

**Paper 12 – Financial Management & International Finance**

1.

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

**Answer:**

i. (C) — ₹65.

Theoretical value of a right	$(V_1) = (P-S)/N+1 = ₹5$ where $N=2$ or, $P-S=5(2+1)$ or, $P=15+S$ -----(i)
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Value of share after right	$(V_0) = NP + S$ where $V_0 = ₹ 75$ or, $75 = (2P + S)/3$ or, $2P+S = 3 \times 75$ or, $2P+S = 225$ -----(ii)
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Putting value of P in equation (ii), we get

$$\begin{aligned} 2P + S &= 225 \\ \text{or, } 2(15+S) + S &= 225 \\ \text{or, } 30 + 3S &= 225 \\ \text{or, } S &= (225-30)/3 \\ \text{or, } S &= 65. \end{aligned}$$

ii. 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. ₹ 0.5070
- B. ₹ 1.5030
- C. ₹ 1.7230
- D. None of the above.

**Answer:**

ii. (A) — ₹ 0.5070

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

$$\begin{aligned} \text{ASK (₹ / ¥)} &= \text{ASK (₹ / £)} \times \text{ASK ( £ / \$)} \times \text{ASK ( \$ / ¥)} \\ &= 75.33 \times 0.6398 \times 0.01052 \\ &= ₹ 0.5070 \text{ (approx.)} \end{aligned}$$

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- 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).

**Answer:**

- iii. (B) — ₹ 73,975

Let, lease rental per annum be, x

$$\begin{aligned} ₹ 500000 &= x + x / (1+0.1) + x / (1+0.1)^2 + \dots + x / (1+0.1)^9 \\ &= x + 5.759 x = 6.759 x \\ \text{or, } x &= ₹ 5,00,000 / 6.759 = ₹ 73,975. \end{aligned}$$

- iv. 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.

**Answer:**

- iv. (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.

- v. ABC Ltd.'s share price at present is ₹ 120. After 6 months, the price will be either ₹ 150 with a probability of 0.8 or ₹ 110 with a probability of 0.2. A European call option exists with an exercise price of ₹ 130. The expected value of the call option at maturity date will be :
- (A) ₹ 16  
 (B) ₹ 20  
 (C) ₹ 10  
 (D) Zero

**Answer:**

- v. (A)—₹ 16

Expected value of call option

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

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vi. Surya Ltd. has issued 30,000 irredeemable 14% debentures of ₹ 150 each. The cost of flotation of debentures is 5% of the total issued amount. The company's taxation rate is 40%. The cost of debentures is :

- A. 8.95%
- B. 7.64%
- C. 9.86%
- D. 8.84%

**Answer:**

vi. (D) — 8.84%

Particulars	₹
Total issued amount (30,000 x ₹ 150)	45,00,000
Less : Flotation cost (₹ 45,00,000 x 5/100)	<u>2,25,000</u>
Net proceeds from issue	42,75,000

$$\text{Annual interest charge} = ₹ 45,00,000 \times 14/100 = ₹ 6,30,000$$

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

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

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

Ignoring operation and maintenance cost, which one would be cheaper? The company's cost of capital is 10%.

[Given : PVIFA (10%, 10 years) = 6.1446 and PVIFA (10%, 15 years) = 7.6061]

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

**Answer:**

vii. (A)—Make A will be cheaper

$$\begin{aligned} \text{Make A} \\ \text{Purchase cost} &= ₹4.50 \text{ million} \\ \text{Equivalent annual cost} &= 4.50/6.1446 = ₹0.73235 \text{ million} \end{aligned}$$

$$\begin{aligned} \text{Make B} \\ \text{Purchase cost} &= ₹6.00 \text{ million} \\ \text{Equivalent annual cost} &= 6.00/7.6061 = 0.78884 \text{ million} \end{aligned}$$

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

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

- A. ₹ 580
- B. ₹ 572
- C. ₹ 543
- D. ₹ 490

**Answer:**

viii. (B)— ₹ 572

$$B_0 = B_n \times \text{PVIF} (K\%, n \text{ years})$$

$$\text{Where, } B_n = ₹ 1,000;$$

$$n = 5 \text{ years}$$

$$K\% = 11.5\%$$

$$\text{incentive} = 0.015$$

$$B_0 = ₹ 1,000 \times 0.5803 = ₹ 580.30$$

$$\text{Issue price will be} = ₹ 580.30 (1 - 0.015) = ₹ 571.60 \text{ or } ₹ 572$$

ix. A company issue commercial paper for ₹ 3 crores with a maturity period of 90 days. The interest rate is 11% p.a. The net amount received by the company will be :

- A. ₹ 2.94 crores
- B. ₹ 2.92 crores
- C. ₹ 2.85 crores
- D. ₹ 3.08 crores

**Answer:**

ix. (B) — ₹ 2.92 crores

Interest @ 11% p.a. for 90 days on ₹1.

$$= 0.11 \times \frac{90}{365} = 0.0271233$$

$$\text{Amount after 90 days} = 1 + 0.0271233 = 1.0271233$$

$$\text{Net amount received} = ₹ 3,00,00,000 / 1.0271233 = ₹ 2,92,07,788 \text{ say } ₹ 2.92 \text{ crores}$$

x. A share Sun Ltd. is currently quoted at ₹ 55. The retained earnings per share being 40% is ₹ 4 per share. If the investors expect annual growth rate of 10%, what would be the cost of equity of Sun Ltd.?

- A. 20.5%
- B. 21.0%
- C. 22.0%
- D. 23.5%

**Answer:**

x. (C) – 22.0%

$$\text{Retained earnings per share} = ₹ 4$$

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$$\begin{aligned} \text{EPS} &= ₹ 4 \times 100/40 = ₹ 10 \\ \text{Dividend} &= ₹ 10 \times 60/100 = ₹ 6 \\ \text{Cost of equity (K}_e\text{)} &= \frac{D_0(1+g)}{P_0} + g \\ &= \frac{6(1+0.10)}{55} + 0.10 = 0.22 \text{ or } 22\% \end{aligned}$$

### 2. Write short notes on:

- (a) Impact of corporate taxation on corporate financing.
- (b) Buyouts
- (c) Cross border leasing.
- (d) Exposure netting
- (e) Zero Date

### Answer :

(a) The influence of corporate taxation on Corporate Financing can be analysed in the following areas :

- i. **Financing Decisions – Cost of Capital** – Debt is cheaper than equity since interest payable on loan is a charge on profit and will reduce the tax payable by the Company. The use of cheaper cost debt funds has a leverage effect and increases the EPS of the Company.
  - ii. **Invest decisions – Capital Budgeting** – For project evaluation, the Cash Flows after Taxes (CFAT) are relevant for discounting purposes. Cash outflows may also be reduced due to various deductions and allowances. The incidence of tax on income and on capital gains affect cash flows and investment decisions.
  - iii. **Dividend Decisions – Retention v Payment** – Tax is one of the major considerations in taking decisions on the amount and rate of dividend. Whether the Company should retain all its earnings or distribute all earnings as dividend, also depends on tax incidence on the Company and its Shareholders. The levy of taxes on Dividends pushes the Cost of Equity Capital of the Company.
  - iv. **Evaluation of Cash Flows** : depreciation is not an outgo in cash but it is deductible in computing the income subject in tax. There will be saving in tax on depreciation, and such savings could be profitably employed. Thus, both interest and depreciation provide tax shield and have a tendency to increase EPS.
  - v. **Rehabilitation of Sick Units** : Unabsorbed Depreciation can be carried forward for 8 years, and this can be carried for set off in another Company's profit in case of amalgamations in specified circumstances. Such a provision will help in the growth of Companies and rehabilitation of sick units.
  - vi. **Protection of Internal Funds**: Tax implications should be taken care off in choosing the size and nature of industry and incentives are given for backward areas. Tax considerations are relevant for purpose of preserving and protecting internal funds.
- (b) It refers to the transfer of management control by creating a separate business by separating it from their existing owners. It may be of two types.
- (i) Management Buyouts (MBOs)
  - (ii) Management Buyins (MBIs)
- (i) In Management Buyouts- Venture Capital institutions provide funds to enable the current operating management/ investors to acquire an existing product line / business. They represent an important part of the activity of VCI.

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- (ii) Management Buys – are funds provide to enable an outside group of manager(s) to buy an existing company. It involves parties, a management team, a target company and an investor (i.e. venture capital institution). MBIs are more risky than MBOs and hence are less popular because it is difficult for new management to assess the actual potential of target company. Usually, MBIs are able to target the weaker or underperforming companies.

(c) 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.

**(d) Meaning :**

- i. **Offsetting exposures :** Exposure netting is the act of offsetting exposures in one currency with exposures in the same or another currency.
- ii. **Example :** If an entity has Dollar Receivables, which is exposed to currency risk, it may enter into an offsetting position by entering into a Dollar Payable arrangement.

**Objective :** The objective of netting, is to offset the likely loss in one exposure, with the likely gain in another.

**Hedging tool :** It is a form of hedging foreign exchange risks. When a Firm opts for exposure netting, it hedges its risk without taking any forward cover or options cover.

- (e) **Zero Date:** Zero Date of the project indicates the date from which the implementation of the project starts and fixation of zero date is the last important step in establishing a project. It is from this date the project has to be monitored to see whether the project is progressing as per schedule of implementation. This signals the effective start of the project and it is from this date the clock starts ticking. The project completion period will be counted from this point of time. The activities which have to be completed before zero date are known as pre-project activities.

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

**(b) Write short note on Common Size Statement.**

**Answer:**

- (a) The venture capital can be defined as the “long term equity investments in business which display potential for significant growth and financial return”.

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

The venture capital financing refers to the financing of new high risky venture promoted by qualified entrepreneurs who lack experience and funds to give shape to their ideas. In a broad sense, under venture capital financing, venture capitalist make investment to purchase equity of debt securities from inexperienced entrepreneurs who undertake highly risky venture with potential of success.

The main features of venture capital investment are :

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

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

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

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

**(b)** The common-size statement is a financial document that is often utilized as a quick and easy reference for the finances of a corporation or business. Unlike balance sheets and other financial statements, the common-size statement does not reflect exact figures for each line item. Instead, the structure of the common size statement uses a common base figure, and assigns a percentage of that figure to each line item or category reflected on the document.

A company may choose to utilize financial statements of this type to present a quick snapshot of how much of the company's collected or generated revenue is going toward each operational function within the organization. The use of a common-size statement can make it possible to quickly identify areas that may be utilizing more of the operating capital than is practical at the time, and allow budgetary changes to be implemented to correct the situation.

The common size statement can also be a helpful tool in comparing the financial structures and operation strategies of two different companies. The use of percentages in the common size statements removes the issue of which company generates more revenue, and brings the focus on how the revenue is utilized within each of the two businesses. Often, the use of a common-size statement in this manner can help to identify areas where each company is utilizing resources efficiently, as well as areas where there is room for improvement.

**4. (a) Jagan is assigned to study the effect of YTM on duration. He is advised to study this effect on five –year, 10% semiannual coupon ₹1000 bond selling at par, for YTM =6% and for YTM = 14%. What can you conclude about the relationship between duration and yield to maturity?**

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(b) Aggressive Leasing Company is considering a proposal to lease out a tourist bus. The bus can be purchased for ₹ 5,00,000 and, in turn, be leased out at ₹ 1,25,000 per year for 8 years with payments occurring at the end of each year :

- i. Estimate the internal rate of return for the company assuming tax is ignored.
- ii. What should be the yearly lease payment charged by the company in order to earn 20% annual compound rate of return before expenses and taxes ?
- iii. Calculate the annual lease rent to be charged so as to amount to 20% after tax annual compound rate of return, based on the following assumptions :
  - I. Tax rate is 40%
  - II. Straight line depreciation
  - III. Annual expenses of ₹ 50,000 and
  - IV. Resale value ₹ 1,00,000 after the turn.

Answer :

(a)

Time	Payment	PV YTM@6%	PV of cash flow	% of PV	Time x %PV
0.5	50	0.971	48.55	4.15%	0.021
1	50	0.943	47.15	4.03%	0.040
1.5	50	0.915	45.75	3.91%	0.059
2	50	0.888	44.4	3.79%	0.076
2.5	50	0.863	43.15	3.69%	0.092
3	50	0.837	41.85	3.58%	0.107
3.5	50	0.813	40.65	3.47%	0.121
4	50	0.789	39.45	3.37%	0.135
4.5	50	0.766	38.3	3.27%	0.147
5	1050	0.744	781.2	66.77%	3.339
Duration of Bond	when YTM =6%		1170	100.00%	4.137

Time	Payment	PV YTM@10%	PV of cash flow	% of PV	Time x %PV
0.5	50	0.952	47.6	4.76%	0.024
1	50	0.907	45.35	4.54%	0.045
1.5	50	0.864	43.2	4.32%	0.065
2	50	0.823	41.15	4.12%	0.082
2.5	50	0.784	39.2	3.92%	0.098
3	50	0.746	37.3	3.73%	0.112
3.5	50	0.711	35.55	3.56%	0.125
4	50	0.677	33.85	3.39%	0.136
4.5	50	0.645	32.25	3.23%	0.145
5	1050	0.614	644.7	64.47%	3.224
Duration of Bond	when YTM =10%		1000	100%	4.055

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Time	Payment	PV YTM@14%	PV of cash flow	% of PV	Time x %PV
0.5	50	0.935	46.75	5.44%	0.027
1	50	0.873	43.65	5.08%	0.051
1.5	50	0.816	40.8	4.75%	0.071
2	50	0.763	38.15	4.44%	0.089
2.5	50	0.713	35.65	4.15%	0.104
3	50	0.666	33.3	3.88%	0.116
3.5	50	0.623	31.15	3.63%	0.127
4	50	0.582	29.1	3.39%	0.136
4.5	50	0.544	27.2	3.17%	0.143
5	1050	0.508	533.4	62.10%	3.105
Duration of Bond	when YTM = 14%		859	100%	3.969

As the yield to maturity increases, duration decreases because of the reinvestment of interim cash flows takes place at higher rates.

(b) i) Payback period

$$= \frac{5,00,000}{1,25,000} = 4 \text{ years}$$

PV factor close to 4,000 in 8 years is 4.0776 at 18%

Therefore, IRR = 18% (approx.)

We can arrive at 18.63% instead of 18% if exact calculations are made as follows :

PV factor in 8 years at 19% is 3.9544

By interpolating, we can get

$$\text{IRR} = 18\% + \frac{4.0776 - 4.000}{1.0776 - 3.9544} \times 1\% = 18.63\%$$

ii) Desired lease rent to earn 20% IRR before expenses and taxes

Present value of inflow annually for 8 years @ 20% = 3.837

$$\text{Lease Rent} = \frac{5,00,000}{3.837} = 1,30,310 \text{ p.a.}$$

iii) Revised lease rental on tourist bus to earn 20% return based on the given conditions

PV factor [(X - Expenses - Depreciation) (1 - T) + D] + (PV factor x Salvage value) = C<sub>0</sub>

$$3.837 [(X - 50,000 - 50,000) (1 - 0.4) + 50,000] + (0.233 \times 1,00,000) = 5,00,000$$

$$3.837 [0.6x - 60,000 + 50,000] + 23,000 = 5,00,000$$

$$2.3022x = 5,15,070$$

$$x = 2,23,730$$

Verification

This may be confirmed as lease rental

$$2,23,730$$

Less : Expenses + Depreciation

$$1,00,000$$

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EBT	1,23,730
Less : Tax 40%	<u>49,492</u>
PAT	74,238
Add : Depreciation	<u>50,000</u>
CFAT	1,24,238

$$= \frac{CO - PV \text{ of } SV}{CFAT} = \frac{` 5,00,000 - ` 23,300}{` 1,24,238} = 3.837 \text{ or } 20\%$$

**5. (a) Discuss the major sources available to an Indian Corporate for raising foreign currency finances.**

**(b) What do you mean by Offer for sale?**

**Answer :**

**(a)** The major sources of foreign currency finances are discussed below :

i. Foreign currency term loan from Financial Institutions : Financial Institutions provide foreign currency

term loan for meeting the foreign currency expenditures towards import of plant, machinery, and equipment and also towards payment of foreign technical knowhow fees.

ii. Export Credit Schemes : Export credit agencies have been established by the government of major industrialized countries for financing exports of capital goods and related technical services. These agencies follow certain consensus guidelines for supporting exports under a convention known as the Berne Union. As per these guidelines, the interest rate applicable for export credits to Indian companies for various maturities are regulated. Two kinds of export credit are provided i.e., buyer's and supplier's credit.

Buyer's Credit : Under this arrangement, credit is provided directly to the Indian buyer for purchase of capital goods and/or technical service from the overseas exporter.

Supplier's Credit : This is a credit provided to the overseas exporters so that they can make available medium-term finance to Indian importers.

iii. External commercial borrowings : Subject to certain terms and conditions, the Government of India permits Indian firms to resort to external commercial borrowings for the import of plant and machinery.

Corporates are allowed to raise up to a stipulated amount from the global markets through the automatic route. Companies wanting to raise more than the stipulated amount have to get an approval

of the MOF. ECBs include bank loans, supplier's and buyer's credit, fixed and floating rate bonds and borrowing from private sector windows of Multilateral Financial Institution such as International Finance Corporation.

iv. Euro Issues : The two principal mechanisms used by Indian companies are Depository Receipts mechanism and Euro convertible Issues. The former represents indirectly equity investment while the latter is debt with an option to convert it into equity.

v. Issues in foreign domestic markets : Indian firms can also issue bonds and Equities in the domestic capital market of a foreign country. In recent year, Indian companies like Infosys Technologies and ICICI have successfully tapped the US equity market by issuing American Depository Receipts (ADRs). Like GDRs, ADRs represent claim on a specific number of shares. The

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principal difference between the two is that the GDRs are issued in the euro market whereas ADRs are issued in the U.S. domestic capital market.

**(b)** Offer for sale is also known as bought out deal (BOD). It is a new method of offering equity shares, debentures etc, to the public. In this method, instead of dealing directly with the public, a company offers the shares or debentures through a sponsor. The sponsor may be a commercial bank, merchant banker, an institution or an individual. A company allots shares to a sponsor at an agreed price between the company and sponsor. The sponsor then passes the consideration money to the company and in turn gets the shares duly transferred to him. After a specified period as agreed between the company and the sponsor, the shares are issued to the public by the sponsor with a premium. After the public offering, the sponsor gets the shares listed in one or more stock exchanges. The holding cost of such shares by the sponsor may be reimbursed by the company or the sponsor may get the profit by issue of shares to the public at premium.

Thus, it enables the company to raise the funds easily and immediately. As per SEBI guidelines, no listed company can go for BOD. A privately held company or an unlisted company can only go for BOD. A small or medium size company which needs money urgently chooses to BOD. It is a low cost method of raising funds. The cost of public issue is around 8% in India. But this method lacks transparency. There will be scope for misuse also. Besides this, it is expensive like the public issue method. One of the most serious short coming of this method is that the securities are sold to the investing public usually at a premium. The Margin thus between the amount received by the company and the price paid by the public does not become additional funds of the company, but it is pocketed by the issuing houses or the existing shareholders.

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

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

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

**(b) Pawan Ltd. provides you the following information :**

i. Capital structure as per Balance Sheet as at 1<sup>st</sup> April, 2010 :

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

ii. Currently quoted prices in stock exchange (as at 31<sup>st</sup> March , 2011)  
15% Debentures at Rs. 120 per debenture  
18% Preference shares at RS. 120 per share  
Equity shares at Rs. 78 per share

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- iii. EPS and DPS  
EPS for the current year is Rs. 20 per share. Dividend Payout Ratio is 60%. Anticipated growth rate is 4%.
- iv. Corporate tax rate is 40%.

Required :

- i. Calculate the weighted average cost of capital using (a) Book Value Weights, (b) Market Value Weights.
- ii. Calculate the cost of new debentures, new preference shares, new equity shares and retained earnings if anticipated external financing opportunities are as follows :
  - a) 12% debentures of Rs. 100 each issued at par and redeemable after 5 years at 5% premium. Flotation cost is 5% of issue price.
  - b) 15% preference shares of RS. 100 each issued at par and redeemable after 5 years at 5% premium. Flotation cost is 5% of the issue price.
  - c) Equity shares of Rs. 10 each issued at Rs. 60. Flotation cost being Rs. 5 per share.
- iii. How much can be spent for capital investment before new equity shares must be issued?
- iv. Calculate the weighted average cost of capital using marginal weights if the company requires Rs. 4,00,000 for future investment and intends to maintain the existing optimal capital structure.
- v. What is the required amount of capital budget if the company wants to expands its total assets by 47.50% ? There are no short term debts.
- vi. How much of the capital budget must be financed by the external equity to maintain the optimal capital structure in part (v).
- vii. Calculate the weighted average cost of capital using marginal weights in part (vi) assuming that the company intends to maintain the existing optimal capital structure.
- viii. Calculate the numbers of new equity shares, debentures and preference shares to be issued in part (vi).

Answer :

(a) Calculation of market price of share under Walter's model :

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

Where P	=	Market price per share
E	=	Earnings per share
D	=	Dividend per share
R <sub>a</sub>	=	Internal rate of return on investment
R <sub>c</sub>	=	Cost of capital

$$\begin{aligned} \text{Dividend per share (D)} &= \text{₹ } 1,60,000 / 40,000 \text{ shares} = \text{₹ } 4 \\ \text{Earnings per share (E)} &= \text{₹ } 6,00,000 / 40,000 \text{ shares} = \text{₹ } 15 \end{aligned}$$

$$\begin{aligned} \text{Rate of return on firms investment (R}_a) & \\ &= \frac{\text{₹ } 6,00,000}{\text{₹ } 40,00,000} \times 100 = 15\% \text{ or } 0.15 \end{aligned}$$

$$R_c = \text{Cost of capital (inverse of P/E ratio i.e. } 1/10) = 0.10$$

$$P = \frac{4 + (0.15/0.10) (15 - 4)}{0.10} = \frac{20.50}{0.10} = \text{₹ } 205$$

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

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

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

$$P = \frac{4 + (0.15/0.10) (15 - 0)}{0.10} = \frac{22.50}{0.10} = ₹ 225$$

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

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

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

$$P = \frac{4 + (0.15/0.20) (15 - 4)}{0.20} = \frac{12.25}{0.20} = ₹ 61.25$$

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

**(b) Calculation of retained earnings as at 31.03.2011**

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

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

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

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

Source of capital A	Amount of each source of capital B (in lakhs)	Proportion of each source of capital C	After tax cost of each source of capital D	Product E = C x D
Equity share capital	15.60	0.520	0.200	0.104

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18% preference share capital	2.40	0.080	0.150	0.012
15% debentures	<u>12.00</u>	<u>0.400</u>	0.075	<u>0.030</u>
Total	30.00	1.000		0.146

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

$$= \frac{D_1}{P_0} + g = \frac{D_0 + (1+g)}{P_0} + g = \frac{12(1+0.04)}{78} + 0.04 = 0.16 + 0.04 = 0.20$$

### ii. Calculation of the new cost

a) Cost of new debentures ( $k_d$ )

$$k_d = \frac{\text{Interest}(1 - \text{tax rate}) + [(\text{Redeemable value} - \text{Net sale proceeds})/N]}{[(\text{Redeemable value} + \text{Net sale proceeds})/2]}$$

$$= \frac{12(1 - 0.4) + [(105 - 95)/5]}{(105 + 95)/2} = 0.092 \text{ or } 9.2\%$$

b) Cost of new preference share ( $k_p$ )

$$k_p = \frac{\text{Preferred dividend} + [(\text{Redeemable value} - \text{Net sale proceeds})/N]}{[(\text{Redeemable value} + \text{Net sale proceeds})/2]}$$

$$= \frac{15 + [(105 - 95)/5]}{(105 + 95)/2} = 0.17 \text{ or } 17.00\%$$

c) Cost of new equity shares ( $k_e$ )

$$k_e = \frac{D_1}{P_0} + g = \frac{D_0 + (1+g)}{P_0} + g = \frac{12(1+0.04)}{(60 - 5)} + 0.04$$

$$= 0.2269 + 0.04 = 0.2669 \text{ or } 26.69\%$$

d) Cost of retained earnings ( $k_r$ )

$$k_r = \frac{D_1}{P_0} + g = \frac{D_0 + (1+g)}{P_0} + g$$

$$= \frac{12(1+0.04)}{60} + 0.04 = 0.208 + 0.04 = 0.248 \text{ or } 24.80\%$$

### iii. Calculation of investment before issue of equity shares

Retained earning available = Total number of shares x EPS – Dividend paid

$$= (20,000 \times \text{Rs. } 20) - (20,000 \times \text{Rs. } 12)$$

$$= \text{Rs. } 4,00,000 - \text{Rs. } 2,40,000 = \text{Rs. } 1,60,000$$

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

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

### iv. Calculation of weighted average cost by using marginal weights

Source of capital A	Amount of each source of capital B (in lakhs)	Proportion of each source of capital C	After tax cost of each source of capital D	Product E = C x D
Retained earnings	1.60	0.400	0.248	0.0992
New 15% preference share	0.40	0.100	0.170	0.0170

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capital				
New 12% debentures	2.00	0.500	0.092	0.0460
Total	4.00	1.000		0.1622

- v. **Required amount of capital budget** = 47.5% of Rs. 20 lakhs = Rs. 9.50 lakhs
- vi. **External equity to be raised** = Equity portion in new investment – Retained earnings available  
 = (40% of Rs. 9,50,000) – Rs. 1,60,000 = Rs. 2,20,000

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

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

viii. **Calculation of number of new securities**

$$\begin{aligned} \text{No. of new equity shares} &= \frac{\text{Rs. 2,20,000}}{\text{Rs.55}} = 4,000 \\ \text{No. of new preference shares} &= \frac{\text{Rs. 95,000}}{\text{Rs.95}} = 1,000 \\ \text{No. of new debentures} &= \frac{\text{Rs. 4,75,000}}{\text{Rs.95}} = 5,000 \end{aligned}$$

7. (a) Explore the interrelationship between Investment, Finance and Dividend Decisions.

(b) MP Limited has made plans for the next year 2014-15. It is estimated that the company will employ total assets of ₹25,00,000; 30% of assets being financed by debt at an interest cost of 9% p.a. the direct costs for the year are estimated at ₹ 15,00,000 and all other operating expenses are estimated at ₹ 2,40,000. The sales revenue are estimated at ₹ 22,50,000. Tax rate is assumed to be 40%. Required to calculate:

- (i) Net profit margin
- (ii) Return on assets
- (iii) Asset turnover
- (iv) Return on equity

**Answer :**

(a) The finance functions are divided into three major decisions, viz., investment, financing and dividend decisions. It is correct to say that these decisions are inter-related because the underlying objective of these three decisions is the same, i.e. maximisation of

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shareholders' wealth. Since investment, financing and dividend decisions are all interrelated, one has to consider the joint impact of these decisions on the market price of the company's shares and these decisions should also be solved jointly. The decision to invest in a new project needs the finance for the investment. The financing decision, in turn, is influenced by and influences dividend decision because retained earnings used in internal financing deprive shareholders of their dividends. An efficient financial management can ensure optimal joint decisions. This is possible by evaluating each decision in relation to its effect on the shareholders' wealth.

The above three decisions are briefly examined below in the light of their inter-relationship and to see how they can help in maximising the shareholders' wealth i.e. market price of the company's shares.

**Investment decision:** The investment of long term funds is made after a careful assessment of the various projects through capital budgeting and uncertainty analysis. However, only that investment proposal is to be accepted which is expected to yield at least so much return as is adequate to meet its cost of financing. This has an influence on the profitability of the company and ultimately on its wealth.

**Financing decision:** Funds can be raised from various sources. Each source of funds involves different issues. The finance manager has to maintain a proper balance between long-term and short-term funds. With the total volume of long-term funds, he has to ensure a proper mix of loan funds and owner's funds. The optimum financing mix will increase return to equity shareholders and thus maximise their wealth.

**Dividend decision:** The finance manager is also concerned with the decision to pay or declare dividend. He assists the top management in deciding as to what portion of the profit should be paid to the shareholders by way of dividends and what portion should be retained in the business. An optimal dividend pay-out ratio maximises shareholders' wealth.

We can infer from the above discussion that investment, financing and dividend decisions are interrelated and are to be taken jointly keeping in view their joint effect on the shareholders' wealth.

(b) The net profit is calculated as follows:

	₹
Sales Revenue	22,50,000
Less: Direct Costs	15,00,000
Gross Profits	7,50,000
Less: Operating Expense	2,40,000
EBIT	5,10,000
Less: Interest (9% × 7,50,000)	67,500
EBT	4,42,500
Less: Taxes (@ 40%)	1,77,000
PAT	2,65,500

$$(i) \quad \text{Net Profit Margin} = \frac{\text{EBIT}(1-t)}{\text{Sales}} \times 100 = \frac{5,10,000 \times (1-0.4)}{22,50,000} = 13.6\%$$

$$(ii) \quad \text{Return on Assets (ROA)} \\ \text{ROA} = \text{EBIT}(1-t) \div \text{Total Assets} \\ = 5,10,000(1-0.4) \div 25,00,000 = 3,06,000 \div 25,00,000 \\ = 0.1224 = 12.24\%$$

$$(iii) \quad \text{Asset Turnover} \\ \text{Asset Turnover} = \frac{\text{Sales}}{\text{Assets}} = \frac{22,50,000}{25,00,000} = 0.9$$

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(iv) Return on Equity (ROE)

$$\text{ROE} = \frac{\text{PAT}}{\text{Equity}} = \frac{2,65,500}{17,50,000} = 15.17\%$$

ROE = 15.17%

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

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

**Required :**

- i. Indicate the financial viability of the project by calculating the net present value
- ii. Determine the sensitivity of the project's NPV under each of the following conditions :
  - a) Decrease in selling price by 5%
  - b) Increase in variable cost by 10%
  - c) Increase in cost of plant and machinery by 10%

**Answer :**

- i. Initial investment outlay Rs. 140 lakhs

Depreciation schedule

(Rs. In lakhs)

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

(Rs. p.u.)

Selling price	120
Less : variable cost	60
Contribution	60

Total contribution per year = 1 lakh units

(Rs. in lakhs)

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

Computation of P.V. of Net Cash Inflow :

(Rs. In lakhs)

<b>End of year</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
PBDT	45	45.00	45.00	45.00	45.00
Less : Depreciation	25	18.75	14.06	10.55	7.91
PBT	20	26.25	30.94	34.45	37.09

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Less : Tax @ 40%	8	10.50	12.38	13.78	14.84
PAT	12	15.75	18.56	20.67	22.25
Depreciation	25	18.75	14.06	10.55	7.91
Salvage value of plant and machinery	-	-	-	-	23.73
Decrease in working capital	-	-	-	-	40.00
Net cash inflow	37	34.50	32.62	31.22	93.89
P.V. factor @ 12%	0.893	0.797	0.712	0.636	0.567
P.V. of net cash inflow	33.04	27.50	23.23	19.86	53.24

$$\text{NPV} = \text{P.V. of net cash inflow} - \text{Initial investment outlay} = 15.87 - 140.00 = \text{Rs. 16.87 lakhs}$$

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

ii. Sensitivity analysis :

a) 5% decline in selling price :

The above change leads to  $(0.5 \times \text{Rs. } 120 \times (1 - 0.4))$

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

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

$$= \text{Rs. } 3.6 \times 3.605 = \text{Rs. } 12.98 \text{ lakhs}$$

Percentage decline in NPV compared to the base case NPV of Rs. 16.87 lakhs

$$= \frac{(12.98 / 16.87) \times 100}{=} = 76.94\%$$

b) Increase in variable cost by 10%:

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

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

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

(Rs. In lakhs)

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

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

$$\text{Percentage decline in NPV} = \frac{(\text{Rs. } 6.31 / \text{Rs. } 16.87 \text{ lakhs}) \times 100}{=} = 37.40\%$$

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

- Using different rates of change for the single rate of 10%
- Examining effect of favourable, as well as, adverse changes
- Using a combination of changes and using probability to find out expected values.

New position :

Particulars	Rs.
Sales (20,000 units x Rs. 2,000)	4,00,00,000

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Variable cost (20,000 units x Rs. 1,800)	3,60,00,000
Contribution	40,00,000
Less : Fixed cost	10,00,000
Profit (cash flow)	30,00,000

Analysis – New investment is only Rs. 25 lakhs which would be repaid within the first year itself. Unless there are other special strategic consideration for not engaging subcontractor, the idea should be implemented.

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

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

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

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

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

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

(b) The paid-up capital of a company is Rs. 100 lakh. It has been declaring 20% dividend for the last 5 years.

It has under consideration an expansion programme involving an investment of Rs. 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 :**

**(a) Project classification :**

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

(ii) This is a case of Modernisation through expansion. The present plant needs sufficient modification to adapt to different colour combinations in detergents

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- along with additional facilities in terms of storage capacity. Thus, it is decided to expand the present warehouse and handling facilities by investing ` 85 lakhs.
- (iii) This is a Replacement Project. Since the existing machinery was installed 17 years back and is insufficient to support the present demands of the market. It needs to be replaced rather than modified or modernized.
- (iv) This is a case of Modernisation of the farming process. By using tractors on farm land, the farming can be done more productively than in the case of a conventional process. Therefore, Shri Ajit Singh is intending to modernize his operations, which would reduce his time & energy and optimize his costs, while increasing the output considerably.
- (v) This is a case of Diversification. Since Milk Products Ltd. is already in the business of dairy products, it simply is extending the product line in its existing line of business.

(b)

### Effect of taxes on Financing Alternatives

(Rs. In lakhs)

Particulars	A	B	C	D
Return on Rs. 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 - 3.16	35X - 1.9	35X - 6.30
Balance	65X	65X - 5.86	65X - 3.52	65X - 11.70
Add : Distributable profit before expansion (0.20 x Rs. 100 lakh)	20	20	20	20
Total profits available for distribution (a)	20 + 65X	14.14 + 65X	16.48 + 65X	8.30 + 65X
Expected rate of dividend (%)	25	25	25	25
Expected dividend [0.25 x (Rs. 100 lakh + new capital)]	50	37.50	42.50	25
Dividend tax (0.10)	5	3.76	4.26	2.50
Total of dividend and dividend tax (b)	55	41.26	46.76	27.50
Rate of return (value of X) to pay dividend and dividend tax [value of X if (a) = (b)]%	54*	42	47	30

\* $20 + 65X = 55$  or,  $X = 35/65 = 54\%$ ; other values are also determined like this.

**10. (a) Clustfine company is considering the purchase of a new plastic extrusion machine at accost of ₹ 2,00,000. The future cashflows, after tax, are dependent on the success of the company's marketing program and on the economic growth in the geographic area. The following probability tree outlines the possible cash flows and their probabilities of occurrence.**

Branch	Initial Probability	Yr 1 Cash Flow(000s)	Conditional Probability*	Yr 2 Cash Flow (000s)
1	0.20	- ₹200	0.25	- ₹1,500
2	0.20	- ₹200	0.25	- ₹1,100
3	0.20	- ₹200	0.50	- ₹700
4	0.60	₹200	0.10	- ₹300
5	0.60	₹200	0.80	₹100
6	0.60	₹200	0.10	₹500

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7	0.20	₹600	0.50	₹900
8	0.20	₹600	0.25	₹1,300
9	0.20	₹600	0.25	₹1,700

\*Probability in period 2, probability in period 1 given.

What are the joint probabilities of occurrence of the various branches?

If the risk-free rate is 8% what is

- (i) The NPV of each of the 9 complete branches
- (ii) The expected value and standard deviation of the probability distribution of possible net present values?

(b) A firm can make investment in either of the following two projects. The firm anticipates its cost of capital to be 10% and the net (after tax) cash flows of the projects for five years are as follows:

(Figures in ₹'000)

Year	0	1	2	3	4	5
Project – A	(500)	85	200	240	220	70
Project – B	(500)	480	100	70	30	20

The discount factors are as under:

Year	0	1	2	3	4	5
PVF (10%)	1	0.91	0.83	0.75	0.68	0.62
PVF (20%)	1	0.83	0.69	0.58	0.48	0.41

Required:

- (i) Calculate the NPV and IRR of each project.
- (ii) State with reasons which project you would recommend.
- (iii) Explain the inconsistency in ranking of two projects.

Answer :

(a) Calculation of Joint Probability:

Branch	Initial Probability	Conditional Probability*	Joint Probability
	A	B	A × B
1	0.20	0.25	0.05
2	0.20	0.25	0.05
3	0.20	0.50	0.10
4	0.60	0.10	0.06
5	0.60	0.80	0.48
6	0.60	0.10	0.06
7	0.20	0.50	0.10
8	0.20	0.25	0.05
9	0.20	0.25	0.05
Total			1.00

### 1. NPV of 9 Branches

Branch	Yr 1 Cash Flow(000s)	PV factor @ 8% Yr-1	Yr 2 Cash Flow(000s)	PV Factor @8% Yr 2	NPV(₹)= -Cash Outflow + (A×B+C×D)

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	A	B	C	D	
1	- ₹200	0.926	- ₹1,500	0.857	-1670700
2	- ₹200	0.926	- ₹1,100	0.857	-1327900
3	- ₹200	0.926	- ₹700	0.857	-985100
4	₹200	0.926	- ₹300	0.857	-271900
5	₹200	0.926	₹100	0.857	70900
6	₹200	0.926	₹500	0.857	413700
7	₹600	0.926	₹900	0.857	1126900
8	₹600	0.926	₹1,300	0.857	1469700
9	₹600	0.926	₹1,700	0.857	1812500

Branch	NPV (₹)	Joint Prob(p <sub>i</sub> )	Expected NPV (₹) NPV	Variance = p <sub>i</sub> . (NPV - NPV) <sup>2</sup>
	A	B	X = A × B	(in 000000)
1	-1670700	0.05	-83535	151658.5
2	-1327900	0.05	-66395	97832.07
3	-985100	0.10	-98510	111513.6
4	-271900	0.06	-16314	7050.71
5	70900	0.48	34032	0
6	413700	0.06	24822	7050.71
7	1126900	0.10	112690	111513.6
8	1469700	0.05	73485	97832.07
9	1812500	0.05	90625	151658.5
		NPV	70900	736109.8

Expected Value = 70900

Standard Deviation =  $\sqrt{736109.8 \times 1000} = 857980$

### (b) Computation of NPV and IRR

For Project A:

Years	Cash flows ₹ '000	PVF 10%	P.V. ₹ '000	PVF 10%	P.V. ₹ '000
0	-500	1.00	-500.00	1.00	-500.00
1	85	0.91	77.35	0.83	70.55
2	200	0.83	166.00	0.69	138.00
3	240	0.75	180.00	0.58	139.20
4	220	0.68	149.60	0.48	105.60
5	70	0.62	43.40	0.41	28.70
	NPV		+116.35		-17.95

NPV of Project A at 10% (Cost of Capital) is ₹ 1,16,350.

IRR of Project A may be calculated by interpolation method as under:

NPV at 20% is (-) 17.95 (₹ '000)

NPV at 10% is + 116.35 (₹ '000)

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$$\therefore \text{IRR} = 10 + \frac{116.35}{116.35 - (-17.95)} (20 - 10)\% = 18.66\%$$

For Project B:

Years	Cash flows ₹ '000	PVF 10%	P.V. ₹ '000	PVF 10%	P.V. ₹ '000
0	-500	1.00	-500.00	1.00	-500.00
1	480	0.91	436.80	0.83	398.40
2	100	0.83	83.00	0.69	69.00
3	70	0.75	52.50	0.58	40.60
4	30	0.68	20.40	0.48	14.40
5	20	0.62	12.40	0.41	8.20
	NPV		+105.10		+30.60

NPV of Project B at 10% (Cost of Capital) is ₹ 1,50,100.

IRR of Project B may be calculated by interpolation method as under:

NPV at 10% is = + 105.10 (₹ '000)

NPV at 20% is = + 30.60 (₹ '000)

$$\text{IRR} = 10 + \frac{105.10}{105.10 - 30.60} (20 - 10)\% = 24.10\%$$

(Note: Though in above solution discounting factors of 10% and 20% have been used. However, instead of 20%, students may assume any rate beyond 20%, say 26%, and then NPV becomes negative. In such a case, the answers of IRR of Project may slightly vary from 24.10%.)

(i) The ranking of the projects will be as under:

	NPV	IRR
Project A	1	2
Project B	2	1

There is a conflict in ranking. IRR assumes that the project cash flows are reinvested as IRR whereas the cost of capital is 10%. The two projects are mutually exclusive. In the circumstances, the project which yields the larger NPV will earn larger cash flows. Hence the project with larger NPV should be chosen. Thus Project A qualifies for selection.

(ii) Inconsistency in ranking arises because if NPV criterion is used, Project A is preferable. If IRR criterion is used, Project B is preferable. The inconsistency is due to the difference in the pattern of cash flows.

Where an inconsistency is experienced, the projects yielding larger NPV is preferred because of larger cash flows which is generates. IRR criterion is rejected because of the flowing reasons:

(i) IRR assumes that all cash flows are re-invested at IRR.

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- (ii) IRR is a percentage but the magnitude of cash flow is important.
- (iii) Multiple IRR may arise if the projects have non-conventional cash flows.

11. (a) The following details of RST Limited for the year ended 31<sup>st</sup> March, 2006 are given below:

Operating leverage	1.4
Combined leverage	2.8
Fixed Cost (Excluding interest)	₹ 2.04 lakhs
Sales	₹ 30.00 lakhs
12% Debentures of ₹ 100 each	₹ 21.25 lakhs
Equity Share Capital of ₹ 10 each	₹ 17.00 lakhs
Income tax rate	30 per cent

Required:

- (i) Calculate Financial leverage
- (ii) Calculate P/V ratio and Earning per Share (EPS)
- (iii) If the company belongs to an industry, whose assets turnover is 1.5, does it have a high or low assets leverage?
- (iv) At what level of sales the Earning before Tax (EBT) of the company will be equal to zero?

(b) ABC Ltd. wishes to find out its weighted marginal cost of capital, WMCC, based on target capital structure proportions. Using the data given below, find out the WMCC.

Source	Proportion	Range	Cost
Equity share capital	50%	Upto ` 3,00,000	13.00%
		3,00,000 – 7,50,000	13.30 %
		7,50,000 and above	15.50%
Preference shares	10%	Up to ` 1,00,000	9.33%
		1,00,000 and above	10.60%
Long term debt	40%	Up to ` 4,00,000	5.68%
		4,00,000 – 8,00,000	6.50%
		8,00,000 and above	7.10%

Answer :

(a)

- (i) Financial leverage  
 Combined Leverage = Operating Leverage (OL) x Financial Leverage (FL)  
 $2.8 = 1.4 \times FL$   
 $FL = 2$   
 Financial Leverage = 2

- (ii) P/V Ratio and EPS  

$$P/V \text{ ratio} = \frac{C}{S} \times 100$$

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$$\text{Operating leverage} = \frac{C}{C-F} \times 100$$

$$1.4 = \frac{C}{C - 2,04,000}$$

$$1.4 (C - 2,04,000) = C$$

$$1.4 C - 2,85,600 = C$$

$$C = \frac{2,85,600}{0.4}$$

$$C = 7,14,000$$

$$P/V = \frac{7,14,000}{30,00,000} \times 100 = 23.8\%$$

Therefore, P/V Ratio = 23.8%

$$\text{EPS} = \frac{\text{Profit after tax}}{\text{No. of equity shares}}$$

$$\begin{aligned} \text{EBT} &= \text{Sales} - V - \text{FC} - \text{Interest} \\ &= 30,00,000 - 22,86,000 - 2,04,000 - 2,55,000 \\ &= 2,55,000 \end{aligned}$$

$$\begin{aligned} \text{PAT} &= \text{EBT} - \text{Tax} \\ &= 2,55,000 - 76,500 = 1,78,500 \end{aligned}$$

$$\text{EPS} = \frac{1,78,500}{1,70,000} = 1.05$$

(iii) Assets Turnover

$$\text{Assets turnover} = \frac{\text{Sales}}{\text{Total Assets}} = \frac{30,00,000}{38,25,000} = 0.784$$

0.784 < 1.5 means lower than industry turnover.

(iv) EBT zero means 100% reduction in EBT. Since combined leverage is 2.8, sales have to be dropped by  $100/2.8 = 35.71\%$ . hence new sales will be  $30,00,000 \times (100 - 35.71) = 19,28,700$ .

Therefore, at 19,28,700 level of sales, the Earnings before Tax of the company will be equal to zero.

### (b) Determination of breaking points of different sources :

Source	Proportion	Cost	Range	Breaking points
Equity share capital	50%	13.00%	Upto ` 3,00,000	$3,00,000/0.50 = 6,00,000$
		13.30 %	3,00,000 – 7,50,000	$7,50,000/0.50 = 15,00,000$
		15.50%	7,50,000 and above	-

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Preference shares	10%	9.33%	Up to ` 1,00,000	$1,00,000/0.10 = 10,00,000$
		10.60%	1,00,000 and above	-
Long term debt	40%	5.68%	Up to ` 4,00,000	$4,00,000/0.40 = 10,00,000$
		6.50%	4,00,000 – 8,00,000	$8,00,000/0.40 = 20,00,000$
		7.10%	8,00,000 and above	-

Now, the WMCC for different ranges of new financing may be calculated as follows :

Range	Source	Proportion	Cost %	Proportion x Cost %
Up to ` 6,00,000	Equity shares	0.50	13.00	6.50
	Preference shares	0.10	9.33	0.93
	Long term debt	0.40	5.68	2.27
		WMCC		<b>9.70</b>
` 6,00,000 – 10,00,000	Equity shares	0.50	13.30	6.65
	Preference shares	0.10	9.33	0.93
	Long term debt	0.40	5.68	2.27
		WMCC		<b>9.85</b>
` 10,00,000 – 15,00,000	Equity shares	0.50	13.30	6.65
	Preference shares	0.10	10.60	1.06
	Long term debt	0.40	6.50	2.60
		WMCC		<b>10.31</b>
` 15,00,000 – 20,00,000	Equity shares	0.50	15.50	7.75
	Preference shares	0.10	10.60	1.06
	Long term debt	0.40	6.50	2.60
		WMCC		<b>11.41</b>
` 20,00,000 and above	Equity shares	0.50	15.50	7.75
	Preference shares	0.10	10.60	1.06
	Long term debt	0.40	7.10	2.84
		WMCC		<b>11.65</b>

12.(a) From the following information of V Ltd., compute the economic value added:

(i) Share Capital	₹ 2000 lakhs
(ii) Reserve and Surplus	₹ 4000 lakhs
(iii) Long-term debt	₹ 400 lakhs
(iv) Tax rate	30%
(v) Risk free rate	9%
(vi) Market rate of return	16%
(vii) Interest	₹40 lakhs
(viii) Beta factor	1.05
(ix) Profit before interest and tax	₹2000 lakhs

(b) From the following project details calculate the sensitivity of the

- (i) Project Cost
- (ii) Annual Cash Flow
- (iii) Cost of Capital

Project Cost	₹ 12000	Annual Cash Flow	₹ 4500
Life of the Project	4 years	Cost of capital	14%

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**Which variable is the most sensitive?**

**The annuity factor at 14% for 4 years is 2.9137 and at 18% for 4 years is 2.6667.**

**Answer:**

**(a)**

V Limited  
Computation of economic Value Added

Economic Value Added	(₹ in lakhs)
Net Operating Profit after Tax( Refer W.N. 5)	1372.00
Add: Interest on long term fund(Refer Working Note 2)	28.00
	1400.00
Less: Cost of Capital ₹6400 lakhs × 15.77%(Refer W.N. 3 and 4)	(1009.28)
Economic Value Added	390.72

Working Notes:

1. Cost of Equity = Risk free Rate + Beta Factor (Market Rate – Risk Free Rate)  
= 9% + 1.05 (16-9) = 9% + 7.35% = 16.35%

2. Cost of Debt

Interest	₹40 lakhs
Less: Tax(30%)	(₹ 12 lakhs)
Interest after tax	₹28 lakhs

$$\text{Cost of Debt} = \frac{28}{400} \times 100 = 7\%$$

3. Weighted Average Cost of Capital

Cost of Equity ₹6000 lakhs × 16.35%(W.N. 1)	₹981 lakhs
Cost of Debt ₹400 lakhs × 7% (W.N.2)	₹ 28 lakhs
Total	<u>₹ 1009 lakhs</u>

$$\text{WACC} = \frac{1009}{6400} \times 100 = 15.77\% \text{ (Approx)}$$

4. Capital Employed

	(₹ in lakhs)
Share Capital	2000
Reserves and Surplus	4000
Long Term Debts	400
Total	6400

5. Net Operating Profit after Tax

	(₹ in lakhs)
Profit before Interest and Tax	2000
Less: Interest	(40)
	1960
Less: Tax 30% on 1960 lakhs	(588)
Net Operating Profit after Tax	1372

**(b)**

Annual cash inflow (₹) (4500 × 2.9137)	13112
Less: Project Cost(₹)	12000

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Net Present value	1112
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(a) Sensitivity for Project Cost

If the project cost is increased by ` 1112, the NPV of the project will become zero. Therefore the Sensitivity for Project cost is :  $\frac{1112}{12000} \times 100 = 9.27\%$

(b) Sensitivity for Annual Cash Inflow

If the present value of annual cash inflow is lower by ₹1112, the NPV of the project will become zero. Therefore, the sensitivity for annual cash flow is :  $\frac{1112}{13112} \times 100 = 8.48\%$

(c) Sensitivity for Cost of Capital

Let 'p' be the annuity factor which gives a zero NPV

Therefore we can say  $-12000 + 4500p = 0$

[ where  $p = PVIFA(x, 4)$ , where x is that rate when NPV = 0 i.e. x is the IRR]

$4500p = 12000$

$p = 12000/4500 = 2.667$

Therefore  $PVIFA(x, 4) = 2.667$ . Now looking across year 4 in the PVIFA table, we get  $x = 18\%$ . Therefore the sensitivity for cost of capital is:

$$\text{Sensitivity\%} = \frac{18\% - 14\%}{14\%} = 28.57\%$$

Analysis – The Cash inflow is more sensitive, since only 8.5% change in cash inflow will make the NPV of the project zero.

**13. 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 Rs. 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 1<sup>st</sup> year, 2<sup>nd</sup> year, 3<sup>rd</sup> year, 4<sup>th</sup> year and 5<sup>th</sup> year respectively.**

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

	(Rs. 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	Rs. 2.00
Conversion cost excluding depreciation	Rs. 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 :**

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- 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 Rs. 6.
- v. One year moratorium on the principal will be available.
- vi. Product promotion expenses for the first three years will be Rs. 2.00 lakhs, Rs. 1.00 lakh and Rs. 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. Debts service coverage ratio.

Answer :

- a. **Computation of Initial working capital required :**

1<sup>st</sup> year production and sales =  $36,00,000 \text{ units} \times 20/100 = 7,20,000 \text{ units}$ .

Particulars	Norm	Computation	Amount (Rs.)
Materials	15 days	$(7,20,000 \times 2 \times 15/360)$	60,000
Work-in-progress	12 days	$(7,20,000 \times 1.5 \times 12/360)$	36,000
Finished goods	60 days	$(7,20,000 \times 3 \times 60/360)$	3,60,000
Debtors	30 days	$(7,20,000 \times 3 \times 30/360)$	1,80,000
Cash	15 days	$(7,20,000 \times 1 \times 15/360)$	<u>30,000</u>
			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 (Rs.)
<b>Cost of project</b>	
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
	<u>1,21,86,000</u>
<b>Means of finance</b>	
Equity capital	33,86,000
Loans	80,00,000
Overdraft for interest	8,00,000
	1,21,86,000

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Debt-equity ratio is 7:3 (basing long-term debt of Rs. 80 lakhs)

- c. **Statement showing profit before depreciation and interest charges for 5 years** (Rs. Lakhs)

Year	1	2	3	4	5
<b>Sales (units in lakhs)</b>	<b>7.20</b>	<b>18.00</b>	<b>36.00</b>	<b>36.00</b>	<b>10.80</b>
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)** (Rs. Lakhs)

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

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

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

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

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

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

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

- (b) Write a note on Forward as hedge instrument.

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Answer :

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

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

$${}^a(\text{Rs. } 1,680 \text{ crore} \times 0.02) - (\text{Rs. } 1,400 \text{ crore} \times 0.01) = \text{Rs. } 19.6 \text{ crore}$$

$${}^b \text{Proposed investment in debtors } [(\text{Rs. } 1,680 \text{ crore} \times 0.55) + \text{Rs. } 120 \text{ crore}] \div 6$$

$$(\text{Debtors turnover, } 360 \text{ days} \div 60 \text{ days} = 6 \text{ days}) = 174 \text{ crore}$$

$$\text{Present investment in debtors}$$

$$[(\text{Rs. } 1,400 \text{ crore} \times 0.55) + \text{Rs. } 120 \text{ crore}] \div 12(360 \div 30) \quad \underline{74.2 \text{ crore}}$$

$$\text{Incremental investment in debtors} \quad \underline{99.80 \text{ crore}}$$

$$\text{Cost of incremental investment in debtors (Rs. } 99.8 \text{ crore} \times 0.20) \quad \underline{19.97 \text{ crore}}$$

$${}^c (\text{Rs. } 1,540 \text{ crore} \times 0.01) - (\text{Rs. } 1,400 \text{ crore} \times 0.01) = 1.4 \text{ crore}$$

$${}^d (\text{Rs. } 1,750 \times 0.20) - (\text{Rs. } 1,400 \text{ crore} \times 0.01) = 21 \text{ crore}$$

**(b)**

Forward as hedge instrument : International transactions both trade and financial give rise to currency exposures. A currency exposure if left unmanaged leaves a corporate open to profits or losses arising on account of fluctuations in currency ratio. One way in which corporate can protect itself from effects of fluctuations in currency rates is through buying or selling in forward markets.

A forward transaction is a transaction requiring delivery at future date of a specified amount of one currency for a specific amount of another currency.

The exchange rate is determined at the time of entering into contract but payment and delivery takes place on maturity. Corporate use forwards to hedge themselves against fluctuations in currency price that would have a significant impact on their financial position. Banks use forward to offset the forward contracts entered into with non-bank customers.

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

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

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

- With 1 point of Sensex at Re 1.00 and contract size of 50 indices, find out how Secure Mutual Fund can protect against the expected fall in the stock market in next one month.
- Evaluate the position of the portfolio if Sensex fall to (a) 17,000 and (b) 16,000 after 1 month.
- What conclusion do you draw from the results of (ii) ?
- What would be the position of the portfolio if market instead of falling actually rose to 18,000 ?
- What conclusion do you draw from the results of (iv) ?

**Answer :**

(i)	Current value of BSE Sensex	17,550
	Price of 1-m futures on BSE Sensex	17,730
	Current value of the portfolio	₹ 50.00 crore
	Beta of the portfolio	1.40

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

$$\begin{aligned}\text{Value to be covered} &= \text{Beta} \times \text{Value of the portfolio} \\ &= 1.4 \times 50 = ₹ 70.00 \text{ crore}\end{aligned}$$

$$\text{Current value of 1 futures contract} = 17,550$$

$$\text{Nos. of Sensex in 1 futures contract} = 50$$

$$\text{Value of 1 futures contract} = ₹ 8.775 \text{ lakh}$$

$$\begin{aligned}\text{Nos. of futures contracts to be sold} &= 70,000/8.775 = 797.72 \text{ contracts} \\ &= 798.00 \text{ contracts (rounded off)}\end{aligned}$$

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

### (ii) Sensex moves to 17,000

$$\text{New value of Sensex} = 17,000$$

$$\% \text{ change in the Sensex} = -3.13\%$$

$$\% \text{ change in the value of the portfolio} = 1.4 \times -3.13\% = -4.39\%$$

$$\text{New value of the portfolio} = ₹ 47.81 \text{ crore}$$

Gain in the futures market

$$\text{Value of futures sold} = 798 \times 17,730 \times 50 = ₹ 707.74 \text{ crore}$$

$$\text{Value of futures bought} = 798 \times 17,000 \times 50 = ₹ 67.83 \text{ crore}$$

$$\text{Profit/loss in the futures market} = ₹ 2.91 \text{ crore}$$

$$\text{Value of the portfolio (at the end of hedge period)} = ₹ 50.72 \text{ crore}$$

### Sensex moves to 16,000

$$\text{New value of Sensex} = 16,000$$

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% change in the Sensex = -8.83%  
 % change in the value of the portfolio =  $1.4 \times -8.83\% = -12.36\%$   
 New value of the portfolio = ₹ 43.82 crore

Gain in the futures market

Value of futures sold =  $798 \times 17,730 \times 50 = ₹ 70.74$  crore  
 Value of futures bought =  $798 \times 16,000 \times 50 = ₹ 63.84$  crore  
 Profit/loss in the futures market = ₹ 6.90 crore  
 Value of the portfolio (at the end of the hedge period) = ₹ 50.72 crore

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

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

**(iv) Sensex moves to 18,500**

New value of Sensex = 18,500  
 % change in the Sensex = 5.41%  
 % change in the value of the portfolio =  $1.4 \times 5.41\% = 7.58\%$   
 New value of the portfolio = ₹ 53.79 crore

Gain in the futures market

Value of futures sold =  $798 \times 17,730 \times 50 = ₹ 70.74$  crore  
 Value of futures bought =  $798 \times 18,500 \times 50 = ₹ 73.82$  crore  
 Profit/loss in the futures market = ₹ 3.07 crore  
 Value of the portfolio (at the end of the hedge period) = ₹ 50.72 crore

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

**16. 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 (Rs./ GBP)		
	Bid	Ask
Spot	Rs. 81.60	Rs. 81.90
3-month forward	Rs. 82.70	Rs. 83.00

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

**Answer:**

**Money market hedge vs. Hedging under forward contract**

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

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**Evaluation** : Money market hedge is possible only if –  
 Net amount repayable for Rupee borrowings for < Rupee payable per GBP  
 under  
 every GBP Invested [Based on Spot Ask Rate] forward [forward ask  
 rate]

$$\begin{aligned}
 \text{Outflow per GBP in 3 month's time} &= \text{Spot Ask Rate} \times \frac{(1 + \text{Rupee Borrowing Rate for 3 months})}{(1 + \text{GBP Deposit Rate for 3 months})} \\
 &= \text{Rs. } 81.90 \times \frac{(1 + 12\% \text{ for 3 months})}{(1 + 6\% \text{ p.a. for 3 months})} \\
 &= \text{Rs. } 81.90 \times (1 + 0.03) \div (1 + 0.015) = \quad \quad \quad \text{Rs. } \mathbf{83.11}
 \end{aligned}$$

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

$$\begin{aligned}
 &= \left[ \frac{(1 + \text{Rupee borrowing rate for 3 months})}{(1 + \text{GBP deposit rate for 3 months})} - 1 \right] \times 100 \times \frac{12 \text{ months}}{\text{No. of months}} \\
 &= \left[ \frac{(1 + 12\% \times 3/12 \text{ months})}{(1 + 6\% \times 3/12 \text{ months})} - 1 \right] \times 100 \times \frac{12 \text{ months}}{3 \text{ months}} \\
 &= [(1.03 / 1.015) - 1] \times 100 \times 4 = \quad \quad \quad \mathbf{5.91\%}
 \end{aligned}$$

**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] x 100 x 12 / No. of months forward [(Rs. 83.00 – Rs. 81.90) / Rs. 81.90] x 100 x 12 / 3 months	<b>5.37%</b>
Rate of interest for rupee borrowings [annualized given]	<b>12%</b>

**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 Rs. 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%

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**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	Rs.
Amount to be settled (Rs.) = GBP 50,000 x 3 months forward rate Rs. 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) Rs. 41,50,000 ÷ (1 + 12% x 3 months/12) Rs. 41,50,000 ÷ (1 + 0.03) = Rs. 41,50,000 ÷ 1.03	<b>40,29,126</b>

**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 Rs. 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. x 3 months/ 12 months) = GBP 50,000 ÷ (1 + 1.5%) = GBP 50,000 ÷ 1.015 = <b>GBP 49,261.0837</b> Amount to be borrowed = GBP to be invested x Spot rate (Ask rate) = GBP 49,261.0837 x Rs. 81.90 / GBP = <b>Rs. 40,34,483</b>
Convert	01.04.2011	Convert Rs. 40,34,483 into GBP at Spot rate (Ask rate since GBP is bought) Rs. 40,34,483 ÷ Rs. 81.90 / GBP = <b>GBP 49,261.0837</b>
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 Rs. 40,34,483 x (1 + 12% p.a. for 3 months) = Rs. 40,34,483 x 1.03 = <b>Rs. 41,55,517.</b>

**Settle Now**

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

**Analysis and conclusion**

Alternatives	Forward rate	Money market hedge	Spot settlement
Present value of	Rs. 40,29,126	Rs. 40,34,483	Rs. 40,95,000

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outflow in rupees	(Present value)	(Rupee borrowing in the beginning)	
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**Conclusion :** Cash outflow under forward rate is the lowest. Therefore, the same should be preferred.

**17.(a)** The investment manager of a large Indian software company receives the following quotes from its foreign exchange broker.

US dollar spot rate : ₹ 47.75/ US \$

US dollar option quotation

Strike price	Call			Put		
	June	September	December	June	September	December
45.0000	3.0	-	-	-	-	-
45.5000	2.6	2.9	-	-	-	-
46.0000	2.0	2.3	2.45	0.2	-	-
46.5000	1.85	1.95	2.15	0.25	-	-
47.0000	1.25	1.85	2.00	0.70	0.90	-
47.5000	0.85	1.15	1.45	1.00	1.25	1.75
48.0000	0.50	0.74	0.89	1.59	1.92	2.50
48.5000	0.30	0.52	0.68	1.70	2.20	-
49.0000	0.15	-	-	1.90	-	-
49.5000	0.10	-	-	2.00	-	-
50.0000	0.08	-	-	2.30	-	-

What calculation will the investment manager make for following questions ?

- i. What is the intrinsic value for the September 47.50 call option?
- ii. What is the intrinsic value for the June 46 put option?
- iii. What is the break-even exchange rate for the December 46.5 call and the December 48 put?
- iv. If the December spot rate is expected to be ₹ 48.50/US \$, which call option should be bought?
- v. The software company will receive its export income in December and the expected spot rate (in December) will be ₹ 46.5/US \$, which put option should be bought?

(b) Spot rate (1 US\$)

Rs. 48.0123

180 days forward rate for 1 US \$

Rs. 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 Rs. 40,00,000 or US\$ 83,312.

**Answer:**

(a) Intrinsic value of an option is the amount by which the option is in-the-money.

For a call option, intrinsic value = Maximum [(Spot rate – Strike rate), 0]

For a put option, intrinsic value = Maximum [(Strike rate – Spot rate), 0]

- i. Intrinsic value for the September 47.5 call option

$$= \text{Max} [(\text{₹ } 47.75/\text{US } \$ - \text{₹ } 47.5/\text{US } \$), 0] = \text{Max} [₹ 0.25/\text{US } \$, 0] = ₹ 0.25/\text{US } \$$$

- ii. Intrinsic value for the June 46 put option

$$= \text{Max} [(\text{₹ } 46/\text{US } \$ - \text{₹ } 47.75/\text{US } \$), 0] = \text{Max} [-(₹ 1.75/\text{US } \$), 0] = 0$$

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- iii. The break-even exchange rate for the December 46.5 call on settlement date is Re X/US \$  
 So, the premium paid = ` 2.15/US \$  
 Profit from the call option = ` (X - 46.5)/US \$  
 At break even, ` (X - 46.5)/US \$ = ` 2.15/US \$  
 X = ` 48.65/US \$  
 The break-even exchange rate for December 48 put is :  
 Premium paid = ` 2.50/US \$  
 Profit from the put option = ` (48 - X)/US \$  
 At break-even, ` (48-X)/US \$ = ` 2.50/US \$  
 X = ` 45.5/US \$
- iv. For an expected spot rate of ` 48.50/US \$, we need to find out profit from buying the December call option at various strike prices.  
 Gain from call option = Max [(Settlement rate - Strike rate), 0] - Premium  
 = Value of option at expiration - Premium

Option	Strike price	Premium (A)	Option value at expiration (B)	Gain/Loss [B - A]
December call	46.00/US \$	2.45/US \$	2.50/US \$	0.05/US \$
December call	46.50/US \$	2.15/US \$	2.00/US \$	-0.15/US \$
December call	47.00/US \$	2.00/US \$	1.50/US \$	-0.50/US \$
December call	47.50/US \$	1.45/ US \$	1.00/US \$	-0.45/US \$
December call	48.00/US \$	0.89/US \$	0.50/US \$	-0.39/US \$
December call	48.50/US \$	0.68/US \$	0.00/US \$	-0.68/US \$

So, for the expected December spot price of ` 48.50/US \$, the December call option of strike price ` 46.00/US \$ should be bought.

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

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

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

$$(b) \text{ Spot rate} = \text{Rs. } 40,00,000 / \$ 83,312 = \text{Rs. } 48.0123$$

$$\text{Forward premium} = \frac{48.8190 - 48.0123}{48.0123} \times \frac{12}{6} \times 100 = 3.36\%$$

$$\text{Annualized interest rate for 6 months - Rupee} = 12\%$$

$$\text{Annualized interest rate for 6 months - US \$} = 8\%$$

$$\text{Interest rate differential} = 12\% - 8\% = 4\%$$

Since the interest rate differential is negative and 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 1 - Borrow \$ 83,312 for 6 months

Amount repayable after 6 months along with interest

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

### Option 2 - Convert \$ 83,312 into Rupees and get the principal amount of Rs. 40,00,000

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

**18. (a) 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.**

**(b) A Company is long on 10MT of copper @ ₹475 per kg (spot) and intends to remain so for the ensuing quarter. The The standard deviation of changes of its spot and future prices are 4% & 6% respectively, having correlation coefficient of 0.75.**

**What is its Hedge ratio? What is the amount of copper future it should short to achieve a perfect hedge.**

**Answer :**

**(a)** From Interest Rate Parity theory we have,  $\frac{F}{S_0} = \left( \frac{1+r_h}{1+r_f} \right)$

£ 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%.  
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

**(b)** The optional hedge ratio to minimize the variance of Hedger's position is given by:

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$$H = \rho \frac{\sigma_S}{\sigma_F}$$

Where,

$\sigma_S$  = Standard deviation of  $\Delta S$

$\sigma_F$  = Standard deviation of  $\Delta F$

$\rho$  = coefficient of correlation between  $\Delta S$  and  $\Delta F$

H = Hedge Ratio

$\Delta S$  = change in spot price

$\Delta F$  = change in future price

Accordingly,

$$H = 0.75 \times \frac{0.04}{0.06} = 0.5$$

Number of contract to be short =  $10 \times 0.5 = 5$

Amount =  $5000 \times ₹475 = ₹ 23,75,000$

**19. 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 – Rs. 100 = ₹ 360
- b) 180 days forward rate Rs. 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 :**

### Option A – Cash flow under Cash Credit

Particulars	Rs. lakhs
Amount borrowed = Cost of machine (₹ 14,400 lakhs x Rs. 100 / ₹ 360)	4,000.00
Amount payable including interest (Rs. 4,000 x 1.0125 <sup>6</sup> )	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	Rs. lakhs
Amount borrowed (by utilizing Cash Credit Facility) = LC Commission (₹ 14,400 lakhs x 1.5% x Rs. 100/₹ 360)	60.00
Amount payable including interest (Rs. 60 x 1.1025 <sup>6</sup> )	64.64

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### Payable towards LC at the end of 180 days

Particulars	Rs. lakhs
Amount payable towards LC liability	14,400.00
Add : Interest at 2% p.a. for 180 days (payable in ₹) $14,400 \times 2\% \times 180 / 365$ days	142.02
Total amount payable (in ₹)	14,542.02
Total amount payable (in Rs.) <span style="float: right;">(₹ 14,542.02 x Rs. 100 / ₹ 365 days)</span>	3,984.12

**Total cash outflow under LC option** = Rs. 64.64 lakhs + Rs. 3,984.12 lakhs = Rs. 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.

**20. 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 :

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

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

**Answer :**

### Cost of operating the Indian unit for 1 year

Particulars	Value
Rental cost [assumed to be annual]	Rs. 15.00 lakhs
Man power cost [80 professionals x 365 days x 10 hours per day x Rs. 4.00 per hour]	Rs. 1,168.00 lakhs
Administrative and other costs [assumed to be annual]	Rs. 12.00 lakhs
Total amount cost of operation	Rs. 1,195.00 lakhs
Exchange rate per USD	Rs. 48.00
Total annual cost of operation in USD [Rs. 1195 lakhs ÷ Rs. 48.00]	USD 24.90 lakhs

### Computation of India 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 x 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

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### 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 28.53 lakhs
Total cash outflow to the company [B]	USD 63.43 lakhs
Net benefit/ cash inflow [A – B]	USD 56.57 lakhs

**Recommendation :** The project yields a net surplus of USD 56.57 lakhs or USD 5.657 millions (approximately). Therefore, the project is financially viable and the US company may go ahead with the project.

**21. An Indian company is planning to set up a subsidiary in the US. The initial project cost is estimated to be US \$ 400 million; working capital requirements are estimated at US \$ 40 million. The Indian company followed the straight-line method of depreciation.**

**The finance manager of the Indian company estimated data in respect of the project as follows :**

- i. Variable cost of production and sales \$ 25 per unit.
- ii. Fixed cost per annum are estimated at \$ 30 million
- iii. Plant will be producing and selling 50 million units at \$ 100 per unit and
- iv. The expected economic useful life of the plant is 5 years with no salvage value.

The subsidiary of the Indian company is subject to 40% corporate tax rate in the US and the required rate of return of such a project is 12%. The current exchange rate between the two countries is ` 48/ US \$ and the rupee is expected to depreciate by 3% per annum for next five years.

The subsidiary will be allowed to repatriate 70% of the CFAT every year along with the accumulated arrears of blocked funds at year-end 5, the withholding taxes are 10%. The blocked funds will be invested in the USA money market by the subsidiary, earning 4% (free of tax) per year.

Determine the feasibility of having a subsidiary company in the USA, assuming no tax liability in India on earnings received by the parent from the US subsidiary.

**Answer:**

**Cash outflows (t = 0)**

Cost of plant and machinery  
 Working capital requirement  
 Incremental cash outflow in rupees (\$ 440 million x ` 48)

**(figures in million)**

\$ 400  
 40  
440

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<b>Cash inflows after taxes</b>	<b>(figures in million)</b>	
Sales revenue (5.0 million units x \$ 100)		500
Less : Costs :		
Variable cost (5.0 million units x \$25)	\$ 125	
Fixed cost	30	
Depreciation (\$400 million/ 5 year)	<u>80</u>	<u>235</u>
Earning before taxes		265
Less : Taxes (0.40)		<u>106</u>
Earning after taxes		159
Add : Depreciation		<u>80</u>
CFAT (T = 1 – 4)		<u>239</u>
CFAT in 5 <sup>th</sup> year :		
Operating CFAT	239	
Add : Release of working capital	<u>40</u>	<u>279</u>

### Determination of NPV (figures in million)

Particulars	Year				
	1	2	3	4	5
Operating CFAT	\$ 239	\$ 239	\$ 239	\$ 239	\$ 239
Less : Retention	<u>71.70</u>	<u>71.70</u>	<u>71.70</u>	<u>71.70</u>	-
Repatriation made	<u>167.30</u>	<u>167.30</u>	<u>167.30</u>	<u>167.30</u>	<u>239.00</u>
Less : Withholding tax	16.7	16.7	16.7	16.7	23.9
Accessible funds to parent	150.6	150.6	150.6	150.6	215.1
Add : Repatriation of blocked funds *	-	-	-	-	274
Add : Recovery of working capital	-	-	-	-	40
Re/\$ exchange rate	49.44	50.9232	52.4509	54.0244	55.6451
Rupee equivalent	7,445	7,669	7,899	8,136	29,442
PV factor (0.12)	<u>0.893</u>	<u>0.797</u>	<u>0.712</u>	<u>0.636</u>	<u>0.567</u>
Present value	6,648	6,112	5,624	5,174	<u>16,694</u>
Total present value					40,252
Less : Cash outflow					21,210
Net present value					19,042

Recommendation : Since the NPV is positive, having a subsidiary in the US is financially viable for the Indian company.

\*Repatriation of blocked funds after withholding taxes

Future value in year 5 of blocked funds of 17.7 million each during t = 1 to 4 years invested at 4% per year =  $4.246 \times 71.7$  million = 304.44 million – 30.44 million withholding tax = 274 million.

**22. (a) Y Ltd. importing goods worth USD 2 million, requires 90 days to make the payment. The overseas supplier has offered a 60 days interest free credit period and for additional credit for 30 days an interest of 8% per annum.**

**The banker of Y Ltd. offer a 30 days loan at 10% per annum and their quote for foreign exchange is as follows:**

	₹
--	---

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Spot 1 USD	56.50
60 days forward for 1 USD	57.10
90 days forward for 1 USD	57.50

You are required to evaluate the following options:

- (i) Pay the supplier in 60 days, or  
(ii) Avail the supplier's offer of 90 days credit.

- (b) Consider a fixed-for-floating LIBOR swap with a notional principal of \$200 million and a fixed rate of 7%. Suppose that the swap cash flows are determined at six-month intervals ( $t = 0, 1, 2, 3$  etc.) Suppose that LIBOR turns out to be:

$t$	LIBOR
0	4.25
1	5.25
2	6.75
3	7.25
4	8.00
5	9.00
6	10.00

What would be the net payments for the counterparties on each of the settlement days?

### 22. (a)

- (i) Pay the supplier in 60 days

If the payment is made to supplier in 60 days the applicable forward rate for 1 USD	₹57.10
Payment Due	USD 2000000
Outflow in Rupees (USD 2000000 × ₹57.10)	₹114200000
Add: Interest on loan for 30 days @10% p.a.	₹951667
Total Outflow in ₹	₹115151667

- (ii) Availing supplier's offer of 90 days credit

Amount Payable	USD 2000000
Add: Interest on credit period for 30 days @ 8% p.a.	USD 13333
Total Outflow in USD	USD 2013333
Applicable forward rate for 1 USD	₹57.50
Total Outflow in ₹ (USD 2013333 × ₹57.50)	₹115766648

Alternative 1 is better as it entails lower cash outflow.

- (b) In this problem we know that while the fixed payments would be calculated based on 7% fixed rate, the floating payments would change with the LIBOR Rates. Thus the first period, fixed payment would amount to = \$ 200 million × 1/2 × 0.0425 = \$4.25 million. Thus we can see that the holder of fixed rate paper has to pay an interest of \$ 7 million - \$ 4.25 million = \$2.75 million to the holder of floating rate paper. This can be seen in the table below.

Time	Net Payment	
	Fixed Rate Paper	Floating Rate Paper

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0	\$ -2.75 million	\$ +2.75 million
1	-1.75 million	+1.75 million
2	-0.25 million	+0.25 million
3	+0.25 million	-0.25 million
4	+1.00 million	-1.00 million
5	+2.00 million	-2.00 million
6	+3.00 million	-3.00 million

We can also see that from the third period, the floating rate paper holder has to pay the fixed rate paper holder.

- 23. An investment company wants to study the investment projects based on market demand, profit and the investment required, which are independent of each other. Following probability distributions are estimated for each of these three factors :**

<b>Annual demand ('000 units)</b>	<b>25</b>	<b>30</b>	<b>35</b>	<b>40</b>	<b>45</b>	<b>50</b>	<b>55</b>
<b>Probability</b>	<b>0.05</b>	<b>0.10</b>	<b>0.20</b>	<b>0.30</b>	<b>0.20</b>	<b>0.10</b>	<b>0.05</b>
<b>Profit per unit</b>			<b>3</b>	<b>5</b>	<b>7</b>	<b>9</b>	<b>10</b>
<b>Probability</b>			<b>0.10</b>	<b>0.20</b>	<b>0.40</b>	<b>0.20</b>	<b>0.10</b>
<b>Investment required ( ` '000)</b>					<b>2,750</b>	<b>3,000</b>	<b>3,500</b>
<b>Probability</b>					<b>0.25</b>	<b>0.50</b>	<b>0.25</b>

Using simulation process, repeat the trial 10 times, compute the investment on each trial taking these factors into trial. What is the most likely return ?

Use the following random numbers :

(30,12,16)    (59,09,69)    (63,94,26)    (27, 08, 74)    (64, 60, 61)    (28,28,72)  
 (31,23,57)    (54,85, 20)    (64,68,18)    (32,31,87)

In the bracket above, the first random number is for annual demand, the second one is for profit and the last one is for the investment required.

**Answer:**

$$\text{Annual return (\%)} = \frac{\text{Profit} \times \text{Number of units demanded}}{\text{Investment}} \times 100$$

First of all, random numbers 00-09 are allocated in proportion to the probabilities associated with each of the three variables as given under :

Annual demand

Units ('000)	Probability	Cumulative probability	Random numbers assigned
25	0.05	0.05	00 – 04
30	0.10	0.15	05 – 14
35	0.20	0.35	15 – 34
40	0.30	0.65	35 – 64
45	0.20	0.85	65 – 84
50	0.10	0.95	85 – 94
55	0.05	1.00	95 - 99

Profit per unit

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Profit (₹)	Probability	Cumulative probability	Random numbers assigned
3	0.10	0.10	00 – 09
5	0.20	0.30	10 – 29
7	0.40	0.70	30 – 69
9	0.20	0.90	70 – 89
10	0.10	1.00	90 - 99

Investment required

Investments (₹ '000)	Probability	Cumulative probability	Random numbers assigned
2,750	0.25	0.25	00 – 24
3,000	0.50	0.75	25 – 74
3,500	0.25	1.00	75 - 99

Let us now simulate the process for 10 trials. The results of the simulation are shown in the tables given below :

Trials	Random no. of demand	Simulated demand ('000 units)	Random no. for profit per unit	Simulated profit per unit	Random no. for investment	Simulated investment (₹ '000)	Simulated return (%)*
1	30	35	12	5	16	2,750	6.36
2	59	40	09	3	69	3,000	4.00
3	63	40	94	10	26	3,000	13.33
4	27	35	08	3	74	3,000	3.50
5	64	40	60	7	61	3,000	9.33
6	28	35	28	5	72	3,000	5.83
7	31	35	23	5	57	3,000	5.83
8	54	40	85	9	20	2,750	13.09
9	64	40	68	7	18	2,750	10.18
10	32	35	31	7	87	3,500	7.00

\*The simulated return is calculated as below :

$$= \frac{\text{Demand} \times \text{profit p.u.}}{\text{Investment}} \times 100$$

The above table shows that the highest likely return is 13.33% which is corresponding to the annual demand of 40,000 units resulting a profit of ₹ 10 per unit and the required investment will be ₹ 30,00,000.

**24.(a) 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		

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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 ?

(b) Write a note on Eurocurrency Markets.

Answer :

(a)

### 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.

(b)

Eurocurrency Market consists of banks that accept deposits and make loans in foreign currencies outside the country of issue. These deposits are commonly known as Eurocurrencies. Thus, US dollars deposited in London are called Eurodollars; British pounds deposited in New York are called Euro sterling, etc.

Eurocurrency markets are very large, well organized and efficient. They serve a number of valuable purposes for multinational business operations. Eurocurrencies are a convenient money market device for MNCs to hold their excess liquidity. They are a major source of short term loans to finance corporate working capital needs and foreign trade.

**25. 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	Rs. 3,60,00,000	?	?	Buy Index-futures	2.3	45
C	Rs. 1,00,00,000	1.60	?	?	1.2	?
D	Rs. 6,40,00,000	1.10	Bullish	?	?	48
E	Rs. 2,50,00,000	1.40	Bearish	?	1	?
F	Rs. 4,50,00,000	?	Bearish	Sell Index futures	1.25	45

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

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**Answer:**

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

**Value per futures contract** = Index price per unit x Lot size per futures contract  
 = Rs. 4000 x 100 = **Rs. 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** =  $\text{Portfolio value} \times \frac{\text{Desired value of beta} - \text{Beta of the portfolio}}{\text{Value of a futures contract}}$

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

$$\Rightarrow 75 = V_p \times (1.80 - 1.20) / \text{Rs. 4 lakhs}$$

$$\Rightarrow 0.60 V_p = 75 \times \text{Rs. 4 lakhs}$$

$$\Rightarrow V_p = \text{Rs. 3 crores} \div 0.60 = \text{Rs. 500 lakhs}$$

**Case B :**

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

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

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

$$\Rightarrow 45 = \text{Rs. 3.60 cr.} \times (2.30 - \beta_E) / \text{Rs. 4 lakhs}$$

$$\Rightarrow 45 \times \text{Rs. 4 lakhs} = \text{Rs. 3.60 cr.} \times (2.30 - \beta_E)$$

$$\Rightarrow 2.30 - \beta_E = \text{Rs. 1.80 cr.} \div \text{Rs. 3.60 cr.}$$

$$\Rightarrow 2.30 - \beta_E = 0.50$$

$$\Rightarrow \beta_E = 2.30 - 0.50 = 1.80$$

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

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

$$\Rightarrow N_F = \text{Rs. } 1.00 \text{ cr.} \times (1.60 - 1.20) / \text{Rs. } 4 \text{ lakhs}$$

$$\Rightarrow N_F = \text{Rs. } 1.00 \text{ cr.} \times 0.40 / \text{Rs. } 4 \text{ lakhs}$$

$$\Rightarrow N_F = \text{Rs. } 40 \text{ lakhs} / \text{Rs. } 4 \text{ lakhs} = \mathbf{10 \text{ contracts}}$$

### Case D :

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

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

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

$$\Rightarrow 48 = \text{Rs. } 6.40 \text{ cr.} \times (\beta_N - 1.10) / \text{Rs. } 4 \text{ lakhs}$$

$$\Rightarrow 48 = 160 \times (\beta_N - 1.10)$$

$$\Rightarrow 48/160 = \beta_N - 1.10$$

$$\Rightarrow 0.30 = \beta_N - 1.10$$

$$\Rightarrow \beta_N = 1.10 + 0.30 = \mathbf{1.40}$$

### Case E :

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

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

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

$$\Rightarrow N_F = \text{Rs. } 2.50 \text{ cr.} \times (1.40 - 1.00) / \text{Rs. } 4 \text{ lakhs}$$

$$\Rightarrow N_F = \text{Rs. } 2.50 \text{ cr.} \times 0.40 / \text{Rs. } 4 \text{ lakhs}$$

$$\Rightarrow N_F = \text{Rs. } 1 \text{ cr.} / \text{Rs. } 4 \text{ lakhs} = \mathbf{25 \text{ contracts}}$$

### Case F :

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

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

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

$$\Rightarrow 45 = \text{Rs. } 4.50 \text{ cr.} \times (\beta_E - 1.25) / \text{Rs. } 4 \text{ lakhs}$$

$$\Rightarrow 45 = \text{Rs. } 112.50 \times (\beta_E - 1.25)$$

$$\Rightarrow (\beta_E - 1.25) = 45 / 112.50$$

$$\Rightarrow (\beta_E - 1.25) = 0.40$$

$$\Rightarrow \beta_E = 0.40 + 1.25 = \mathbf{1.65}$$

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26. A newly incorporated company intends to set up a project for the manufacture of three varieties of products. The company has already purchased land and all site development work has been completed and paid from equity fund. The cost of the project is estimated to be as follows :

	` in lakhs
1. Land and site development	13.30
2. Building and civil works	14.30
3. Plant and machinery	129.35
4. Utilities and fixed assets	10.95
5. Contingencies and escalations (10% on items 2 and 4 and 5% on item 3)	9.00
6. Preliminary and pre-operatives	12.30
7. Interest during construction	10.10
8. Margin money for working capital	<u>15.70</u>
	<b>215.00</b>

The above project to be financed as per the following :

	` in lakhs
1. Equity share capital	58.80
2. Interest free loans from promoters	19.50
3. Term loans	<u>136.70</u>
	<b>215.00</b>

As a project manager you are required to prepare a statement showing cost of production and profitability (before tax) and debt service coverage ratio on the basis of the following assumptions for consideration of the Board :

- i. The installed capacity of the plant would be 846 MT comprising the following :  
Product A – 216 MT      Product B – 336 MT      Product C – 294 MT
  - ii. Capacity utilization has been assumed as follows :  
First year                      50% of each product  
Second year                    60% of each product  
Third year                        70% of each product
  - iii. Requirement of raw material at full capacity utilization has been estimated as follows for the three products in aggregate :
- | Sl. No. | Item | Annual requirement (tones) | Unit rate (`) |
|---------|------|----------------------------|---------------|
| 1       | X    | 504.0                      | 2,600         |
| 2       | Y    | 8.4                        | 7,000         |
| 3       | Z    | 200.0                      | 19,000        |
| 4       | P    | 38.2                       | 91,600        |
| 5       | Q    | 50.4                       | 27,500        |
- iv. Requirement of packing material at full capacity utilization has been estimated at ` 111.80 lakhs.
  - v. The total cost of power and fuel oil has been estimated at ` 4.60 lakhs at full capacity utilization
  - vi. Repair and maintenance have been estimated at 1% on building, 2% on plant and machinery and miscellaneous fixed assets.
  - vii. Administrative and other overheads have been estimated at ` 2.00 lakhs and an annual increase of 15% has been considered during subsequent years.
  - viii. Salary and wages have been estimated at ` 10.00 lakhs and an increase of 10% per year has been considered in subsequent years.
  - ix. Selling expenses have been considered at 10% of the total sales.
  - x. Selling price for the product has been estimated as under :  
Product A - ` 30/kg.      Product B - ` 70/kg.      Product C - ` 45/kg.

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- xi. For the purpose of projections depreciation to be considered on straight line basis (assuming the life of the project as 10 years and a scrap value of 5%).
- xii. Interest on term loan has been considered at 14% and the interest on bank borrowings have been considered at 16.5%.
- xiii. Working capital loan for different capacity utilization level has been assumed as follows :  
50% level - ` 25 lakhs, 60% level - ` 30 lakhs 70% level - ` 35 lakhs
- xiv. Term loan to be repaid within 6 years from the date of commencement of commercial production.
- xv. The calculation to be made for 6 years and relevant assumption may be made.

**Answer :**

**a) Allocation of Contingencies of ` 9 lakhs**

Item of asset	Original estimate	Contingencies provisions	Amount rounded off	Total value of assets
Land and site development	13.30	-	-	13.30
Building and civil works	14.30	10%	1.43	15.73
Plant and machinery	129.35	5%	6.47	135.82
Miscellaneous fixed assets	<u>10.95</u>	10%	1.10	<u>12.05</u>
	167.90		9.00	176.90

**b) Allocation of Interest During Construction ` 10.10 lakhs**

Items of asset	Asset value	Interest allocated	Value of assets
Building and civil works	15.73	0.97	16.70
Plant and machinery	135.82	8.39	144.21
Miscellaneous fixed assets	<u>12.05</u>	<u>0.74</u>	<u>12.79</u>
	163.60	10.10	173.70

**Value of Assets after Allocation of Interest During Construction ` lakhs**

Land and site development	13.30
Building and civil works	16.70
Plant and machinery	144.21
Miscellaneous fixed assets	<u>12.79</u>
	187.00

**Value of depreciable assets ` lakhs**

Building and civil works	16.70
Plant and machinery	144.21
Miscellaneous fixed assets	<u>12.79</u>
	173.70

**c) Allocation of pre-operative expenses**

As per section 35D of the Income Tax Act, 1961 2.5% of the "cost of the project" can be written off over a period of 10 years. Thus ` 215 lakhs x 2.5% = ` 5.37 lakhs can be written off over a period of 10 years. The balance amount of pre-operative ` 6.93 (i.e. ` 12.30 – 5.37) lakhs is to be capitalized and is to be allocated over fixed assets. The capitalization should be done over the site development also. However, for the sake of convenience the capitalization is done over the following three category of assets :

Building and civil works, Plant and machinery, and Miscellaneous fixed assets.

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This may be allocated in the ratio of value of depreciable assets as follows :

Item of asset	Ratio for allocation	Amount allotted	Total
Building and civil works	16.70	0.67	17.37
Plant and machinery	144.21	5.75	149.96
Miscellaneous fixed assets	<u>12.79</u>	<u>0.51</u>	<u>13.30</u>
	173.70	6.93	180.63

### Value of fixed assets after allocation of pre-operatives

₹ lakhs

Land and site development	13.30
Building and civil works	17.37
Plant and machinery	149.96
Miscellaneous fixed assets	<u>13.30</u>
	193.93

Thus, the total value of assets after capitalization of contingencies, interest during construction, and pre-operative etc. are ₹ 193.93 lakhs.

#### d) Checking the accuracy of capitalization to check the accuracy of the allocation the following approach can be adopted :

Value of assets after allocation = Cost of project – Margin money for working capital to be written off

$$= 215.00 - 15.70 - 5.37 = ₹ 193.93 \text{ lakhs}$$

Hence, the value of the assets capitalized above is correct.

#### e) Depreciation

Depreciation is to be calculated on the straight line basis. Assuming the life of the project is 10 years and the scrap value is 5% the value of the depreciable assets would be :

$$= 193.93 - 13.30 = ₹ 180.63 \text{ lakhs}$$

$$\text{Building} \quad ₹ 17.37 \text{ lakhs}$$

$$\text{Others} \quad ₹ 163.36 \text{ lakhs}$$

$$\text{Scrap value @ 5\%} = ₹ 9.03 \text{ lakhs}$$

$$\text{Annual depreciation} = (180.63 - 9.03) \div 10 = 17.16 \text{ lakhs}$$

#### f) Raw material

##### Raw material requirement at 10%

Item	Quantity (MT)	Price (₹)	At 100% capacity (₹)
X	504.00	2,600	13,10,400
Y	8.40	7,000	58,800
Z	200.00	19,000	38,00,000
P	38.20	91,600	34,99,120
Q	50.40	27,500	13,86,000
			1,00,54,320

#### Raw material requirement

₹ lakhs

At 50 % capacity 50.27

At 60% 60.33

At 70% 70.38

#### g) Packing expenses

₹ lakhs

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At 100%	111.80
At 50%	55.90
At 60%	67.08
At 70%	78.26

### h) Power and fuel expenses

At 100% capacity the expenses on power and fuel would be ` 4.60 lakhs.

Capacity utilization	50%	60%	70%
Power and fuel (` lakhs)	2.30	2.76	3.22

### i) Repairs and maintenance expenses

` lakhs

Building and civil works (17.37 x 1/100)	0.17
Plant and machinery (including miscellaneous fixed assets) (163.26 x 2/100)	3.27
	3.44

### j) Sales realization at 100% capacity

` lakhs

Product A	216 MT x ` 30,000	64,80,000
Product B	336 MT x ` 70,000	2,35,20,000
Product C	294 MT x ` 45,000	1,32,30,000
		4,32,30,000

### Sales realization at different levels of capacity

Capacity utilization	50%	60%	70%
Sales realization (` lakhs)	216.15	259.38	302.61

### k) Estimation of selling expenses

Selling expenses are to be calculated at 10% of the sales realization

` lakhs

Particulars	1 year	2 years	3 to 6 years
Capacity utilization	50%	60%	70%
Sales realization (` lakhs)	216.15	259.38	302.61
Selling expenses (10% of sales)	21.62	25.94	30.26

### l) Power and fuel

Capacity utilization	100%	50%	60%	70%
Power and fuel (` lakhs)	4.6	2.3	2.76	3.22

### m) Administration and other overheads

` lakhs

<b>Years</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
Administration and other overheads (15% increase p.a.)	2	2.3	2.65	3.04	3.5	4.02

### n) Salary and wages

` lakhs

<b>Years</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
Salary and wages (10% increase p.a.)	10.00	11.00	12.10	13.31	14.64	16.10

### o) Interest on working capital loan

` lakhs

Capacity utilization	50%	60%	70%
Working capital loan	25.00	30.00	35.00
Interest on working capital loan @	4.13	4.95	5.78

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16.5%		
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**p) interest on term loan**

` lakhs

Year	Payment	Balance	Interest @ 14%
1	-	136.70	19.14
2	-	136.70	19.14
3	34.00	102.70	19.14
4	34.00	68.70	14.38
5	34.00	34.70	9.62
6	34.70	-	4.86
	136.70		86.28

**q) depreciation on buildings**

` lakhs

Particulars	1	2	3	4	5	6
Opening balance	163.26	147.75	132.24	116.73	101.22	85.71
Depreciation	15.51	15.51	15.51	15.51	15.51	15.51
WDV	147.75	132.24	116.73	101.22	85.71	70.20
2% on opening balance for repairs etc.	3.27	2.96	2.65	2.33	2.02	1.71

**r) Repairs and maintenance**

` lakhs

Years	1	2	3	4	5	6
Repairs and maintenance	3.44	3.12	2.79	2.45	2.13	1.80

**Statement of cost of production and profitability before tax**

` lakhs

Years	1	2	3	4	5	6
Raw materials	50.27	60.33	70.38	70.38	70.38	70.38
Packing materials	55.90	67.08	78.26	78.26	78.26	78.26
Power and fuel	2.30	2.76	3.22	3.22	3.22	3.22
Repairs and maintenance	3.44	3.12	2.79	2.45	2.13	1.80
Administration and other overheads	2.00	2.30	2.65	3.04	3.50	4.02
Salaries	10.00	11.00	12.10	13.31	14.64	16.11
Selling expenses	21.62	25.94	30.26	30.26	30.26	30.26
Interest on ways and means	4.13	4.95	5.78	5.78	5.78	5.78
Interest on term loans	19.14	19.14	19.14	14.38	9.62	4.86
Depreciation	17.16	17.16	17.16	17.16	17.16	17.16
Cost of production (a)	<u>185.96</u>	<u>213.78</u>	<u>241.74</u>	<u>238.24</u>	<u>234.95</u>	<u>231.85</u>
Sales (b)	<u>216.15</u>	<u>259.38</u>	<u>302.61</u>	<u>302.61</u>	<u>302.61</u>	<u>302.61</u>
Profit before tax (b) – (a)	30.19	45.60	60.87	64.37	67.66	70.76
Tax @ 50% (assumed)	15.09	22.80	30.44	32.19	33.83	35.38
Profit after tax (PAT)	15.10	22.80	30.43	32.18	33.83	35.38
Available cash inflow (PAT + Depreciation + Interest on term loan)	51.40	59.10	66.73	63.72	60.61	57.40
Necessary payments (term loan repayment + interest)	19.14	19.14	53.14	48.38	43.62	39.56

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$$\text{Debt Service Coverage (DSCR) Ratio} = \frac{\text{Available total cash inflow}}{\text{Total necessary payments}} = \frac{358.96}{222.98} = 1.61$$

27. The financial position of the A Company Ltd. As on 31<sup>st</sup> March 2012 and 31<sup>st</sup> March, 2011 and the Profit and Loss Account for the year on 31<sup>st</sup> March 2012 are as follows :

Particulars	2012	2011
<b>Assets</b>		
Land and buildings	1,50,000	1,00,000
Plant and machinery	2,20,000	2,00,000
Less : Accumulated depreciation	82,000	80,000
Inventory	1,25,000	90,000
Debtors	40,000	45,000
Cash	70,000	50,000
	<u>5,23,000</u>	<u>4,05,000</u>
<b>Liabilities</b>		
Share capital	1,75,000	75,000
Share premium	12,500	7,500
Reserves and surplus	62,500	17,500
Institutional loan	23,000	15,000
Debentures	1,20,000	1,50,000
Creditors	25,000	30,000
Salaries payable	15,000	10,000
Provisions for tax	50,000	60,000
Provision for dividend	40,000	40,000
	<u>5,23,000</u>	<u>4,05,000</u>

### Profit and Loss Account for the year ended 31<sup>st</sup> March 2012

Sales		5,00,000
Less : Cost of goods sold		<u>2,10,000</u>
Gross profit		2,90,000
Less : Operating expenses :		
Office and administrative	45,000	
Selling and distribution	25,000	
Interest	12,000	
Depreciation	<u>22,000</u>	<u>1,04,000</u>
Operating profit		1,86,000
Add : Gain on sale of plant		<u>6,000</u>
Total profit		1,92,000
Less : Income-tax		<u>87,000</u>
Net profit		1,05,000

The additional information is given below :

- i. During the year, plant costing ` 50,000 (accumulated depreciation of ` 20,000) was sold.
- ii. The debentures of the face value of ` 30,000 were converted into shares capital at par.
- iii. The company paid a dividend of ` 40,000 and issued bonus shares of ` 20,000 during the year.
- iv. The company further issued 5,000 shares of ` 10 each at a premium of Re. 1 per share during the year.

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You are required to prepare a Statement of Sources and Application of Funds.

Answer :

Working notes :

### Profit and Loss Adjustment A/c.

Particulars	`	Particulars	`
To Depreciation	22,000	By Balance b/d	17,500
To Dividend	40,000	By Plant and machinery A/c. (profit on sale)	6,000
To Bonus Shares	20,000	By Fund from operations (balancing figure)	<u>1,21,000</u>
To Balance c/d	<u>62,500</u>		
	<u>1,44,500</u>		<u>1,44,500</u>

### Plant and Machinery A/c.

Particulars	`	Particulars	`
To Balance b/d	2,00,000	By Bank A/c. (purchase)	36,000
To Profit & Loss A/c. (profit on sale)	6,000	By Provision for depreciation A/c.	20,000
To Bank A/c.	70,000	By Balance c/d.	<u>2,20,000</u>
	<u>2,76,000</u>		<u>2,76,000</u>

### Provision for Depreciation on Plant and Machinery A/c.

Particulars	`	Particulars	`
To Plant & Machinery A/c.	20,000	By Balance A/c.	80,000
To Balance c/d	82,000	By Profit and Loss A/c.	22,000
	<u>1,02,000</u>		<u>1,02,000</u>

### Schedule showing changes in Working Capital

Particulars	2011	2012	Increase	Decrease
Current assets				
Cash	50,000	70,000	20,000	-
Debtors	45,000	40,000	-	5,000
Inventory	<u>90,000</u>	<u>1,25,000</u>	35,000	-
(a)	<u>1,85,000</u>	<u>2,35,000</u>		
Current liabilities				
Creditors	30,000	25,000	5,000	-
Salaries payable	10,000	15,000	-	5,000
Provision for tax	60,000	50,000	10,000	-
Provision for dividend	<u>40,000</u>	<u>40,000</u>	-	-
(b)	<u>1,40,000</u>	<u>1,30,000</u>	-	-
Working capital	45,000	1,05,000	-	-
(a) – (b)				
Increase in working capital	<u>60,000</u>	-	-	<u>60,000</u>
	1,05,000	1,05,000	70,000	70,000

### Funds flow statement for the year ended 31<sup>st</sup> March, 2012

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<b>Sources of funds</b>	
Funds from operations	1,21,000
Sale of plant	36,000
Institutional loan raised	8,000
Issue of shares	55,000
	<u>2,20,000</u>
<b>Application of funds</b>	
Purchase of land and buildings	50,000
Purchase of plant and machinery	70,000
Payment of dividend	40,000
Increase in working capital	<u>60,000</u>
	2,20,000

28. Write short notes on :

- (a) Capital Rationing
- (b) LD Clause
- (c) Bridge Finance
- (d) Brown Field Project.

**Answer:**

**(a) Capital Rationing** – Capital Rationing refers to a situation where the firm is constrained for external or self-imposed reasons to obtain necessary funds to invest in all profitable investment projects.

Capital Rationing exists when funds available for investment are to undertake all projects which are otherwise acceptable. Capital Rationing may arise due to :

- (i) External constraints, or
- (ii) Internal constraints imposed by management.

External Capital Rationing arises out of the inability of firm to raise sufficient funds from the market at given cost of capital.

Internal Capital Rationing is caused by self imposed restriction by management to its capital expenditure outlays.

The selection process under capital Rationing will involve two steps :

- (i) Ranking of projects according to some measure of profitability : P.I, BCR, NPV, IRR etc.
- (ii) Selecting projects in descending order of profitability until the budget figures are exhausted keeping in view the objective of maximizing the value of the firm.

**(b) LD Clause** — Liquidated Damage clause inserted in the contract of contractor or supplier thereby giving a financial protection to owner in event of failure on the part of contractor to fulfill the obligation of the contractor in time. L/D is generally imposed @ 0.5% per week or part thereof

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subject to maximum 50% of the order value for late execution of order. L/D clause may be made more specific of imposition, may be even day to day basis delay basis.

**(c) Bridge Finance** — This is a type of finance where the amount is provided by direct financing institutions either against long term loans or against underwriting of share issue. This is to meet the financial requirements when there is reasonable delay in the public issue. The bridging finance is granted mainly for meeting the urgent and emergent requirements.

**(d) Brown Field Project** — A project implemented in the precincts of a working plant/working facility is known as Brown Field Project. Revamping/Replacement/Rehabilitation/Renovation/Modernisation projects come under this category of BFP. The most common BFP is the modernization or partial renovation of a running plant.

Management of a BFP within framework of an operating plant calls for much more imagination, detailed planning meticulous scheduling and control and an integrated teamwork from all concerned departments like maintenance, engineering, civil construction, and administration.

**29. 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 Rs. 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 it can be hedged by a forward contract.**

**Answer:**

Spot rate of ₹ 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 per Rupee	=	3.6 yen – 10% of 3.6 = 3.6 × 0.36 = 3.24 Yen

Particulars	Rs. (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	Rs. (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 Rs. 3.33 lakhs. This could be reduced to Rs. 2.73 lakhs if it is covered with Forward contract. Hence, taking forward contract is suggested.

**30. Discuss the following:**

**(a) Functions of Finance Manager.**

**(b) The wealth maximization objective is superior to the profit maximization objective of a firm.**

**Answer:**

**(a)** The Finance Manager's main objective is to manage funds in such a way so as to ensure their optimum utilisation and their procurement in a manner that the risk, cost and control considerations are properly balanced in a given situation. To achieve these objectives the Finance Manager performs the following functions:

- (i) Estimating the requirement of Funds: Both for long-term purposes i.e. investment in fixed assets and for short-term i.e. for working capital. Forecasting the requirements of funds involves the use of techniques of budgetary control and long-range planning.
- (ii) Decision regarding Capital Structure: Once the requirement of funds has been estimated, a decision regarding various sources from which these funds would be raised has to be taken. A proper balance has to be made between the loan funds and own funds. He has to ensure that he raises sufficient long term funds to finance fixed assets and other long term investments and to provide for the needs of working capital.
- (iii) Investment Decision: The investment of funds, in a project has to be made after careful assessment of various projects through capital budgeting. Assets management policies are to be laid down regarding various items of current assets. For e.g. receivable in coordination with sales manager, inventory in coordination with production manager.
- (iv) Dividend decision: The finance manager is concerned with the decision as to how much to retain and what portion to pay as dividend depending on the company's policy. Trend of earnings, trend of share market prices, requirement of funds for future growth, cash flow situation etc., are to be considered.
- (v) Evaluating financial performance: A finance manager has to constantly review the financial performance of the various units of organisation generally in terms of ROI Such a review helps the management in seeing how the funds have been utilised in various divisions and what can be done to improve it.
- (vi) Financial negotiation: The finance manager plays a very important role in carrying out negotiations with the financial institutions, banks and public depositors for raising of funds on favourable terms.
- (vii) Cash management: The finance manager lays down the cash management and cash disbursement policies with a view to supply adequate funds to all units of organisation and to ensure that there is no excessive cash.
- (viii) Keeping touch with stock exchange: Finance manager is required to analyse major trends in stock market and their impact on the price of the company share.

**(b)** A firm's financial management may often have the following as their objectives:

- (i) The maximisation of firm's profit.
- (ii) The maximisation of firm's value / wealth.

The maximisation of profit is often considered as an implied objective of a firm. To achieve the aforesaid objective various type of financing decisions may be taken. Options resulting into maximisation of profit may be selected by the firm's decision makers. They even sometime may adopt policies yielding exorbitant profits in short run which may prove to be

unhealthy for the growth, survival and overall interests of the firm. The profit of the firm in this case is measured in terms of its total accounting profit available to its shareholders.

The value/wealth of a firm is defined as the market price of the firm's stock. The market price of a firm's stock represents the focal judgment of all market participants as to what the value of the particular firm is. It takes into account present and prospective future earnings per share, the timing and risk of these earnings, the dividend policy of the firm and many other factors that bear upon the market price of the stock.

The value maximisation objective of a firm is superior to its profit maximisation objective due to following reasons.

1. The value maximisation objective of a firm considers all future cash flows, dividends, earning per share, risk of a decision etc. whereas profit maximisation objective does not consider the effect of EPS, dividend paid or any other returns to shareholders or the wealth of the shareholder.
2. A firm that wishes to maximise the shareholders wealth may pay regular dividends whereas a firm with the objective of profit maximisation may refrain from dividend payment to its shareholders.
3. Shareholders would prefer an increase in the firm's wealth against its generation of increasing flow of profits.
4. The market price of a share reflects the shareholders expected return, considering the long-term prospects of the firm, reflects the differences in timings of the returns, considers risk and recognizes the importance of distribution of returns.

The maximisation of a firm's value as reflected in the market price of a share is viewed as a proper goal of a firm. The profit maximisation can be considered as a part of the wealth maximisation strategy.