1.0% = USD 1,000,000

Net premium : = USD 939,800

Richard buys out-of-the-money € call, giving it the right, but not the obligation to buy € at 1.2606 USD/€ in late October. It simultaneously sells a October € put option, incurring the obligation to buy € at 1.2521 USD/€ in October, if the buyer chooses to exercise the option. The cost of buying the € call is cancelled out to the extent of 50% by the proceeds from selling the € put.

This strategy offers the same form of disaster insurance as buying an out of the money option. The only difference is that the strategy is relatively inexpensive, but its potential cost is that Richard may have to cover its short position in USD if the USD appreciates against the € below 1.2521 USD/€.

Q. 29. The CFO of ABC Ltd. has been studying the exchange rates and interest relevant to India and USA. ABC Ltd. has purchased materials from an American Company at a cost of US $ 5.05 millions, payable in US $ in 3 months time. In order to maintain profit margins, the CFO wishes to adopt, if possible, a risk-free strategy that will ensure that the cost of the goods to ABC Ltd. does not exceed ₹ 21 cr.

Exchange rates	Bid rate [₹ / US $ 1]	Ask rate [₹ /US $ 1]
Spot rate	40.35	40.65
1 month forward	41.20	41.50
3 months forward	42.15	42.50

Interest rates (available to ABC Ltd.) –

Period	India		USA	
	Deposit rate	Borrowing rate	Deposit rate	Borrowing rate
1 month	5%	12%	3%	8%
3 months	6%	13%	4%	9%

Calculate whether it is possible for ABC Ltd. to achieve a cost directly associated with this transaction of no more than ₹ 21 crores, by means of a forward market hedge, or money market hedge. Transaction costs may be ignored.

Answer 29.

Forward market hedge

Requisite : Forward market hedge is possible only of amount payable at forward rate (ask rate) is lower than 21 crores.

Amount payable after 3 months : US $ 50.50 lakhs × ₹ 42.50 (forward ask) = ₹ 21.46 crores.

Conclusion : Since the amount payable under forward rate is more than the desired level of ₹ 21 crores, there is no forward market hedge.

Money market hedge

Requisite : Money market hedge is possible only in case of difference in rates of interest for borrowing and investing.

Activity flow :

Borrow : Borrow rupee equivalent of money to be invested at 6% p.a. for 3 months.

Convert : Convert the money borrowed in rupee to US $ at spot rate (Bid)

Invest : Invest US$ so converted in Dollar Deposits at 4% p.a. for 3 months.

Realize : Realize the deposit including interest and use the proceeds to settle the liability.

Cash flow :

Particulars		Amount
Amount payable after 3 months		US $ 50.50 lakhs
Amount to be invested at 4% p.a. for realizing US $ 50.50 lakhs = US $ 5.50 lakhs ÷ (1 + Interest rate of 4% p.a. × 3/12) = 50.50 ÷ 1.01		US $ 50.00 lakhs
Amount to be borrowed amount to be invested in US $ 50.00 lakhs × Spot Ask Rate ₹ 40.65 /$		₹ 2032.50 lakhs
Interest payable	On money borrowed @ 13% p.a. for 3 months = ₹ 20.325 cr. × 13% × 3 months/ 12 months	₹ 66.06 lakhs
Total amount payable	Amount borrowed ₹ 2032.50 + Interest ₹ 66.06	₹ 2098.56 lakhs

Conclusion : Since the amount payable is ₹ 20.99 crores i.e. less than ₹ 21 crores, it is advisable to go by money market hedge.

Q. 30. A Ltd., an Indian Company, is planning to import a special variety of raw material from Japan at a cost of ¥ 14,400 lakhs. A Ltd. can utilize its cash credit facility at 15% interest p.a. with monthly rests with which it can import the material. However, there is an offer from the Tokyo Branch of an Indian based Bank extending credit of 180 days at 2% per annum against opening of an irrevocable letter of credit.

The other relevant particulars are –

(a) Present exchange rate : ₹ 100 = ¥ 360

(b) 180 days forward rate : ₹ 100 = ¥ 365

(c) Commission charges for LC = 1 ½ % per 6 months.

Advise whether A Ltd. should accept the offer from the foreign branch?

Answer 30.

Option A – Cash flow under Cash Credit

Particulars	**₹ lakhs**
Amount borrowed = Cost of machine (¥ 14,400 lakhs × ₹ 100 /¥ 360)	4,000.00
Amount payable including interest (₹ 4,000 × 1.0125^6)	4,309.53

Rate of interest charged every month = 15%/ 12 = 1.25%

Option B – Cash flow under Letter of Credit Option

List of cash flows under LC option

- **LC charges is paid upfront (by utilizing cash credit facility)**
- **Amount due (including interest on LC) is paid in ¥ after 180 days procuring foreign exchange using forward contract.**

Payable towards LC charges

Particulars	**₹ lakhs**
Amount borrowed (by utilizing Cash Credit Facility) = LC Commission (¥ 14,400 lakhs × 1.5% × ₹ 100/¥ 360)	60.00
Amount payable including interest (₹ 60 × 1.1025^6)	64.64

Payable towards LC at the end of 180 days

Particulars	**₹ lakhs**
Amount payable towards LC liability	14,400.00
Add : Interest at 2% p.a. for 180 days (payable in ¥) 14,400 × 2% × 180/ 365 days	142.02
Total amount payable (in ¥)	14,542.02
Total amount payable (in ₹) (¥ 14,542.02 × ₹ 100 / ¥ 365)	3,984.12

Total cash outflow under LC option = ₹ 64.64 lakhs + ₹ 3,984.12 lakhs = ₹ 4,048.76 lakhs

Suggestion : Total cash outflow under Option B (LC option) is lower than cash outflow under Option A (Cash Credit Facility). Therefore, LC route should be followed.