

# Revisionary Test Paper\_Final\_Syllabus 2008\_June 2013

## Paper-12 : FINANCIAL MANAGEMENT & INTERNATIONAL FINANCE

- Q. 1. a) For each of the questions given below, one out of four answers is correct. Indicate the correct answer and give your workings/ reasons briefly.
- i. The traditional view of financial management looks at :
    - A. Arrangement of short-term and long-term funds from financial institutions.
    - B. Mobilisation of funds through financial instruments
    - C. Orientation of Finance function with Accounting function
    - D. All of the above
  - ii. A firm seeks to increase its current ratio from 1.5 before its closing date of the accounts. The action that would make it possible is :
    - A. Delaying payment of salaries
    - B. Increase charge for depreciation
    - C. Making cash payment to creditors
    - D. Selling marketable securities for cash at book value.
  - iii. The dividends distributed to the shareholders and taxes paid during the year are shown as application of funds when provision for dividends and provision for taxes are treated as :
    - A. Current liabilities
    - B. Non-current liabilities
    - C. Fund items
    - D. Non-fund items
  - iv. In using debt-equity ratio in capital structure decisions, there is an optimal capital structure where :
    - A. The WACC is minimum
    - B. The cost of debt is lowest
    - C. The cost savings are highest
    - D. The marginal tax benefit is equal to marginal cost of financial distress
  - v. Where the firm has sufficient profits from its existing operations, the loss on the new project will :
    - A. Cause overall loss
    - B. Reduce the overall taxation liability
    - C. Increase WACC
    - D. Increase cost of debt
  - vi. Buying and selling call and put option with different strike prices and different expiration dates are called :
    - A. Butterfly spread
    - B. Diagonal spread
    - C. Vertical spread
    - D. Short hedge
  - vii. 'Straddle' as a type of option trading means :
    - A. One call, one put, same security, same strike and same period
    - B. One call, one put, same security, different strike price and same period
    - C. One call, two puts, same security, same strike price and same period
    - D. None of the above.
  - viii. Which of the following is/are basic precondition/s for interest arbitrage theory ?
    - A. Free capital mobility
    - B. No taxes
    - C. No government restrictions on borrowing in foreign currency
    - D. All of the above

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- ix. Global Depository Receipts (GDR) are issued to :
- A. Investors of India who want to subscribe to shares of foreign companies
  - B. Only to persons of Indian origin residing in a foreign country
  - C. Non resident investors against publicly traded shares of the issuing companies and denominated in US dollars.
  - D. Foreign banks as security to raise foreign currency loans.
- x. If the amount and timing of a foreign currency outflow are both uncertain, then the best hedging technique will be to :
- A. Buy a put option
  - B. Buy a call option
  - C. Sell a call option
  - D. Buy a forward contract

Q. 1. (b) In each of the questions given below, one out of four is correct. Indicate the correct answer.

- i. Vishnu Steels Ltd. Has issued 30,000 irredeemable 14% debentures of ₹ 150 each. The cost of floatation of debentures is 5% of the total issued amount. The company's taxation rate is 40%. The cost of debentures is :
- A. 8.95%
  - B. 7.64%
  - C. 9.86%
  - D. 8.84%
- ii. The balance sheet of ABC Ltd. Shows the capital structure as follows :  
2,50,000 equity shares of ₹ 10 each; 32,000, 12% preference shares of ₹ 100 each; general reserve of ₹ 14,00,000; securities premium account ₹ 6,00,000; 25,000, 14% fully secured non-convertible debentures of ₹ 100 each.; term loans from financial institutions ₹ 10,00,000.  
The leverage of the firm is :
- A. 67.2%
  - B. 62.5%
  - C. 59.8%
  - D. 56.3%
- iii. A company has obtained quotes from two different manufacturers for an equipment. The details are as follows :
- | Product | Cost (₹ Million) | Estimated life (years) |
|---------|------------------|------------------------|
| Make X  | 4.50             | 10                     |
| Make Y  | 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 X will be cheaper
  - B. Make Y will be cheaper
  - C. Cost will be the same
  - D. None of the above
- iv. According to the second method of lending by a bank as per Tandon committee suggestion, the maximum permissible bank borrowing – based on the following information is :
- Total current assets ₹ 40,000; Current assets other than bank borrowings ₹ 10,000; Core current assets ₹ 5,000.
- A. ₹ 22,500
  - B. ₹ 20,000
  - C. ₹ 16,250
  - D. ₹ 18,500

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- v. ABC Ltd. Is selling its products on credit basis and its customers are associated with 5% credit risk. The annual turnover is expected at ₹ 5,00,000 if credit is extended with cost of sales at 75% of sale value. The cost of capital of the company is 15%. The net profit of the company is :
- A. ₹ 1,25,000  
B. ₹ 77,670  
C. ₹ 88,430  
D. ₹ 1,10,500
- vi. The following various currency quotes are available from a leading bank:  
₹/£ 75.31/75.33  
£ / \$ 0.6391/0.6398  
\$/¥ 0.01048/0.01052  
The rate at which yen(¥ ) can be purchased with rupees will be  
A. Re. 0.5070  
B. ₹ 1.5030  
C. ₹ 1.7230  
D. None of the above.
- vii. Ms. S buys 10000 shares of RR Ltd. at ₹ 50 and obtains a complete hedge of shorting 400 Nifties at ₹ 2200 each. She closes out her position at closing price of next day at which point the share of RR Ltd. has dropped 2% and the Nifty future has dropped 1.5% . What is the overall profit/(loss) of this set of transaction ?  
A. Gain ₹ 3200  
B. Gain ₹ 2200  
C. Loss ₹ 3200  
D. Loss ₹ 2200
- viii. An Indian company is planning to invest in US. The US inflation rate is expected to be 3% and that of India is expected to be 8% annually. If the spot rate currently is ₹ 45/US\$, what spot rate can you expect after 5 years ?  
A. ₹ 59.09/US\$  
B. ₹ 57.00/US\$  
C. ₹ 57.04/US\$  
D. ₹ 57.13/US\$
- ix. The stock of Pioneer company sells for ₹ 120. The present value of exercise price and the value of a call option are ₹ 108.70 and RS. 19.80 respectively. Hence the value of the put option is :  
A. ₹ 8.50  
B. ₹ 9.00  
C. ₹ 10  
D. Zero
- x. The spot and 6 months forward rates of L in relation to the rupee (Re/L) are ₹ 77.92542/78.1255 and ₹ 78.8550/78.9650 respectively. What will be the annualized forward margin (premium with respect to Ask price) ?  
A. 2.31%  
B. 2.15%  
C. 1.80%  
D. 1.59%

Answer 1. (a)

- i) D  
ii) C  
iii) B

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- iv) D  
v) B  
vi) B  
vii) A  
viii) D  
ix) C  
x) B

**Answer 1. (b)**

i) **D – 8.84%**

	₹	
Total issued amount (30,000 x ₹ 150)		45,00,000
Less : Floatation cost (₹ 45,00,000 x 5/100)		<u>2,25,000</u>
Net proceeds from issue		42,75,000
Annual interest charge =	$\frac{₹ 45,00,000 \times 14}{100}$	= ₹ 6,30,000
$K_d$ =	$\frac{I(1-t)}{NP} = \frac{6,30,000(1-0.40)}{42,75,000}$	= 0.0884 or 8.84%

ii) **C – 59.8%**

Fixed income funds = Preference share capital + Debentures + Term loans		
= ₹ 32,00,000 + ₹ 25,00,000 + ₹ 10,00,000		= ₹ 67,00,000
Equity funds = Equity share capital + General reserve + Securities premium		
= ₹ 25,00,000 + ₹ 14,00,000 + ₹ 6,00,000		= ₹ 45,00,000
Total funds used in the capital structure		
= ₹ 67,00,000 + ₹ 45,00,000		= ₹ 1,12,00,000
Leverage =	$\frac{₹ 67,00,000}{₹ 1,12,00,000} \times 100$	= 59.8%

iii) **A – Make X will be cheaper**

Make X		
Purchase cost	=	₹ 4.50 million
Equivalent annual cost	=	4.50/6.1446 = ₹ 0.73235
Make Y		
Purchase cost	=	₹ 6.00 million
Equivalent annual cost	=	6.00/7.6061 = ₹ 0.78884 million
Therefore, equivalent annual cost of make X is lower than make Y, make X is suggested to purchase.		

iv) **B – ₹ 20,000**

MPBF under second method		
= (75% current assets) – (Current liabilities other than bank borrowings)		
= (₹ 40,000 x 75/100) – ₹ 10,000	=	₹ 20,000

v) **B – ₹ 77,670**

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

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**vi. A - Re. 0.5070**

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

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

**vii. A – Gain ₹ 3,200**

	Value of bought shares	Value of short future
Today's valuation	50*10000=₹5.00 lac	400 * 2200=₹8.80 lac
Next day's valuation	49*10000=₹4.90 lac	400 * 2167=₹ 8.668 lac
Gain /(loss)	2% dropped=Rs0.10 lac	1.5% dropped= ₹0.132 lac

$$\text{Net Gain} = ₹0.13200 - ₹0.1000 \text{ lac} = ₹ 3200/-$$

**viii. C – ₹ 57.04/US\$**

According to Purchase Power Parity, spot rate after 5 years

$$= ₹ 45 \times [(1 + 0.08) / (1 + 0.03)]^5 = 45 \times 1.2675 = ₹ 57.04$$

**ix. A – ₹ 8.50**

$$\begin{aligned} \text{Value of put option} &= \text{Value of call option} + \text{PV of exercise price} - \text{Stock price} \\ &= ₹ 19.80 + \text{RS. } 108.70 - ₹ 120 \\ &= ₹ 8.50 \end{aligned}$$

**x. B – 2.15%**

The forward margin (premium with respect to Ask price) rate :

$$\begin{aligned} &= \frac{F - S}{S} \times \frac{12}{n} \times 100 \\ &= \frac{78.9650 - 78.1255}{78.1255} \times \frac{12}{6} \times 100 = 2.1491\% \text{ or } 2.15\% \end{aligned}$$

**Q. 2. Write short notes on :**

- i. **Marking to market**
- ii. **Cross border leasing**
- iii. **'Financial Engineering'**
- iv. **Forward to forward contracts**
- v. **Economic value added**

**Answer 2.**

- i. **Marking to market** – Marking to market is a characteristic feature of future contracts. Future contracts are standardized contracts that trade on organized future markets. Under a future contract the seller agrees to deliver to the buyer a specified quantity of security, commodity or foreign exchange at a fixed time in future at a price agreed to at the time of entering into the contract. To ensure that default risk is reduced to minimum, both parties are required to deposit some margin money with the organized clearing house, which is known as the initial margin. Further, with the fluctuation in the price of the underlying asset, the balance in the margin account may fall below specified minimum level or even become negative so that it may not happen like this, at the end of each trading session, all outstanding contracts are appraised at the settlement price of that session. This is known as Marking to Market.

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This would mean that some participants would make a loss while others would stand to gain. The exchange adjusts this by debiting the margin accounts of those members who made a loss and crediting the accounts of those members who have gained. A member making a loss must make good loss and the counter party will receive his profit.

Thus the value of the future contracts is set to zero at the end of each trading day.

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

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

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

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

In recent years, the rapidity with which corporate finance and investment finance have changed in practice has given birth to a new area of study known as financial engineering. It involves use of complex mathematical modeling and high speed computer solutions.

It has been practiced by commercial banks in offering new and tailor-made products to different types of customers. Financial Engineering has been used in schemes of mergers and acquisitions.

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

- iv. A forward-to-forward contract is a swap transaction that involves the simultaneous sale and purchase of one currency for another, where both transactions are forward contracts. It allows the company to take advantage of the forward premium without locking on to the spot rate. The spot rate has to be locked on to before the starting date of the forward-to-forward contract.

A forward-to-forward contract is a perfect tool for corporate houses that want to take advantage of the opposite movements in the spot and forward market by locking in the forward premium at a high or low. Now, CFOs can defer locking on the spot rate to the future when they consider the spot rate to be moving in their favour. However a forward-to-forward contract can have serious cash flows implications for a corporate.

- v. Economic value added (EVA) measures economic profit/ loss as opposed to accounting profit/loss. EVA is essentially the surplus left after making an appropriate charge for the capital employed in the business. It may be calculated in any of the following, apparently different but essentially equivalent, ways :

$$\begin{aligned} \text{EVA} &= \text{NOPAT} - c \times \text{Capital} \\ \text{EVA} &= \text{Capital} (r - c) \\ \text{EVA} &= [\text{PAT} + \text{Int.} (1 - t)] - c \times \text{Capital} \end{aligned}$$

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$$EVA = PAT - k_e \times \text{Equity}$$

Where EVA is the economic value added, NOPAT is the net operating profit after tax,  $c$  is the cost of capital, Capital is the economic book value of the capital employed in the firm,  $r$  is the return on capital, PAT is the profit after tax, Int. is the interest expense of the firm,  $t$  is the marginal tax rate of the firm,  $k_e$  is the cost of equity, and equity is the equity employed in the firm.

EVA will rise if operating efficiency is improved, if value adding investments are made, if uneconomic activities are curtailed and if the cost of capital is lowered.

Q. 3. a) What is foreign exchange risk ? Briefly explain the major types of foreign exchange exposures.

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

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

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

Required :

When should the company replace the machine ?

(Notes : Present value of an annuity of Re. 1 per period for 8 years at interest rate of 15% : 4.4873; present value of Re. 1 to be received after 8 years at interest rate of 15% : 0.3269)

**Answer 3. (a)**

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

Foreign exchange exposures can be classified into three broad categories :

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

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

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

**Answer 3. (b)**

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

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$$\begin{aligned} \text{PV of costs of new machine} &= ₹ 90,000 + ₹ 10,000 \times \text{PVIFA} (15\%, 8) - ₹ 20,000 \times \text{PVIF} (15\%, 8) \\ &= ₹ 90,000 + ₹ 44,873 - ₹ 6,538 \\ &= ₹ 1,28,335 \end{aligned}$$

$$\begin{aligned} \text{Equivalent annual cost of new machine} &= ₹ 1,28,335 / \text{PVIFA} (15\%, 8) \\ &= ₹ 28,600 \end{aligned}$$

If we replace machine now :

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

If we replace machine after one year :

We do not get ₹ 40,000 now. This should be treated as lost opportunity. This should be taken as cost. Secondly, we get ₹ 25,000 at the end of the year. Thirdly, we need to spend ₹ 10,000 on maintenance. Thus, PV of cost of old machine (if replaced after one year)

$$\begin{aligned} &= ₹ 40,000 (\text{opportunity cost}) + ₹ 10,000 \text{PVIF} (15\%, 1) - ₹ 25,000 \times \text{PVIF} (15\%, 1) \\ &= ₹ 26,960 \end{aligned}$$

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

$$= 1.15 \times ₹ 26,960 = ₹ 31,000$$

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

**Q. 4. a) What is the difference between Economic Value Added and Accounting Profit ?**

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

**Balance Sheets**  
As at .....

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

The following information concerning the transaction are available :

- i. Net profit for 2012 as per Profit and loss account was ₹ 49,097
- ii. A 10% cash dividend was paid during the year.
- iii. The premium of Life Insurance Policies were ₹ 2,773 of which ₹ 1,627 was charged to Profit and Loss Account of the year.

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- iv. New machinery was purchased for ₹ 31,365 and machinery costing ₹ 32,625 was sold during the year. Depreciation on machinery sold had accumulated to ₹ 29,105 at the date of sale. It was sold as scrap for ₹ 1,500. The remaining increase in Fixed Assets resulted from construction of a Building.
- v. The Mortgage Debentures mature at the rate of ₹ 5,000 per year. In addition to the above, the company purchased and retired ₹ 8,500 of Debentures at ₹ 103. Both the premium on retirement and the applicable discount were charged to Profit and Loss Account.
- vi. The allowance for Inventory Loss was created by a charge to expenses in each year to provide for obsolete items.
- vii. A debit to reserve for contingencies of ₹ 11,400 was made during the year. This was in respect of a past tax liability.

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

### Answer 4. (a)

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

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

$$\text{EVA} = \text{NOPAT} - K \times \text{WACC}$$

Where,

$$\text{NOPAT} = \text{Net operating profit after tax} = \text{EBIT} (1 - t)$$

$$K = \text{Capital employed (Equity + Debt)}$$

$$\text{WACC} = \text{Weighted average cost of equity and debt.}$$

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

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

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

### Answer 4. (b)

#### Statement of Sources and Applications of Funds For the year ended 31<sup>st</sup> December 2012

Sources	₹	Applications	₹
Sale of Machinery	1,500	Purchase of machinery	31,365
Trading profit (adjusted)	75,457	Payment for construction of building	36,264
	76,957	Dividend paid	10,000
Add: Decrease in working capital	28,600	Redemption of debentures	13,755
		Tax liability paid	11,400
		Premium on Life Policy (1,146 + 1,627)	2,773
	<u>1,05,557</u>		<u>1,05,557</u>

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Workings :

### Statement of Change in Working Capital

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

#### 4% Mortgage Debenture A/c.

Dr.		Cr.	
Particulars	₹	Particulars	₹
To, 4% Mortgage debenture holders	13,500	By bal b/d	82,000
To, Bal c/d	<u>68,500</u>		
	82,000		82,000

#### 4% Mortgage Debenture holders' A/c.

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

#### Accumulated Depreciation A/c.

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

#### Allowance for Inventory Loss A/c.

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

#### Reserve for Contingencies A/c.

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

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### Life Insurance Policy A/c.

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

### Building and Machinery A/c.

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

### Debenture Discount A/c.

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

### Profit and Loss A/c.

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

Q. 5. a) Venture Capital is considered to be a high risk capital. Do you agree? Enumerate the main features of Venture Capital investment.

b) A company has the following capital structure :

	₹
Ordinary shares of ₹ 10 each, fully paid	40,00,000
7.5% Cumulative preference shares of ₹ 100 each, fully paid	2,00,000
Reserve & retained profits	45,00,000
11% Long-term loan	<u>6,00,000</u>
<b>Total</b>	<b><u>93,00,000</u></b>

In addition, the company has a bank overdraft for working capital and this averages to ₹ 10 lakhs. Interest thereon is 15%. You are required to :

Calculate the company's overall rate of return on capital employed in order to ensure :

- i. Payment of all interest
- ii. Dividend of preference dividend
- iii. Payment of preference dividend

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- iv. Ordinary shareholder's dividend is 12%  
Assume the tax rate to be 50%.

### Answer 5. (a)

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

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

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

The main features of venture capital investment are :

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

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

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

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

### Answer 5. (b)

#### Calculation of Profit (before tax and interest)

	₹	₹
Interest on Bank overdraft $\left( ₹ 10,00,000 \times \frac{15}{100} \right)$	1,50,000	
$\left( ₹ 6,00,000 \times \frac{11}{100} \right)$	66,000	2,16,000
7.5% Dividend on cumulative pref. shares $\left( ₹ 2,00,000 \times \frac{7.5}{100} \right)$	15,000	
Ordinary shareholders' dividend $\left( ₹ 40,00,000 \times \frac{12}{100} \right)$	4,80,000	
Reserve & retained profits		
$[(₹ 4,80,000 + 15,000) \times \frac{100}{60} = 8,25,000]$		
(8,25,000 – 4,95,000)	3,30,000	8,25,000
Tax @ 50% of Net profit before tax		
Therefore, net profit after tax will be 100% i.e.		8,25,000
Profit before tax and interest		18,66,000

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Capital employed :  
(₹ 93,00,000 + ₹ 10,00,000) 1,03,00,000

$$\begin{aligned}\text{Therefore, overall return on capital employed} &= \frac{\text{Profit}}{\text{Capital Employed}} \times 100 \\ &= \frac{\text{₹ } 18,66,000}{\text{₹ } 1,03,00,000} \times 100 \\ &= 18.12\%\end{aligned}$$

Q. 6. a) When a lease can be considered as a Financial Lease ?

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 6. (a)

A lease is considered as a Financial lease if the lessor intends to recover his capital outlay plus the required rate of return on funds during the period of lease. It is a form of financing the assets under the cover of lease transaction. A financial lease is a noncancellable contractual commitment on the part of the lessee (the user) to make a series of payments to the lessor for the use of an asset. In this type of leases, lessee will use and have control over the asset without holding ownership of the asset. The lessee is expected to pay for upkeep and maintenance of the asset. This is also known by the name 'capital lease'. The essential point of this type of lease agreement is that it contains a condition whereby the lessor agrees to transfer the title for the asset at the end of the lease period at a nominal cost. At the end of lease it must give an option to the lessee to purchase the asset he has used. Under this lease usually 90% of the fair value of the asset is recovered by the lessor as lease rentals and the lease period is 75% of the economic life of the asset. The lease agreement is irrevocable. Practically all the risks incidental to the asset ownership and all the benefits arising therefrom is transferred to the lessee who bears the cost of maintenance, insurance and repairs. Only the title deeds remain with the lessor.

Answer 6. (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

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

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ii) Desired lease rent to earn 20% IRR before expenses and taxes  
Present value of inflow annually for 8 years @ 20% = 3.837

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

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 x 1,00,000) = 5,00,000  
3.837 [0.6 x – 60,000 + 50,000] + 23,000 = 5,00,000  
2.3022 x = 5,15,070  
X = 2,23,730

Verification	₹
This may be confirmed as lease rental	2,23,730
Less : Expenses + Depreciation	<u>1,00,000</u>
EBT	1,23,730
Less : Tax 40%	<u>49,492</u>
PAT	74,238
Add : Depreciation	<u>50,000</u>
CFAT	1,24,238

$$= \frac{C_0 - \text{PV of SV}}{\text{CFAT}} = \frac{\text{₹ } 5,00,000 - \text{₹ } 23,300}{\text{₹ } 1,24,238} = 3.837 \text{ or } 20\%$$

Q. 7. a) Explain the term "Swaps". Outline the possible benefits to a Company of undertaking an Interest rate swap.

b) ABC Ltd. Provides you the following information :

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

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

(Assume Income tax @ 40%)

Required :

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

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### Answer 7. (a)

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

Benefits of Interest rate swap :

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

### Answer 7. (b)

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

Particulars	Financial Plan A ₹	Financial Plan B ₹	Financial Plan C ₹
Sales	1,00,000	1,00,000	1,00,000
Less : Variable cost	<u>50,000</u>	<u>50,000</u>	<u>50,000</u>
Contribution	50,000	50,000	50,000
Less : Fixed Costs	<u>38,000</u>	<u>38,000</u>	<u>38,000</u>
Earnings before Interest & tax (EBIT)	12,000	12,000	12,000
Less : Interest	<u>6,000</u>	<u>9,000</u>	<u>7,500</u>
Earnings before tax (EBT)	6,000	3,000	4,500
Less : Tax @ 40%	<u>2,400</u>	<u>1,200</u>	<u>1,800</u>
Earnings after tax (EAT)	3,600	1,800	2,700
Less : Pref. Dividend	-	-	<u>1,500</u>
Earnings for equity shareholders	<u>3,600</u>	<u>1,800</u>	<u>1,200</u>
No. of equity shares	480	320	280
Earnings per share (EPS)	7.5	5.625	4.286
Price earning ratio	10	8	8
Market price	75	45	34.286
Operating leverage (Contribution/ EBIT)	4.167	4.167	4.167
Financial leverage (EBIT/ EBT) [ $\frac{\text{EBT}}{\text{EBT} - \text{Pref. Dividend} \cdot (1-t)}$ ]	2.000	4.000	6.000
Combined leverage (Operating leverage x Financial Leverage)	8.334	16.668	25.002

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

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

Particulars	Plan A	Plan B
EBIT	X	X
Less : Interest	6,000	9,000
EBT	X – 6,000	X – 9,000
Less : Tax @ 40%	0.4X – 2,400	0.4X – 3,600

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EAT	$0.6X - 3,600$	$0.6X - 5,400$
No. of shares	480	320
EPS	$\frac{0.6X - 3,600}{480}$	$\frac{0.6X - 5,400}{320}$

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

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

$$\begin{aligned} 192X - 11,52,000 &= 288X - 25,92,000 \\ 96X &= 14,40,000 \\ X &= 15,000 \end{aligned}$$

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

**(v) Statement showing the calculation of Financial BEP**

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

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

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

Particulars	Plan A	Plan B	Plan C
Fixed cost	38,000	38,000	38,000
P/V Ratio	50%	50%	50%
Cost BEP (in ₹) [ $\frac{\text{Fixed Cost}}{\text{P/V Ratio}}$ ]	76,000	76,000	76,000
Cost BEP (in units) [BEP / Selling price per unit]	76,000	76,000	76,000

- Q. 8. 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) M Ltd. has a capital of ₹ 10,00,000 in equity shares of ₹ 100 each. The shares are currently quoted at par. The company proposes declaration of a dividend of ₹ 10 per share. The capitalization rate for the risk class to which the company belongs is 12%. What will be the market price of the share at the end of the year, if – (i) no dividend is declared; and (ii) 10% dividend is declared ? Assuming that the company pays the dividend and has net profits of ₹ 5,00,000 and makes new investments of ₹ 10,00,000 during the period, how many new shares must be issued ? Use the M. M. Model.

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Answer 8. (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

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

Rate of return on firms investment (R<sub>a</sub>)  
=  $\frac{₹ 6,00,000}{₹ 40,00,000} \times 100 = 15\%$  or 0.15

R<sub>c</sub> = Cost of capital (inverse of P/E ratio i.e. 1/10) = 0.10

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

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

Firm's dividend payout ratio = ₹ 1,60,000 / ₹ 6,00,000 = 0.2667 or 26.67%

Rate of return of the firm (R<sub>a</sub>) is 15%, which is more than its cost of capital (R<sub>c</sub>) 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<sub>c</sub> of the firm is the inverse of P/E ratio i.e. 1/5 = 0.20. In such case R<sub>c</sub> > R<sub>a</sub>

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

The P/E ratio at which the dividend policy will have no effect on the value of the firm when R<sub>c</sub> is equal to the rate of return of the firm R<sub>a</sub>. 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.

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Answer 8. (b)

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

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

(a) When dividend is not declared

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

(b) When dividend is declared

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

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

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

Verification of M. M. Dividend Irrelevancy Theory

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

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

Q. 9. a) Explore the interrelationship between Investment, Finance and Dividend Decisions.

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

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

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

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

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\*Cost of goods sold has been derived as :

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

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

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

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

### Answer 9. (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 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.

### Answer 9. (b)

**Statement showing the Net Working Capital Estimate of a Company :**

Current Assets :	₹	₹	₹
Stock of raw material (2 months) :			
(₹ 8,40,000 x 2/12)			1,40,000
Work-in-progress :			
Raw materials (₹ 8,40,000 x 15/100)		1,26,000	
Other expenses :			
Wages and manufacturing exp.	6,25,000		
Administrative expenses	<u>1,40,000</u>		
	(7,65,000 x 40%)	<u>3,06,000</u>	32,000

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Stock of finished goods :			
Stock	1,70,000		
Less : Depreciation 10%			
(i.e. 2,35,000 x 10%)	<u>23,500</u>		1,46,500
Debtors (2 months) :			
Cost of goods sold – Dep. (15,30,000 – 2,11,500)	13,18,500		
[Dep. (2,35,000 – 23,500)]			
Administrative expenses	1,40,000		
Selling expenses	<u>1,30,000</u>		
Total	15,88,500		
Less : Cash sales @ 20%	<u>3,17,700</u>		
	(12,70,800x2/12)		2,11,800
Cash (say)			<u>50,700</u>
Total investment in current assets			9,81,000
Less : Current liabilities :			
Creditors ( 1 ½ months) ( $\frac{\text{₹ } 8,40,000}{12} \times 1 \frac{1}{2}$ )	1,05,000		
Lag in payment of expenses (1month) :			
Wages and manufacturing expenses			
( $\frac{\text{₹ } 6,25,000}{12} \times 1/12$ )	=52,083		
Administrative expenses			
( $\frac{\text{₹ } 1,40,000}{12} \times 1/12$ )	= 11,667		
Selling expenses			
( $\frac{\text{₹ } 1,30,000}{12} \times 1/12$ )	= <u>10,833</u>	<u>74,583</u>	<u>1,79,583</u>
Net working capital			8,01,417
Add : 10% for contingencies			<u>80,142</u>
Estimated working capital requirement			<u>8,81,559</u>

Notes :

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

Q. 10. a) What are currency futures ? List the steps involved in the technique of hedging through futures.

b) Lucky Computer Stores is making a business plan for the next five years. Sales growth over the past years has been good. Sales would grow substantially if a major electronics firm is established in the vicinity as proposed by an investor.

Lucky Computers has 3 options :

- i. To enlarge the current store.
- ii. To relocate it at a new site and
- iii. To simply wait and do nothing

The decision to expand or move would take little time and therefore, the stores would not lose revenue. If nothing were done in the first year and strong growth occurred, then the decision to expand would be reconsidered. Waiting longer than one year would allow competition to move in, making expansion no longer feasible.

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The assumptions and conditions are :

- I. Strong growth, emanating from the new electronics firm has a probability of 55%
- II. Strong growth with new site would give annual returns of ₹ 1,95,000 p.a.
- III. Weak growth with a new site would mean annual returns of ₹ 1,15,000 p.a.
- IV. Strong growth with expansion would yield annual returns of ₹ 1,90,000 p.a.
- V. Weak growth with expansion would mean annual returns of ₹ 1,00,000 p.a.
- VI. There would be returns of ₹ 1,70,000 p.a. at the existing store with no changes in case of strong growth and returns of ₹ 1,05,000 if growth is weak.
- VII. Expansion at current site would cost ₹ 87,000
- VIII. A shift to the new site would cost ₹ 2,10,000
- IX. In case of strong growth, if existing site is enlarged during the 2<sup>nd</sup> year, the cost would still be ₹ 87,000.

Which option should Lucky Computer Stores take, if operating costs for all options are equal ?

**Answer 10. (a)**

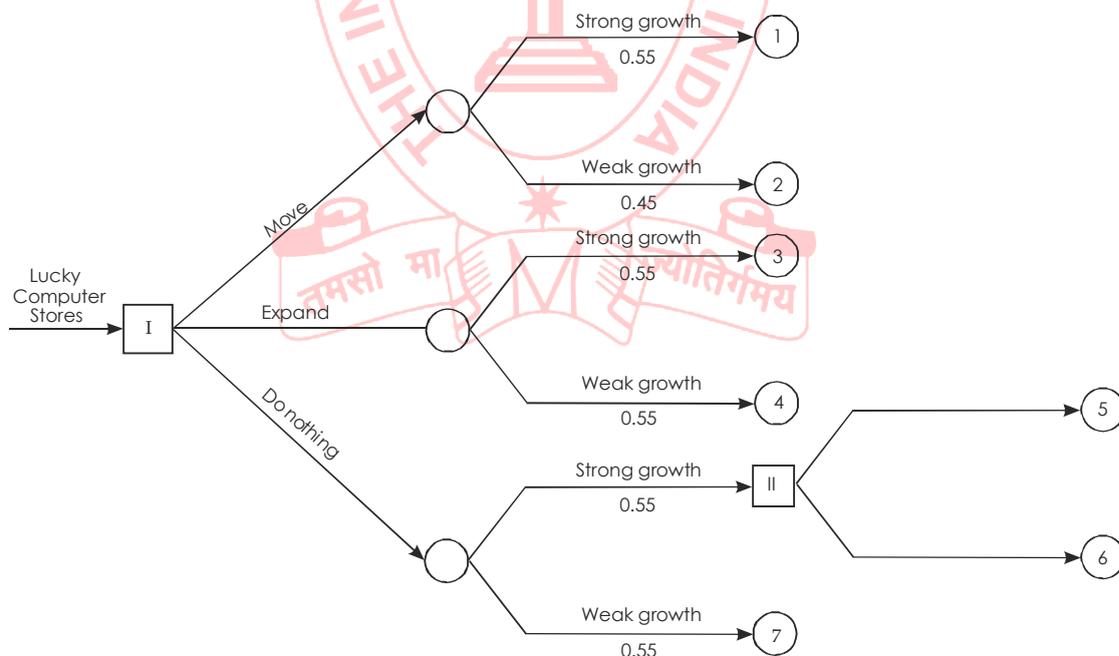
A currency futures contract is a derivative financial instrument that acts as a conduit to transfer risks attributable to volatility in prices of currencies. It is a contractual agreement between a buyer and a seller for the purchase and sale of a particular currency at a specific future date at a predetermined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

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

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

**Answer 10. (b)**

**Decision Tree Analysis :**



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Computation of expected values for different alternatives from No. 1 to No. 7

Alternatives

(1)	(₹ 1,95,000 x 5 years) – ₹ 2,10,000	=	₹ 7,65,000
(2)	(₹ 1,15,000 x 5 years) – ₹ 2,10,000	=	₹ 3,65,000
(3)	(₹ 1,90,000 x 5 years) – ₹ 87,000	=	₹ 8,63,000
(4)	(₹ 1,00,000 x 5 years) – ₹ 87,000	=	₹ 4,13,000
(5)	[(₹ 1,70,000 x 1 year) + (₹ 1,90,000 x 4 years)] – ₹ 87,000	=	₹ 8,43,000
(6)	(₹ 1,70,000 x 5 years) – 0	=	₹ 8,50,000
(7)	₹ 1,05,000 x 5 years) – 0	=	₹ 5,25,000

Analysis – There is a decision point II between option 5 and 6. Since option 6 has a better expected value than option 5, we choose option 6 at this decision point.

Expected values

(i)	Moving = (7,65,000 x 0.55) + (3,65,000 x 0.45)	=	₹ 5,85,000
(ii)	Expand Store = (8,63,000 x 0.55) + (4,13,000 x 0.45)	=	₹ 6,60,000
(iii)	Do nothing now, do not expand next year = (8,50,000 x 0.55) + (5,25,000 x 0.45)	=	₹ 7,03,750

From the above, it is seen that the best decision is to do nothing (both now and next year).

**Q. 11. 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 :**

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

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 11.**

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

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First of all, random numbers 00-99 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

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.

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Q. 12. A company is evaluating a new venture that will cost ₹ 10 crore. The venture will have a return on investment of 20% and the firm forecasts a 12% growth in earnings from the project. The treasurer has identified the following sources for financing the project :

- a. Equity shares to be sold at ₹ 400 per share.
- b. Convertible debentures with a 60% coupon to net ₹ 980 (face value ₹ 1,000), and convertible at ₹ 500 per share after 2005.
- c. Debentures with warrants with a 60% coupon to net ₹ 980 (face value ₹ 1,000), and with each bond having one warrant entitling the holder to buy one equity share at ₹ 500 after 2008.

The financing decision is being made in the fourth quarter of 2003. Over the past ten years, the company has been growing at a 10% rate of sales and earnings.

The treasurer expects the company to continue to grow at 10% even though the firm has traditionally paid 40% of its earnings as dividends. The treasurer expects equity shares to continue to rise in price. Using the price trend over the past 5 years, he has projected probable market price ranges for the next three years. The historical data and the projections of the treasurer are as below :

Year	Historical market price (₹)	Year	Forecasted	
			Probability (%)	Market price (₹)
2005	220	2011	20	450
2006	250		60	500
2007	330		20	600
2008	270	2012	20	480
2009	380		60	550
2010	450		20	620
		2013	20	500
			60	600
			20	700

The proforma balance sheet and income statement prepared by the treasurer for the year 2007 is shown as below :

### Proforma Balance Sheet (December 31,2010)

₹ '000

Liabilities	2010	2009	Assets	2010	2009
Equity shares (₹ 10 each)	10,000	10,000	Plant and equipment	2,25,000	2,31,000
Shares premium	40,000	40,000	Less : Accumulated depreciation	<u>62,000</u>	<u>59,000</u>
Retained earnings	1,36,000	1,27,000	Inventories	64,000	62,000
Bonds (7%)	90,000	52,000	Receivables	44,000	45,000
Mortgage (6%)	30,000	55,000	Cash and bank balance	22,000	18,000
Accounts payable	7,000	6,000	Other current assets	<u>4,000</u>	<u>3,000</u>
Other current liabilities	<u>11,000</u>	<u>10,000</u>			
	3,24,000	3,00,000		3,24,000	3,00,000

### Proforma Income Statement

₹'000

	Sales	EBIT	Interest*	EBT	NIAT	EPS
2010	4,20,000	71,500	8,000	63,500	31,750	31.75
2009	3,80,000	65,000	7,000	58,000	29,000	29.00

\*Rounded off.

The management was initially impressed by the fact that the new venture will increase sales by ₹ 12 crore. Management is also interested in the expected 12% growth rate of the venture. As per company's financial policy, the firm's debt-asset ratio should not be above 40%.

With the above information and detailed analysis for next 3 years, what will be the long-term sources of financing for the new proposal ?

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Make suitable assumptions in your answer, wherever necessary figures could be rounded off. Income tax rate applicable to the company is to be taken at 50%.

### Answer 12.

Statement showing EPS in 2007 (end) under various financing options (₹ In lakhs)

Particulars	With existing business	With new business financed by		
		Equity shares	Convertible debt	Debt (+) Warrant
EBIT <sup>1</sup>	786.50	986.50	986.50	986.50
Less : Interest on debt :				
Existing (₹ 9 crore x 0.07) + (₹ 3 crore x 0.06)	81.00	81.00	81.00	81.00
New debt (1,02,040 <sup>2</sup> debentures x ₹ 60 per debenture)	-	-	<u>61.22</u>	<u>61.22</u>
Earnings before taxes	705.50	905.50	844.28	844.28
Less : Taxes (0.50)	<u>352.75</u>	<u>452.75</u>	<u>422.14</u>	<u>422.14</u>
Earnings after taxes	352.75	452.75	422.14	422.14
Number of shares (in lakhs)	10.00	<u>12.50</u> <sup>3</sup>	10.00	10.00
EPS (₹)	35.275	36.22	42.214	42.214

Statement showing EPS in 2010 (end) under various financing options (₹ In lakhs)

Particulars	With existing business	With new business financed by		
		Equity shares	Convertible debt	Debt (+) Warrant
EBIT	951.66 <sup>4</sup>	1,202.54 <sup>5</sup>	1,202.54	1,202.54
Add : Additional EBIT due to additional funds raised <sup>6</sup>	-	-	-	102.04 <sup>7</sup>
Less : Interest on existing debt	81.00	81.00	81.00	81.00
Less : Interest on new debt (in the case of warrant option)	-	-	-	<u>61.22</u>
EBT	870.66	1,121.54	1,121.54	1,162.36
Less : Taxes (0.50)	<u>435.33</u>	<u>560.77</u>	<u>560.77</u>	<u>581.18</u>
EAT	435.33	560.77	560.77	581.18
Number of shares (lakh)	10.00	<u>12.50</u>	<u>12.04</u> <sup>8</sup>	<u>11.02</u> <sup>8</sup>
EPS (₹)	43.533	44.862	46.576	52.74

Statement showing debt (assumed to be long-term) to assets ratio in 2007 and 2010 (₹ In lakhs)

Particulars	With existing business	With new business financed by		
		Equity shares	Convertible debt	Debt (+) Warrant
Year-end 2007				
Total assets	<u>3,240</u>	<u>4,240</u>	<u>4,240</u>	<u>4,240</u>
Existing debt	1,200	1,200	1,200	1,200
Additional debt	-	-	<u>1,020</u>	<u>1,020</u>
Total debt	<u>1,200</u>	<u>1,200</u>	<u>2,220</u>	<u>2,220</u>
Debt/ Assets ratio (%)	<u>37.03</u>	<u>28.30</u>	<u>52.36</u>	<u>52.36</u>
Year-end 2010				
Total assets <sup>9</sup>	<u>3,949.27</u>	<u>5,152.17</u>	<u>5,124.62</u>	<u>5,142.99</u>
Existing debt	1,200	1,200	1,200	1,200
Additional debt	-	-	-	<u>1,020</u>
Total debt	<u>1,200</u>	<u>1,200</u>	<u>1,200</u>	<u>2,220</u>
Debt/Assets ratio (%)	<u>30.39</u>	<u>23.29</u>	<u>23.42</u>	<u>43.19</u>

Recommendation : Though EPS is the highest (at ₹ 52.74) under debt plus warrant plan, it cannot be implemented as debt/ assets ratio exceed 40% (43.19%). IN view of this, the next best alternative is that the company should opt for convertible debt plan as under this plan potential EPS is the maximum (at ₹ 46.576 in 2010 and at ₹ 42.214 in 2007).

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Working notes :

(₹ In lakhs)

1. a)	Without new venture		
	EBIT (2000)	715.00	
	Add : 10% growth	<u>71.50</u>	786.50
b)	With new venture		
	Expected EBIT without new venture		786.50
	Add: 20% growth on ₹ 10 crore new investment (₹ 10 crore x 0.20)		<u>200.00</u>
			<u>986.50</u>

2. Number of new debentures to be issued  
(Amount to be raised ₹ 10 crore/Net proceeds per debenture, ₹ 980) 1,02,040

3. Number of new equity shares to be issued  
(₹ 10 crore/Sale price of equity shares, ₹ 400) 2,50,000

4. EBIT in 2003 = Current EBIT, ₹ 715 lakh x Growth factor @ 10% for 3 yrs. i.e. 1.331 951.66

5. EBIT in 2003 with new business : ₹ 951.66 lakh + (₹ 10 crore X 20% ROR x 12% growth factor for 2 yrs. i.e. 1.254 = 250.88 lakh) 1,202.54

6. Determination of expected market price in 2008 to 2010.

Years		
2008	2009	2010
450 x 0.2 = 90	480 x 0.2 = 96	500 x 0.2 = 100
500 x 0.6 = 300	550 x 0.6 = 330	600 x 0.6 = 360
600 x 0.2 = <u>120</u>	620 x 0.2 = <u>124</u>	700 x 0.2 = <u>140</u>
510	550	600

Since expected market price is higher (at ₹ 550 in 2002 and at ₹ 600 in 2003) than the conversion price (i.e. ₹ 500 after 2002), it is reasonable to assume that debt-holders/ warrant-holders will like to exercise their option, resulting in higher number of equity shares in 2003.

7. In the case of convertible debt, no additional funds will accrue. There will be additional funds in the case of warrant option equivalent to (1,02,040 warrants x ₹ 500 issue price of equity share) = ₹ 510.20 lakh.

As per the principle of conservatism, the ROR likely to be earned on these funds (₹ 510.20 lakh) is ROR promised by a new venture i.e. 20% or existing ROR which-ever is lower. (Conventionally, ROR is computer on existing long-term funds employed in business at book value).

$$\text{ROR (on capital employed)} = \frac{\text{EBIT}}{\text{Equity funds + Long-term debt}} = \frac{\text{₹ 715 lakh}}{(\text{₹ 1860 lakh} + \text{₹ 1200 lakh})} = 23.37\%$$

Thus, expected additional EBIT with warrant option is = ₹ 510.20 lakh x 0.2 = 102.04 lakh

8. Number of new equity shares issued

i.	Convertible debts = 1,02,040 debentures x 2		= 2,04,080
ii.	Warrants = 1,02,040 x 1		= 1,02,040

9. Increase in retained earnings during 3 years under various options :  
It is computer as per the following ratio :

$$\frac{[\text{EAT (year-end 2000)} + \text{EAT (year-end 2003)}]}{2} \times \text{Retention ratio} \times 3 \text{ years}$$

i. No new venture =  $\frac{[\text{₹ 352.75 lakh} + \text{₹ 435.33 lakh}]}{2} \times 0.6 \times 3 \text{ years} = \text{₹ 709.27 lakhs}$

2

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- ii. Issue of equity shares =  $\frac{[\text{₹ } 452.75 \text{ lakh} + \text{₹ } 560.77 \text{ lakh}]}{2} \times 0.6 \times 3 \text{ years} = \text{₹ } 912.17 \text{ lakh}$
- iii. Issue of convertible debentures =  $\frac{[\text{₹ } 422.14 \text{ lakh} + \text{₹ } 560.77 \text{ lakh}]}{2} \times 0.6 \times 3 \text{ years}$   
 $= \text{₹ } 884.62 \text{ lakh}$
- iv. Issue of debt + warrant =  $\frac{[\text{₹ } 422.14 \text{ lakh} + \text{₹ } 581.18 \text{ lakh}]}{2} \times 0.6 \times 3 \text{ years}$   
 $= \text{₹ } 902.99 \text{ lakh}$

It is assumed that the assets will increase by the amount of increase in retained earnings under various options.

**Q. 13. a) Describe the Little – Mirrlees approach to Social Cost Benefit Analysis (SCBA) of a project and the Indian modification of the same.**

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

- i. Total asset : ₹ 450 lakhs (₹ 250 lakhs of Fixed Assets and ₹ 200 lakhs of Current Assets)
- ii. Scheme of financing : ₹ 100 lakhs equity, ₹ 200 lakhs term loan, ₹ 100 lakhs working capital advance and ₹ 50 lakhs trade creditors.
- iii. Interest rate : Term loan 12% p.a. and working capital advance : 15% p.a.
- iv. Term loan is repayable in 5 equal installments, commencing from 3<sup>rd</sup> year of operations. (Assume that installment for each year is paid on the last day of the year).
- v. Depreciation : 30% on written down value.
- vi. Production is expected to reach 60% of capacity in the 1<sup>st</sup> year of operations, 70% in the 2<sup>nd</sup> year and 80% from the 3<sup>rd</sup> year onwards.
- vii. Expected revenue from the project will be ₹ 500 lakhs p.a. on 10% capacity utilization and corresponding Direct Costs are ₹ 200 lakhs. Fixed costs are ₹ 100 lakhs p.a. Working capital advance of ₹ 100 lakhs is on 80% capacity and proportionately reduced in the first two years.
- viii. Tax rate applicable is 50%.

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

**Answer 13. (a)**

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

The principal reasons for the discrepancies are :

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

Little-Mirrlees approach to SCBA involved determining the accounting of shadow prices particularly for foreign exchange, savings and unskilled labour, considering the equity factor and the use of Discounted Cash Flow (DCF) analysis. It seeks to measure costs and benefits in terms of international prices, rather than in terms of domestic prices and also in terms of uncommitted social income.

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

To calculate economic rate of return, the domestic market prices are substituted with international prices for all non-labour inputs and outputs. CIF prices for inputs and FOB prices for outputs are used for all

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tradable items. For tradable items where international prices are not available and for non-tradable items, social conversion factors are used.

The effective rate of protection is calculated as follows :

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

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

Domestic Resource Cost is computed as :

$$[(\text{Value added at domestic prices})/(\text{Value added at world prices})] \times \text{Exchange Rate.}$$

### Answer 13. (b)

#### Projected Profit & Loss Account

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

$$\begin{aligned} \text{Average DSCR} &= (\text{Total operation cash flow}) / (\text{Total payment against debts}) \\ &= (554.87 \div 320.00) = 1.73. \end{aligned}$$

Q. 14. 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.

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- (ii) XYZ Ltd., produces blue detergent powder. Recent studies carried out by marketing indicate that there is a growing opportunity for white detergent powder. Producing detergent powders in two different colours in the same plant requires modification to the existing plant such as, additional facilities for storage and handling. The total investment involved would be ₹ 85 lakhs.
- (iii) Economic Producers Ltd., is an ancillary unit producing components for trucks. Their main machinery was installed 17 years back. The equipment is frequently breaking down throwing the delivery schedules out of balance. The equipment can produce 700 components per day. New equipment available for producing the same component costs ₹ 25 lakhs with a delivery time of 3 months.
- (iv) Sri Ajit Singh owns 25 acres of land on which he grows wheat. He is planning to buy a tractor to speed up his farm operations as well as reduce input costs.
- (v) Milk Products Ltd., is in dairy business, producing milk powder and ghee. Recently, a market survey carried out by the consultants appointed by the company indicates an opportunity for selling cheese. The total outlay in terms of capital expenditure would be ₹ 270 lakhs.

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

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

Should the project be abandoned and if so, when ?

Cost of capital may be taken as 10%.

Present value (PV) factor @ 10% is 1.000, 0.909, 0.826, 0.751 and 0.683 for 0,1,2,3 & 4 years respectively.

**Answer 14. (a)**

Project classification :

- (i) This is a case of Balancing Project in which the capacity of power generation is being augmented by investing ₹ 60 lakhs to cope up with interruptions in power supply and to ensure continuous production.
- (ii) This is a case of Modernisation through expansion. The present plant needs sufficient modification to adapt to different colour combinations in detergents along with additional facilities in terms of storage capacity. Thus, it is decided to expand the present warehouse and handling facilities by investing ₹ 85 lakhs.
- (iii) This is a Replacement Project. Since the existing machinery was installed 17 years back and is insufficient to support the present demands of the market. It needs to be replaced rather than modified or modernized.
- (iv) This is a case of Modernisation of the farming process. By using tractors on farm land, the farming can be done more productively than in the case of a conventional process. Therefore, Shri Ajit Singh is intending to modernize his operations, which would reduce his time & energy and optimize his costs, while increasing the output considerably.
- (v) This is a case of Diversification. Since Milk Products Ltd. is already in the business of dairy products, it simply is extending the product line in its existing line of business.

**Answer 14. (b)**

Expected NPV over 4 years of economic life :

Year	Cash flow (₹)	Abandonment value (₹)	PV factor @ 10%	NPV (₹) of cash flow	NPV (₹) of abandonment value
0	(-) 1,00,000	-	1.000	(-) 1,00,000	-
1	35,000	65,000	0.909	31,815	59,085

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2	30,000	45,000	0.826	24,780	37,170
3	25,000	20,000	0.751	18,775	15,020
4	20,000	-	0.683	13,660	-
Total				(-) 10,970	

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

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

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

**Q. 15. A company is considering two mutually exclusive projects X and Y. Project X costs ₹ 30,000 and Project Y ₹ 36,000. You are given below the net present value probability.**

Project X		Project Y	
NPV estimate (₹)	Probability	NPV estimate (₹)	Probability
3,000	0.1	3,000	0.2
6,000	0.4	6,000	0.3
12,000	0.4	12,000	0.3
15,000	0.1	15,000	0.2

- i. Compute the expected net present value of projects X and Y.
- ii. Compute the risk attached to each project.
- iii. Which project do you consider more risky and why ?
- iv. Compute the probability index of each project.

**Answer 15.**

(i) **Statement showing computation of expected net present value of the projects X and Y.**

Project X			Project Y		
NPV estimate (₹)	Probability	Expected value	NPV estimate (₹)	Probability	Expected value
3,000	0.1	300	3,000	0.2	600
6,000	0.4	2,400	6,000	0.3	1,800
12,000	0.4	4,800	12,000	0.3	3,600
15,000	0.1	1,500	15,000	0.2	3,000
	1.0	EV = 9,000		1.0	EV = 9,000

Thus the expected net present value of both projects X and Y are same.

(ii) **Computation of Standard Deviation of each project :**

For Project X

Probability (P)	NPV Estimates (₹) ( $\mu$ )	( $\mu - 9,000$ )	P ( $\mu - 9,000$ ) <sup>2</sup>
0.1	3,000	- 6,000	36,00,000

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0.4	6,000	- 3,000	36,00,000
0.4	12,000	+ 3,000	36,00,000
<u>0.1</u>	15,000	+ 6,000	36,00,000
		Variance	1,44,00,000

Standard deviation of Project X =  $\sqrt{1,44,00,000}$  = ₹ 3,794.73

For Project Y

Probability (P)	NPV Estimates (₹) ( $\mu$ )	( $\mu - 9,000$ )	$P(\mu - 9,000)^2$
0.2	3,000	- 6,000	72,00,000
0.3	6,000	- 3,000	27,00,000
0.3	12,000	+ 3,000	27,00,000
<u>0.2</u>	15,000	+ 6,000	72,00,000
		Variance	1,98,00,000

Standard deviation of Project Y =  $\sqrt{1,98,00,000}$  = ₹ 4,450

- (iii) Risk is measured by the possible variation of outcomes around the expected value and the decision will be taken keeping in view the variation in the expected value where two projects have the same expected value, the decision maker would choose the project which has smaller variation in expected value.

In the selection of one of the two projects X and Y, project Y is preferable because the possible profit which may occur is subject to loss variation (or dispersion), much higher risk is lying with project Y.

- (iv) Computation of profitability of each project :
- Profitability Index = Present value of cash inflows ÷ Present value of cash outflow
- NPV = Sum of total cash inflows – Project cost
- Sum of total cash inflows = Project cost + NPV
- Project X = ₹ 30,000 + ₹ 9,000 = ₹ 39,000
- Project Y = ₹ 36,000 + ₹ 9,000 = ₹ 45,000
- Profitability Index :
- Project X = ₹ 39,000 / 30,000 = 1.30
- Project Y = ₹ 45,000 / 36,000 = 1.25
- Thus profitability index of Project X is more than that of Project Y.

- Q. 16. a) An Indian software company receives an order from an European union country. The buyer will pay in four quarterly installments each of €0.5 million, starting from the end of the first quarter. The rates for euros in India is as follow :

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

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

- b) Are arbitrage gains possible from the following set of information to the arbitrageur ?
- Spot rate : 47.88/\$
- 3 month forward rate : ₹ 47.28/\$
- 3 month interest rates :
- Re. : 7% p.a.
- \$ : 11% p.a.

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### Answer 16. (a)

Indian software company will have the following income streams :

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

### Answer 16. (b)

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

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

$$\text{Interest rate differential} = 11\% - 7\% = 4\% \text{ per annum}$$

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

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

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

US dollar spot rate : ₹ 47.75/ US \$

US dollar option quotation

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

What calculation will the investment manager make for following questions ?

- i. What is the intrinsic value for the December 47.5 call option ?
- ii. What is the intrinsic value for the September 46 put option ?

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

### Answer 17.

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

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

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

- i. Intrinsic value for the December 47.5 call option  

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

$$= \text{Max} [₹ 0.25/\text{US } \$, 0] = ₹ 0.25/\text{US } \$$$
- ii. Intrinsic value for the September 46 put option  

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

$$= \text{Max} [-(\text{₹ } 1.75/\text{US } \$), 0] = 0$$
- iii. The break-even exchange rate for the March 46.5 call on settlement date is Re. X/US \$  
 So, The premium paid = ₹ 2.15/US \$  
 Profit from the call option = ₹ (X – 46.5)/US \$  
 At break even, ₹ (X – 46.5)/US \$ = ₹ 2.15/US \$  

$$X = ₹ 48.65/\text{US } \$$$
 The break even exchange rate for March 48 put is :  
 Premium paid = ₹ 2.50/US \$  
 Profit from the put option = ₹ (48 – X)/US \$  
 At break-even, ₹ (48 – X)/US \$ = ₹ 2.50/US \$  

$$X = ₹ 45.5/\text{US } \$$$
- iv. For an expected spot rate of ₹ 48.50/US \$,, we need to find out profit from buying the March call option at various strike prices.

Gain from call option  

$$= \text{Max} [(\text{Settlement rate} - \text{Strike rate}), 0] - \text{Premium}$$

$$= \text{value of option at expiration} - \text{Premium}$$

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

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

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

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

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

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Q. 18. 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 18.

<b>Cash outflows (t = 0)</b>	(figures in million)
Cost of plant and machinery	\$ 400
Working capital requirement	<u>40</u>
Incremental cash outflow in rupees (\$ 440 million x ₹ 48)	<u>₹ 21,120</u>
<b>Cash inflows after taxes</b>	(figures in million)
Sales revenue (5.0 million units x \$ 100)	500
Less : Costs :	
Variable cost (5.0 million units x \$25)	\$ 125
Fixed cost	<u>30</u>
Depreciation (\$400 million/ 5 year)	<u>80</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)	239
CFAT in 5 <sup>th</sup> year :	
Operating CFAT	239
Add : Release of working capital	<u>40</u>
	279

**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



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### Working Notes :

#### (i) Calculation of Equity Shareholders' Funds Long-term Debts

$$\begin{aligned} \text{Debt Equity Ratio} &= \frac{\text{Long - term Debts}}{\text{Shareholders' Funds}} \\ 2 &= ₹ 8,00,000 / \text{Shareholders' Funds} \\ \text{Shareholders' Funds} &= ₹ 8,00,000/2 = ₹ 4,00,000 \\ \text{Supposing Pref. Share Capital} &= x \\ \text{Equity Shareholders' Funds} &= ₹ 4,00,000 - x \end{aligned}$$

#### (ii) Calculation of Pref. Share Capital

$$\begin{aligned} \text{Capital Gearing Ratio} &= \frac{\text{Long - term Debts plus Pref. Share Capital}}{\text{Equity Shareholders' Funds}} \\ 3 &= \frac{\text{Rs. } 8,00,000 + x}{\text{Rs. } 4,00,000 - x} \\ ₹ 12,00,000 - 3x &= ₹ 8,00,000 + x \\ x &= ₹ 1,00,000 \\ \text{Pref. Share Capital} &= ₹ 1,00,000 \\ \text{Equity Shareholders' Fund} &= ₹ 4,00,000 - ₹ 1,00,000 = ₹ 3,00,000 \end{aligned}$$

#### (iii) Calculation of Operating Profit

$$\begin{aligned} \text{Return on Equity} &= \frac{\text{Net Profit after Int. Tax \& Pref. Div.}}{\text{Equity Shareholders' Funds}} \\ 25\% &= x / ₹ 3,00,000 \\ x &= ₹ 75,000 \end{aligned}$$

	₹
A. Net Profit after Int., Tax & Pref. Dividend	75,000
B. Add : Pref. Dividend	15,000
C. Net Profit after Int. & Tax (A+B)	90,000
D. Add : Tax @ 50%	90,000
E. Net Profit before Tax	1,80,000
F. Interest on Long-term Debt @ 15% on ₹ 8,00,000	1,20,000
G. Operating Profit (E-F)	3,00,000

#### (iv) Calculation of Sales

$$\begin{aligned} \text{Operating Cost Ratio} &= 87.5\% \\ (\text{Material} + \text{Labour} + \text{Mfg. Exp.} + \text{Dep.} + \text{Office \& Selling Exp.}) \\ \text{Operating Profit Ratio} &= 100 - 87.5\% = 12.5\% \\ &= \text{Operating Profit/Sales} \times 100 \\ \text{Sales} &= ₹ 3,00,000/12.5\% = ₹ 24,00,000 \\ \text{Materials} &= 40\% \text{ of } ₹ 24,00,000 = ₹ 9,60,000 \\ \text{Labour} &= 25\% \text{ of } ₹ 24,00,000 = ₹ 6,00,000 \\ \text{Manufacturing Expenses} &= 10\% \text{ of } ₹ 24,00,000 = ₹ 2,40,000 \\ \text{Office \& Selling Expenses} &= 2.5\% \text{ of } ₹ 24,00,000 = ₹ 60,000 \end{aligned}$$

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Q. 20. (a) The following information is available for the equity stock of Prakash Limited.

$$S_0 = ₹ 120, E = ₹ 110, r = 0.12, \sigma = 0.40$$

Calculate the price of a 6 month call option as per the Black-Scholes model.

(b) The following information is available for the call and put options on the stock of Zenith Limited.

	Call	Put
Time to expiration (months)	3	3
Risk free rate	10%	10%
Exercise price	₹ 50	₹ 50
Stock price	₹ 60	₹ 60
Price	₹ 16	₹ 2

Determine if the put-call parity is working :

Answer 20. (a)

$$C_0 = S_0 N(d_1) - \frac{E}{e^{rt}} N(d_2)$$

$$d_1 = \frac{\ln\left(\frac{S_0}{E}\right) + \left(r + \frac{1}{2}\sigma^2\right)t}{\sigma\sqrt{t}}$$

$$d_2 = d_1 - \sigma\sqrt{t}$$

$$d_1 = \frac{\ln\left(\frac{120}{110}\right) + \left(0.12 + \frac{1}{2} \times 0.16\right) 0.5}{0.4\sqrt{0.5}}$$

$$= \frac{.0870 + 0.10}{0.2828} = 0.6612$$

$$d_2 = 0.6612 - 0.2828 = 0.3784$$

$$N(d_1) = N(0.6612) = 0.7457$$

$$N(d_2) = N(0.3784) = 0.6474$$

$$\frac{E}{e^{rt}} = \frac{110}{e^{0.12 \times 0.5}} = \frac{110}{1.0618} = 103.60$$

$$C_0 = ₹ 120 \times 0.7457 - ₹ 103.60 \times 0.6474 = ₹ 22.41$$

Answer 20. (b)

According to the put-call parity

In the problems  $S_0 = ₹ 60, P_0 = ₹ 2, E = ₹ 50, r = 10\%$  and  $t = 0.25$

If the put-call parity were to work  $C_0$  should be

$$60 + 2 - \frac{50}{e^{0.10 \times 0.25}} = ₹ 13.23$$

The price of the call option is given to be ₹ 16, which is different from ₹ 13.23. So the put-call parity is not working.

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**Q. 21. (a)** Fresno Corporation Ltd., a US company will need £ 2,00,000 in 180 days. It considers using (1) a forward hedge, (2) a money market hedge, (3) and option hedge, or (4) no hedge. Its analysts develop the following information, which can be used to assess the alternative approaches to hedging :

- Spot rate of pound as of today = \$ 1.50
- 180-days forward rate of pound as of today = \$ 1.47
- Interest rates per annum are as follows :

	UK	US
180-days deposit rate	4.5%	4.5%
180-days borrowing rate	5.0%	5.0%

- A call option on pounds that expires in 180 days has an exercise price of \$ 1.48 and a premium of \$ 0.03
- Fresno Corporation forecasted the future sport rate in 180 days as follows :

Possible outcome	Probability
\$ 1.43	20%
1.46	70%
1.52	10%

Evaluate each alternative with necessary calculation and give your recommendations. (Assume 360 days in a year.) — Ignore Transaction Cost or Taxes.

**(b)** The following information pertains to RICO Ltd.

	(Amount in ₹ Lakh)
No profit	60
Outstanding 12% preference shares	200
Number of shares outstanding	6 lakh
Return on Investment	20%
Equity capitalization rate	16%

Required :

- (i) What should be dividend pay-out ratio so as to keep the share price at ₹ 41.25 bu using WALTER MODEL?
- (ii) What is the optimum dividend pay-out ratio according to Walter Model.

**Answer 21. (a)**

**Fresno Corporation Ltd.**

**Forward Hedge :**

Purchase pounds 180 days forward :

$$\begin{aligned} \text{Dollars needed in 180 days} &= \text{Payable in } \text{£} \times \text{Forward Rate of } \text{£} \\ &= 2,00,000 \times \$ 1.47 = \$ 2,94,000 \end{aligned}$$

**Money Market Hedge :**

Borrow \$, Convert to £, Invest £, Repay \$ loan in 180 days.

$$\text{Amount in } \text{£} \text{ to be invested} = \text{£ } 2,00,000 / (1+0.0225) = \text{£ } 1,95,599$$

$$\text{Amount in } \$ \text{ needed to} = \text{£ } 1,95,599 \times \$ 1.50$$

$$\text{Convert into } \text{£} \text{ for deposit} = \$ 2,93,398$$

Interest and principal

$$\text{owed on } \$ \text{ loan and} = 2,93,398 \times 1.025$$

$$\text{after 180 days} = \$ 3,00,733$$

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### Call Option :

Exercise = \$ 1.48 : Premium = \$ 0.03

Expected Spot Rate In 180 days	Premium Per Unit Paid for Option	Exercise Option	Total Price (including Premium Paid per unit)	Total Price Paid for £ 2,00,000 (xi)	Prob. Pi	Expected Amount Pix (xi)
\$ 1.43	\$ 0.03	No	\$ 1.46	\$ 2,92,000	0.20	\$ 58,400
1.46	0.03	No	1.49	2,98,000	0.70	2,08,600
1.52	0.03	Yes	1.51	3,02,000	0.10	30,200
						\$ 2,97,200

NO HEDGE Option / Remain Unhedge :

Future Spot Rate Expected in 180 days	Dollars needed to Purchase £ 2,00,000 (xi)	Prob. Pi	Expected Amount Pix (xi)
\$ 1.43	\$ 2,86,000	0.20	\$ 57,200
1.46	2,92,000	0.70	2,04,400
1.52	3,04,000	0.10	30,400
			\$ 2,92,000

**Decision :** The probability distribution Outcomes for no hedge strategy appears to be most preferable to Fresno Corporation Ltd.

Answer 21. (b)

RICO Ltd.

Net Profit	(₹ in lakh)
Less : Preference dividend (0.12 × 200 lakh)	60.00
Earnings for Equity share holders	24.00
Earnings per share (EPS) = 36 lakh/6 lakh	36.00
	₹ 6.00 per share

Let the dividend payout ratio be X. So the share price will be :

Here,

$$D = \text{Dividend per share} = 6x$$

$$P = [D + (E - D)(r/Ke)] / Ke$$

$$P = \text{Market price per share} = ₹ 41.25$$

$$E = \text{Earnings per share} = ₹ 6$$

$$r = \text{Return on investment} = 20\% = 0.20$$

$$Ke = \text{Cost of equity} = 16\% = 0.16$$

$$\text{Hefe, } ₹ 41.25 = [6x + (6 - 6x)(0.20/0.16)]/0.16$$

$$= [6x + (6 - 6x) \times 1.25] / 0.16$$

$$= [6x + 7.50 - 7.5x] / 0.16$$

$$\text{or, } 6.6 = 7.50 - 1.5x$$

$$\text{or } 1.5x = 7.50 - 6.60 = 0.90$$

$$x = 0.90 / 1.5 = 0.60 \text{ i.e., } 60\%$$

So, the required dividend payout ratio will be : 60%.

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- (ii) According to Walter's model where the return on investment (20%) is more than the cost of equity, (16%) the price per share increase as the dividend payout ratio decrease. Hence the optimum dividend payout ratio in this case is nil.

**Q. 22. (a) What are forwards? How they can be used to hedge?**

**(b) On August 2, Mr. Tandon buys 5 contracts of December Reliance futures at 840. Each contract covers 50 shares. Initial margin was set at ₹ 2400 per contract while maintenance margin was fixed at ₹ 2000 per contract. Daily settlement prices are as follows :**

August 2	818
August 3	866
August 4	830
August 5	846

Mr. Tandon meet all margin calls. Whenever he is allowed to withdraw money from the Margin Account, he withdraws half the maximum amount allowed.

- Compute for each day : (i) Margin call;  
 (ii) Profit & (Loss) on the contract;  
 (iii) The balance in the Account at the end of the day.

**Answer 22. (a)**

Forwards are custom made contracts to buy or sell foreign exchange in the future at a specific price. Maturity and size of contracts can be determined individually to almost exactly hedge the desired position.

The hedging method uses up bank credit lines even when two forward contracts exactly offset each other. The company can hedge its receivables. It could sell dollars forward at a rate which it can obtain from the bank today and thus know for certain the quantum of rupee inflows after three months. A similar approach can be used in the case of a payable. In this case, the company could buy forward at a rate, which is known to-day. A partial or full cover can be adopted by the firm depending on its perception of the risk involved.

All corporate treasurers, hedging their forex exposures with forward contracts, are aware that forward contracts are best hedging instruments for safeguarding against adverse rate movements. Forward contracts only turn the risk upside and lead to opportunity losses in the event of favourable market movements.

**Answer 22. (b)**

**Computation of Margin Call, Profit/(Loss) and Balance in the account at the end of the day :**

**Initial Margin :** 5 Contracts × 2400 = ₹ 12,000.

**Maintenance Margin :** 5 Contracts × 2000 = ₹ 10,000.

August, 2	Details	Amount ₹
Opening Balance		—
Add : Initial Margin Paid	2400 × 5 Contracts	12,000
Add : Profit & Loss To-day	5 Contracts × 50 shares × (– 22)/Shares	(5,500)
Balance Before Margin		<u>6,500</u>
Add : Margin Call Paid	(Balance fell below Maintenance margin) To bring balance back to Initial Margin	<u>5,500</u>
Closing Balance		12,000

August, 3	Details	Amount ₹

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Opening Balance		12,000
Add : Profit & (Loss) To-day	5 Contracts × 50 Shares × (+ 48)/shares	12,000
Balance before withdrawl		24,000
Less : Profit withdrawn	Half of (24,000 – 12,000)	6,000
Closing Balance		18,000

August, 4	Details	Amount ₹
Opening Balance		18,000
Add : Profit & (Loss) To-day	5 Contracts × 50 Shares × (– 36)/Shares	(9,000)
Balance before Margin Call		9,000
Add : Margin Call paid	To bring balance back to initial Margin (since balance fell below maintenance margin)	3,000
Closing Balance		12,000

August, 5	Details	Amount ₹
Opening Balance		12,000
Add : Profit & (Loss) To-day	5 Contracts × 50 Shares × (+ 16/Shares)	4,000
Balance before withdrawn		16,000
Less : Profit withdrawn	Half of (16,000 – 12,000)	2,000
Closing Balance		14,000

Margin call whenever balance goes below = 5 Contracts × 2000 = ₹ 10,000

Withdrawl (Half) Whenever margin A/c shows balance above 5 × 2,400 = ₹ 12,000.

**Q. 23. (a) Write a short note on Index Future.**

**(b) An Indian importer has to settle a bill for \$ 1,35,000.**

The exporter has given the Indian Company two options :

(i) Pay immediately without any interest charge.

(ii) Pay after 3 months, with interest 6% p.a.

The importer's bank charges 16% p.a. on overdrafts.

If the exchange rates are as follows, what should the company do?

Spot (₹/\$) : 48.35 / 48.36

3-month (₹/\$) : 48.81 / 48.83

Give reasons for your advice.

**Answer 23. (a)**

An index Future is a derivative whose value is dependent on the value of the underlying asset (e.g. BSE Sensex, S & P, CNX Nifty). While trading on index futures, an investor is basically buying and selling the basket of securities comprising an index in their relative weights.

Unlike commodity and other futures contracts index future contracts are settled in cash. Index futures contract is basically an obligation to deliver a settlement, an amount equal to M (Multiplier) times the difference between the stock index value on the expiration date of contract and the price at which the contract was originally struck [indicated as (I – P) × M], (the value of M is pre-determined for each stock Market Index). The transactions, in actual practice, are settled through clearing house and no actual or physical delivery of stock is made. At the close of the trading session each day, every customer's position is marked to Market.

Index futures help an investor to take a position on the market and also hedge the share portfolio against adverse market conditions.

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Answer 23. (b)

### INDIAN IMPORTER

Evaluation of comparative options offered by the exporter for settlement of payment.

	\$	₹
<b>Option 1 : Pay immediately without any interest charge</b>		
(a) Bill value converted to Indian Rupees (135000 × 48.36)	135000	65,28,600
(b) Interest on borrowing from Bank (O/D) @ 16% p./a. (for 3 month)		<u>2,61,144</u>
Total		<u>67,89,744</u>

	\$	₹
<b>Option 2 : Pay after 3 months, with interest @ 6% p.a.</b>		
(a) Bill value	135000	
(b) Interest @ 6% p.a. for 3 months		<u>2025</u>
Conversion of Indian Rupees	<u>137025</u>	
@ Forward ₹ / \$ Rste (137025 × 48.83)		66,99,931
Saving		<u>98,813</u>

**Advice :** In the light of evaluated options — Supra, it is advisable to settle the payable after 3 months — Since

- (i) Rupee outflow is less by ₹ 98813 in the option 2
- (ii) the 3 months forward premium on US \$ is less than the interest differential.

**Q. 24. (a) Explain what is meant by Free Cash Flow?**

**(b) Sumit Ltd. in planning to import an equipment from Japan at a cost of 3,400 lakh yen. The company may avail loans at 18 per cent per annum with quarterly rests with which it can import the equipment. The company has also an offer from Osaka branch of an India based bank extending credit of 180 days at 2 percent per annum against opening of an irrecoverable letter of credit.**

**Additional information :**

Present exchange rate	₹ 100 = 340 yen
180 day's forward rate	₹ 100 = 345 yen

**Commission charges for letter of credit at 2 percent per 12 months.**

**Advise the company whether the offer the foreign branch should be accepted.**

**Answer 24. (a)**

Free Cash Flow is the cash flow available to a company from operations after interest expenses, tax, debt repayments and lease obligations, any charge in working capital and capital spending on assets needed to continue existing operations. The free cash flow is the legitimate cash flow for the purpose of business valuation in that it reflects the cash flows generated by a company's operations for all the providers (debt and equity) of its capital. The free cash flow is a more comprehensive term as it includes cash flows due to after tax non-operating income as well as adjustment for non-operating assets.

The procedure of determining FCF is exhibited below :

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

A company that generates sufficient free cash flow has to decide how to use this cash flow. Primarily the

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cash should be invested in such investments as will increase the shareholder wealth.

Any surplus cash after all positive NPV investments have been undertaken, should be returned to the shareholders, in the form of (i) dividends or, (ii) by share repurchase.

### Answer 24. (b)

**Alternative I :** Purchase of multipurpose machine by availing loan @ 18% interest p.a. (₹ lakhs)

Cost of machine 3,400 lakhs Yen	(Conversion rate ₹ 100 = 340 Yen)	1,000.00
Add : 1st quarter interest	(@ 18% p.a. on ₹ 1,000 lakhs)	45.00
Add : 2nd quarter interest	(@ 18% p.a. on ₹ 1,045 lakhs)	47.03
Total cash outflow		1,092.03

**Alternative II :** Extension of 180 days credit by Osaka branch of an India-based bank (₹ lakhs)

Commission charges for establishment of letter of credit (@ 2% per annum for 180 days on ₹ 1,000 lakhs)		10.00
Add : 1st quarter interest		0.45
2nd quarter interest		0.47
		10.92

**Amount payable at the end of 180 days** (lakh Yen)

Cost		3,400.00
Interest @ 2% p.a.	$(3,400 \times 2/100 \times 180 / 365)$	33.53
Total Yen		3,433.53

**Amount in Rupees** (₹ lakhs)

Conversion of Yen into rupees	$\frac{3,433.53}{3435} \times 100$	995.23
Add : Charges on letter of credit and interest charges thereon		10.92
Total cash outflow		1,006.15

**Recommendation :** The total cash outflow is lesser in case of Alternative II by ₹ 85.88 lakhs. Therefore, import of machine by establishing letter of credit is suggested.

**Q. 25.** The following table shows interest rates for the United States Dollar and French Francs. The spot exchange rate is 7.05 Francs per dollar. Complete the missing entries :

Particulars	3 Months	6 Months	1 Year
Dollar interest rate (annually compounded)	11½%	12¼%	?
Franc interest rate (annually compounded)	19½%	?	20%
Forward Franc per Dollar	?	?	7.5200
Forward discount on Franc per cent per year	?	- 6.3%	?

### Answer 25.

(a) Calculation of 3 months forward discount on Franc per cent per year and 3 months forward Franc per Dollar

3 months Dollar interest rate = 11.5% or 0.115

3 months Franc interest rate = 19.5% or 0.195

As per Interest Rate Parity Theorem :

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Interest rate differential = Exchange rate differential

$$\frac{1+r_d}{1+r_f} = \frac{S_{f/d}}{F_{f/d}}$$

where,

$r_f$  = Rate of interest of country with Francs as currency

$r_d$  = Rate of interest of country with Dollar as currency

$S_{f/d}$  = Spot rate between Franc and Dollar

$F_{f/d}$  = Forward rate between Franc and Dollar

Interest rate differential = Exchange rate differential

$$\frac{1+0.115}{1+0.195} = \text{Exchange rate differential (differential between forward rate and spot rate)}$$

Differential between forward and sport = 93.3%

∴ Forward discount on Franc per cent for 3 months = 93.3% – 100% = – 6.7%

Forward discount on Franc per cent for 3 months = – 6.7%/4 = – 1.675%

Sport rate of Franc against Dollar = 1/7.05 = 0.141844

Forward Franc = Today's spot rate (difference between forward and spot rate)

$$= 0.141844 \text{ dollar } (100\% - 1.675\%) = 0.1394681 \text{ dollar}$$

Forward Franc per Dollar = 1/0.1394681 = 7.17

(b) Calculation of 6 months Franc interest rate and 6 months forward Franc per Dollar

6 months Dollar interest rate = 12 1/4% or 12.25%

Forward discount on franc % per year = – 6.3% or – 3.15% for 6 months

Hence 6 months Forward rate = 0.141844 dollar (spot rate) (100% – 3.15%)

$$= 0.13737 \text{ dollars}$$

Forward francs per dollar = 1/0.13737 = 7.28 francs

Differential in interest rate between two countries

= Differential between Forward and Spot rate

$$\frac{1+ \text{Dollar interest rate}}{1+ \text{Franc interest rate}} = \text{Differential between Forward and Spot rate}$$

$$\frac{1+ .1225}{1+ \text{Franc interest rate}} = (100\% - 6.3\%)$$

$$\frac{1.1225}{1+ \text{Franc interest rate}} = 93.7\%$$

$$1 + \text{Franc interest rate} = \frac{1.1225}{93.7\%}$$

$$\text{Franc interest rate} = 1.19797 - 1 = 0.19797 \text{ or } 19.8\%$$

(c) Calculation of one year Dollar interest rate and one year forward discount on Franc

One year Franc interest rate = 20% Forward Franc per

dollar = 7.5200

(\\$)

Today's spot rate is 7.05 (given) Francs per Dollar i.e., 1 France	0.141844
Forward Frans is 7.52 Frans per Dollar i.e., 1 France	0.132978
Difference	0.008866

Forward discount on Francs per cent per year

$$= \frac{0.008866}{0.141844} \times 100 = -6.25\% \text{ or } -6.3\% \text{ (rounded off)}$$

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Differential in interest rates between two countries

= Differential between forward rate and spot rate

$$\frac{1 + \text{Dollar interest rate}}{1 + 0.20} = \frac{7.05}{7.52}$$

$$\begin{aligned} \text{Dollar interest rate} &= 1.20 \times 0.9374 - 1 \\ &= 1.125 - 1 = 0.125 \text{ or } 12.5\% \end{aligned}$$

**Q. 26. (a)** XYZ Ltd. a US firm will need £ 3,00,000 in 180 days. In this connection, the following information is available :

Spot rate 1£ = \$ 2.00

180 days forward rate of £ as of today = £ 1.96

Interest rates are as follows :

Particulars	U.K.	U.S.
180 days deposit rate	4.5%	5%
180 days borrowing rate	5%	5.5%

A call option on £ that expires in 180 days has an exercise price of \$ 1.97 and a premium of \$ 0.04.

XYZ Ltd. has forecasted the spot rates 180 days hence as below :

Future rate (\$)	1.91	1.95	2.05
Probability	25%	60%	15%

Which of the following strategies would be most preferable to XYZ Ltd.?

- (i) a forward contract
- (ii) a money market hedge
- (iii) an option contract
- (iv) no hedging

Show calculations in each case.

**(b)** For imports from UK, Philadelphia Ltd. of USA owes £ 6,50,000 to London Ltd., payable on May, 2010. It is now 12 February, 2010.

The following future contracts (contract size £ 62,500) are available on the Philadelphia exchange :

Expiry	Current futures rate
March	1.4900 \$/£ 1
June	1.4960 \$/£ 1

- (i) Illustrate how Philadelphia Ltd. can use future contracts to reduce the transaction risk if, on 20 May the spot rate is 1.5030 \$/£ 1 and June futures are trading at 1.5120 \$/£. The spot rate on 12 February is 1.4850 \$/£ 1.
- (ii) Calculate the "hedge efficiency" and comment on it.

**Answer 26. (a)**

- (i) **Taking a Forward Contract**

$$\begin{aligned} \text{US \$ needed on expiration of 180 days} \\ = \text{£ } 3,00,000 \times \$ 1.96 = \$ 5,88,000 \end{aligned}$$

- (ii) **Money Market Hedge Transaction**

Now :

Borrow in US dollars and invest in UK pounds on expiration of 180 days

On expiration of 180 days :

Repay in US \$ :

US \$ needed to purchase UK £

$$= \frac{\text{£ } 3,00,000}{1 + 0.045} = \text{£ } 2,87,081$$

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US \$ needed to convert into UK £

$$= \text{£ } 2,87,081 \times \$ 2 = \$ 5,74,162$$

Principal and interest payable in US \$ loan on expiry of 180 days

$$= \$ 5,74,162 \times \$ 1.055 = \$ 6,05,741$$

**(iii) Entering into Option Market by taking Call Option**

Expected spot rate in 180 days	Premium per unit	Exercise option	Total price per unit	Total price for £ 3,00,000 (x)	Probability (p)	(px)
1.91	0.04	No	1.95	5,85,000	0.25	1,46,250
1.95	0.04	No	1.99	5,97,000	0.60	3,58,200
2.05	0.04	Yes	2.01	6,03,00	0.15	90,450
						5,94,900

**Answer 26. (b)**

- (i) For Philadelphia Ltd. the appropriate futures contract will be the one that will expire soonest after the end of the exposure period i.e. the June contract.

Number of contracts needed

$$= \text{£ } 6,50,000 / \text{£ } 62,500 = 10.4 \text{ (say 10 contracts)}$$

P Ltd. will buy 10 June contracts now (12 Feb.) at \$1.4960/£1 and sell 10 contracts on 20 May for \$1.5120/£1, thus making a profit from the futures trading that will largely but not totally, netate the 'loss' from the spot market (since sterling has strengthened between 12 February and 20 May).

We now calculate the profit/loss from the futures contracts trade :

- (i) The 'tick' movement is  $(1.5120 - 1.4960) = 0.0160$  i.e., 160 ticks (for one tick = 0.00001)
- (ii) 'Tick' value per contract =  $\text{£ } 62,500 \times 0.00001 = \$ 6.25$
- (iii) Profit =  $10 \text{ contracts} \times 160 \times \$ 6.25 = \$ 10,000$
- (iv) Overall cost on 20 May when P Ltd. will exchange \$ for £ on the spot market :
- (v) The net 'cost' to P Ltd.  
 $= \$ 9,76,950 - \$ 10,000 = \$ 9,66,950$

- (ii) Hedge Efficiency

The spot on February 12 was 1.4850 \$/£1. So £650,000 would have cost \$ 9,65,250 and the los on the 'spot market' is \$  $(9,76,950 - 9,65,250) = \$ 11,700$ .

The hedge efficiency is therefore the future contract profit divided by the spot market loss

$$= \frac{\$10,000}{\$11,700} \times 100 = 85.5\%$$

The inefficiency is due to :

- (i) rounding the contracts to 10 from 10.4, and
- (ii) basis risk - the fact that the movement on the futures price has not exactly equalled the movement on the spot rate.

**Q. 27. (a)** The following quotes are available for 3-months options in respect of a share currently traded at ₹ 31 :

Strike price	₹ 30
Call option	₹ 3
Put option	₹ 2

An investor devises a strategy of buying a call and selling the share and a put option. Draw his profit/loss profile if it is given that the rate of interest is 10% per annum. What would be the position if the strategy adopted is selling a call and buying the put and the share?

- (b)** What is the difference between Forward and Futures contracts?

### Answer 27. (a)

**Strategy I :** Buying a call and selling a put and a share

Initial cash inflow (₹ 31 – ₹ 3 + ₹ 2) = ₹ 30

Interest rate = 10%

Amount grows in 3 months to  $(30 \times e^{1 \times .25}) = ₹ 30.76^*$

If the share price is greater than ₹ 30, he would exercise the call option and buy one share for ₹ 30 and his net profit is ₹ 0.76 (i.e. ₹ 30.76 – 30).

However, if the share price is less than ₹ 30, the counter-party would exercise the put option and the investor would buy one share at ₹ 30. The net profit to the investor is again ₹ 0.76.

**Strategy II :** Selling a call and buying a put and a share

In case, the investor has to arrange a loan @ 10% of ₹ 30 (i.e. ₹ 31 + ₹ 2 – ₹ 3).

This amount would be repaid after 3 months. Amount payable  $(30 \times e^{1 \times .25})$  is ₹ 30.76.

After 3 months, if the market price is more than ₹ 30, the counter-party would exercise the call option and the investor would be required to sell the share at ₹ 30. The loss to the investor would be ₹ 0.76 (i.e. ₹ 30.76 – 30).

However, if the rate is less than ₹ 30, the investor would exercise the put option and would get ₹ 30 from the rate of share. The loss to be buyer would again be ₹ 0.76.

\* Interest can also be calculated on simple interest basis instead of continuous compound interest.

### Answer 27. (b)

Fundamentally, forward and futures contracts have the same function: both types of contracts allow people to buy or sell a specific type of asset at a specific time at a given price.

However, it is in the specific details that these contracts differ. First of all, futures contracts are exchange-traded and, therefore, are standardized contracts. Forward contracts, on the other hand, are private agreements between two parties and are not as rigid in their stated terms and conditions. Because forward contracts are private agreements, there is always a chance that a party may default on its side of the agreement. Futures contracts have clearing houses that guarantee the transactions, which drastically lowers the probability of default to almost never.

Secondly, the specific details concerning settlement and delivery are quite distinct. For forward contracts, settlement of the contract occurs at the end of the contract. Futures contracts are marked-to-market daily, which means that daily changes are settled day by day until the end of the contract. Furthermore, settlement for futures contracts can occur over a range of dates. Forward contracts, on the other hand, only possess one settlement date.

Lastly, because futures contracts are quite frequently employed by speculators, who bet on the direction in which an asset's price will move, they are usually closed out prior to maturity and delivery usually never happens. On the other hand, forward contracts are mostly used by hedgers that want to eliminate the volatility of an asset's price, and delivery of the asset or cash settlement will usually take place.

### Q. 28. Hedging with Commodity Futures :

Bharat Oil Corporation (BOC) imports crude oil for its requirements on a regular basis. Its requirements are estimated at 100 tonnes per month.

Of late, there has been a surge in the prices of oil. The current price (month of June) of crude oil is ₹ 5,500 per barrel. The firm expects the price to rise in coming months to ₹ 5,800 by August. It wants to hedge against the rising prices for its requirements of the month of August.

Multi Commodity Exchange (MCX) in India offers a futures contract in crude oil. The contract size is 100 barrels and August contract is currently traded at ₹ 5,668 per barrel.

- How can BOC hedge its exposure against the rising price of crude oil?
- If Bharat Oil Corporation hedges its exposure at MCX, how many contracts it must book?
- Analyse the position of BOC if in the month of August (i) the spot price is ₹ 5,750 and futures price is ₹ 5,788, (ii) the spot price is ₹ 5,417 and futures market were matched?

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

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**Answer 28.**

1 tonnes = 7.33 barrels

- (a) Hedging strategy would be to take position in the futures market opposite to that of in the physical market.

BOC is short on crude oil and therefore they must go long on the futures of crude oil.

Following would be the hedging strategy :

June : Buy futures contract now

August : Purchase crude oil at the price prevailing then in the spot market, and Sell the future contracts.

- (b) Quantity to be imported/hedged = 100 tonnes or 733 barrels  
 Contract size = 100 barrels  
 Nos of contracts bought =  $733/100 = 8$  (rounded off)

- (c) In August, the firm would buy its requirements of crude oil in the market and unwind its position in the futures market by selling the contracts bought in June. By doing so, the gains/loss in the physical market would be offset significantly.

August futures on crude oil = ₹ 5,668 per barrel

- (i) When the price of crude oil rises :

Spot crude oil price = ₹ 5,750    Future price = ₹ 5,788

Purchase price in the spot for =  $733 \times 5750 = ₹ 42,14,750$

Cash flow on futures position

Buying price	5668
Selling price	5788
Profit	120

Realizations from futures market =  $8 \times 100 \times 120$

= - ₹ 96,000

Net amount paid

₹ 41,18,750

Effective price per barrel =  $41,18,750/733$

= ₹ 5,619

- (ii) When the price of crude oil falls :

Spot crude oil price = ₹ 5,417

Futures price = ₹ 5,455

Purchase price in the spot for =  $733 \times 5417 = ₹ 39,70,661$

Cash flow on futures position

Buying price	5668
Selling price	5455
Profit	- 213

Realisations from futures market =  $8 \times 100 \times - 213$

= ₹ 1,70,400

Net amount paid

₹ 41,41,061

Effective price per barrel =  $41,41,061/733$

= ₹ 5,649

- (d) If positions in the physical market and futures market were matched then

The effective price would be =  $S_1 - (F_1 - F_0)$

When price rose the effective price paid is

=  $5750 - (5788 - 5668) = ₹ 5,630$  per barrel

When price fell the effective price paid is

=  $5417 - (5455 - 5668) = ₹ 5,630$  per barrel

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### Q. 29. Option Pricing – Black Scholes Model :

The following data is given :

Current stock price = ₹ 100.00

Strike Price = ₹ 110.00

Time to expiration = 3 months

Risk free rate of return = 6.00%

Variance of return on the stock = 0.0625

- (a) Find out the value of the call option using Black Scholes Model.
- (b) Find out the intrinsic value and the time value of the call option.
- (c) Using put call parity, find out the value of the put option with same parameters.
- (d) Find out the intrinsic values and time values of the put option.

### Answer 29.

(a) The value of the call option for non-dividend paying stock is given by Black Scholes Model (BSM) :

$$c = SN(d_1) - Xe^{-rt}N(d_2)$$

$$\text{where } d_1 = \frac{\ln(S/X) + (r + \sigma^2/2)t}{\sigma\sqrt{t}}; \text{ and}$$

$$d_2 = \frac{\ln(S/X) + (r - \sigma^2/2)t}{\sigma\sqrt{t}} \text{ or}$$

Following values may be inserted in the BSM to find the value of the call.

Spot Price,  $s = ₹ 100.00$

Exercise Price,  $X = ₹ 110.00$

Time to expiry,  $t = 3 \text{ months} = 0.25 \text{ years}$

Interest Rate,  $r = 6\% \text{ p.a.}$

Standard Deviation,  $\sigma = 25\% \text{ p.a.}$

Inserting the values, we get :

$$d_1 = -0.5800; N(d_1) = 0.2810$$

$$d_2 = -0.7050; N(d_2) = 0.2404$$

$$S \times N(d_1) = 28.1000$$

$$\text{PV of } X = 108.3623$$

$$\text{PV}(X) \times N(d_2) = 26.0503$$

$$\text{Call Value} = S \times N(d_1) - \text{PV}(X) \times N(d_2) = ₹ 2.05$$

(b) Intrinsic value of call,  $\text{Max}(S - X, 0) = ₹ 0.00$

$$\text{Time value of the call} = 2.05 - 0 = ₹ 2.05$$

(c) Put Call Parity states that the difference of the call and put price must be equal to the difference of spot and present value of the exercise price.

$$c - p = S - \text{PV}(X)$$

$$p = c - S + \text{PV}(X)$$

$$= 2.05 - 100 + 108.36 = ₹ 10.41$$

(d) Intrinsic value of put,  $\text{Max}(S - X, 0) = ₹ 10.00$

$$\text{Time value of put } \text{Max}(S - X, 0) = 10.41 - 10.00 = ₹ 0.41$$

## Revisionary Test Paper\_Final\_Syllabus 2008\_June 2013

**Q. 30.** A company has borrowed through a fixed rate instrument of 8%. The swap quote from the bank is 7.80/7.90, i.e., bank pays 7.80 fixed for receiving LIBOR and would receive 7.90% fixed for paying LIBOR. The company enters the swap deal with the bank.

After some time, the swap market changes to 6.40/6.50 and the company again reverses the original swap by entering into 2nd swap opposite to that of the first one.

- (a) What does the structure of the first swap achieve?
- (b) What is the cost of funds for the firm before and after the swap?
- (c) What is the structure of 2nd swap and what does it do?
- (d) Find the cost of funds for the company after the second swap?

**Answer 30.**

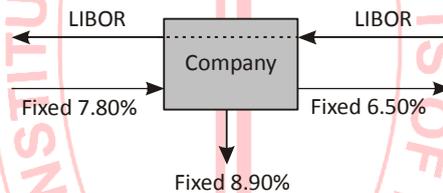
(a) The company would undertake the transform the fixed rate liability to floating rate, as it possibly expects a decline in the interest rates.

Following would be the structure of the swap with the bank.



(b) Cost of funds after swap =  $L + 0.2\%$

(c) The company would enter into a swap opposite to that of the first one. In the first swap, the firm received fixed and paid variable. Now in the second swap, it would pay fixed while receiving LIBOR. This would enable cancelling the floating leg. The company would gain the differential of the fixed legs of first and second swap.



- (d) Pay fixed to borrowers 8.00
- Receive fixed from bank (1st swap) - 7.80
- Pay fixed to bank (2nd swap) 6.50
- Effective cost after 2nd swap 6.70