

CA INTERMEDIATE

FINANCIAL MANAGEMENT

THEORY AND PRACTICAL PROBLEMS

INTRODUCED BY ICAI

POWERED BY-

Chapter 1

SCOPE AND OBJECTIVES OF FINANCIAL MANAGEMENT

Theoretical based Questions

QUESTION 1.

POINT OUT the difference between Financial Management & Financial Accounting?

(Similar Question Present in SSEI Book Volume I Question 2 Page 7)

ANSWER:

Financial Management and Accounting

The relationship between financial management and accounting are closely related to the extent that accounting is an important input in financial decision making. In other words, accounting is a necessary input into the financial management function.

Financial accounting generates information relating to operations of the organisation. The outcome of accounting is the financial statements such as balance sheet, income statement, and the statement of changes in financial position. The information contained in these statements and reports helps the financial managers in gauging the past performance and future directions of the organisation.

Though financial management and accounting are closely related, still they differ in the treatment of funds and also with regards to decision making. Some of the differences are:-

Treatment of Funds

In accounting, the measurement of funds is based on the accrual principle i.e. revenue is recognised at the point of sale and not when collected and expenses are recognised when they are incurred rather than when actually paid. The accrual based accounting data do not reflect fully the financial conditions of the organisation. An organisation which has earned profit (sales less expenses) may said to be profitable in the accounting sense but it may not be able to meet its current obligations due to shortage of liquidity as a result of say, uncollectible receivables. Such an organisation will not survive regardless of its levels of profits. Whereas, the

treatment of funds in financial management is based on cash flows. The revenues are recognised only when cash is actually received (i.e. cash inflow) and expenses are recognised on actual payment (i.e. cash outflow). This is so because the finance manager is concerned with maintaining solvency of the organisation by providing the cash flows necessary to satisfy its obligations and acquiring and financing the assets needed to achieve the goals of the organisation. Thus, cash flow based returns help financial managers to avoid insolvency and achieve desired financial goals.

Decision – making

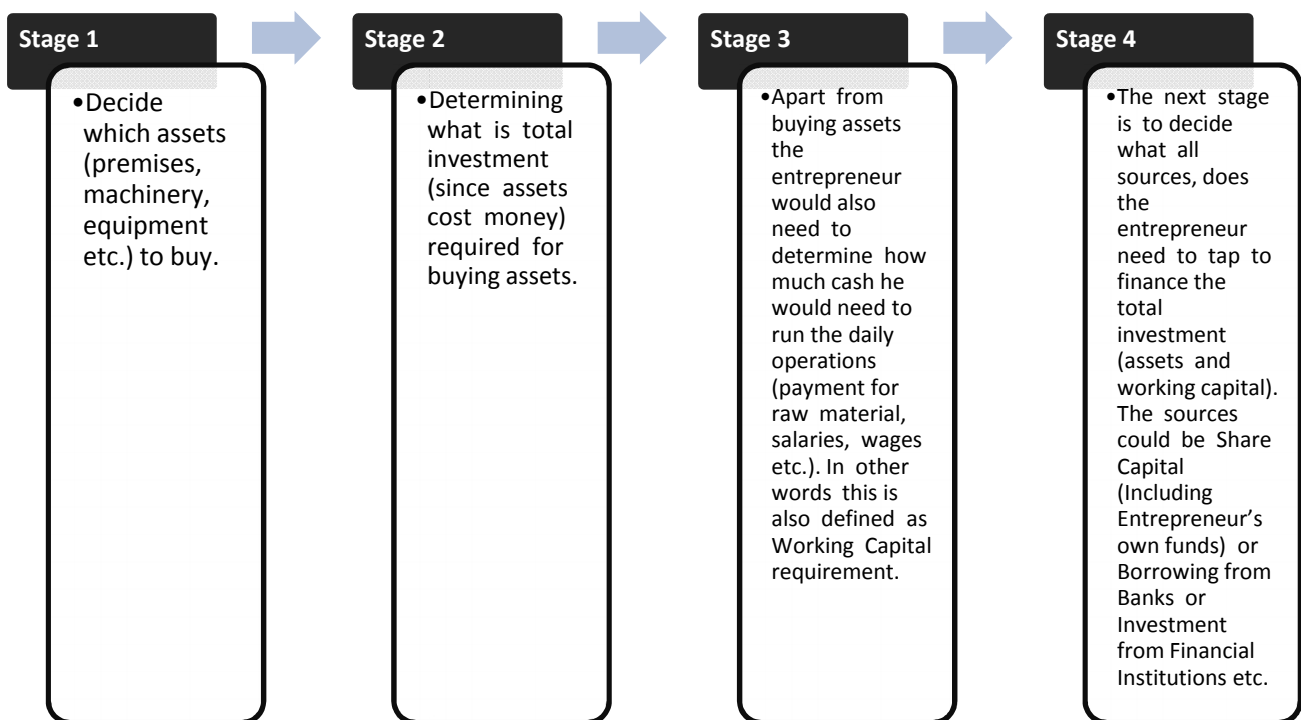
The purpose of accounting is to collect and present financial data of the past, present and future operations of the organization. The financial manager uses these data for financial decision making. It is not that the financial managers cannot collect data or accountants cannot make decisions, but the chief focus of an accountant is to collect data and present the data while the financial manager's primary responsibility relates to financial planning, controlling and decision making. Thus, in a way it can be stated that financial management begins where accounting ends.

QUESTION 2.

“Financial management is concerned with acquisition & financing of short term & long-term credit”. ELABORATE.

ANSWER:

We will like to explain Financial Management by giving a very simple scenario. For the purpose of starting any new business/venture, an entrepreneur goes through the following stages of decision making:-



While deciding how much to take from each source, the entrepreneur would keep in mind the cost of capital for each source (Interest/Dividend etc.). As an entrepreneur he would like to keep the cost of capital low.

Thus, financial management is concerned with **efficient acquisition (financing) and allocation** (investment in assets, working capital etc.) of funds with an objective to make profit (dividend) for owners. In other words, focus of financial management is to address three major financial decision areas namely, **investment, financing and dividend decisions.**

Any business enterprise requiring money and the 3 key questions being enquired into

1. Where to get the money from? (**Financing Decision**)
2. Where to invest the money? (**Investment Decision**)
3. How much to distribute amongst shareholders to keep them satisfied? (**Dividend Decision**)

Chapter 3

FINANCIAL ANALYSIS AND PLANNING– RATIO ANALYSIS

Practical Problems

QUESTION 1.

Following information has been provided from the books of Laxmi Pvt. Ltd. for the year ending on 31st March, 2020:

Net Working Capital	₹ 4,80,000
Bank overdraft	₹ 80,000
Fixed Assets to Proprietary ratio	0.75
Reserves and Surplus	₹ 3,20,000
Current ratio	2.5
Liquid ratio (Quick Ratio)	1.5

You are required to PREPARE a summarised Balance Sheet as at 31st March, 2020 assuming that there is no long term debt.

(Similar Sum Present in SSEI Book Volume I Question 1 Page 71)

ANSWER:**Working notes:****i. Current Assets and Current Liabilities computation:**

$$\begin{aligned} \text{Current assets/ Current liabilities} &= 2.5/1 \\ \text{Or Current assets} &= 2.5 \text{ Current liabilities} \\ \text{Now, Working capital} &= \text{Current assets} - \text{Current liabilities} \\ \text{Or ₹ 4,80,000} &= 2.5 \text{ Current liability} - \text{Current liability} \\ \text{Or } 1.5 \text{ Current liability} &= ₹ 4,80,000 \\ \therefore \text{Current Liabilities} &= ₹ 3,20,000 \\ \text{So, Current Assets} &= ₹ 3,20,000 \times 2.5 = ₹ 8,00,000 \end{aligned}$$

ii. Computation of stock

$$\begin{aligned} \text{Liquid ratio} &= \text{Liquid assets/ Current liabilities} \\ \text{Or } 1.5 &= \frac{\text{Current assets} - \text{Inventories}}{₹ 3,20,000} \\ \text{Or } 1.5 \times ₹ 3, 20,000 &= ₹ 8,00,000 - \text{Inventories} \\ \text{Or Inventories} &= ₹ 8,00,000 - ₹ 4, 80,000 \\ \text{Or Stock} &= ₹ 3,20,000 \end{aligned}$$

iii. Computation of Proprietary fund; Fixed assets; Capital and Sundry creditors

$$\begin{aligned} \text{Fixed Asset to Proprietary ratio} &= \text{Fixed assets/ Proprietary fund} \\ &= 0.75 \end{aligned}$$

$$\therefore \text{Fixed Assets} = 0.75 \text{ Proprietary fund (PF)}$$

[FA+NWC – Long Term Debt = PF] i.e. FA + NWC = PF as there is no long-term debt.

$$\text{Or NWC} = \text{PF} - \text{FA (i.e. .75 PF)}$$

$$\begin{aligned}
 \text{Or Net Working Capital (NWC)} &= 0.25 \text{ Proprietary fund} \\
 \text{Or } ₹ 4,80,000/0.25 &= \text{Proprietary fund} \\
 \text{Or Proprietary fund} &= ₹ 19,20,000 \\
 \text{and Fixed Assets} &= 0.75 \text{ proprietary fund} \\
 &= 0.75 \times ₹ 19,20,000 \\
 &= ₹ 14,40,000 \\
 \\
 \text{Capital} &= \text{Proprietary fund – Reserves \& Surplus} \\
 &= ₹ 19,20,000 – ₹ 3,20,000 \\
 &= ₹ 16,00,000 \\
 \\
 \text{Sundry Creditors} &= (\text{Current liabilities – Bank overdraft}) \\
 &= (₹ 3,20,000 – ₹ 80,000) \\
 &= ₹ 2,40,000
 \end{aligned}$$

Balance Sheet as at 31st March, 2020

G6	₹	Assets	₹
Capital	16,00,000	Fixed Assets	14,40,000
Reserves & Surplus	3,20,000	Stock	3,20,000
Bank overdraft	80,000	Other Current Assets	4,80,000
Sundry creditors	2,40,000		
	22,40,000		22,40,000

QUESTION 2.

Manan Pvt. Ltd. gives you the following information relating to the year ending 31st March, 2020:

1.	Current Ratio	2.5 : 1
2.	Debt-Equity Ratio	1 : 1.5
3.	Return on Total Assets (After Tax)	15%
4.	Total Assets Turnover Ratio	2
5.	Gross Profit Ratio	20%
6.	Stock Turnover Ratio	7
7.	Net Working Capital	₹ 13,50,000
8.	Fixed Assets	₹ 30,00,000
9.	1,80,000 Equity Shares of	₹ 10 each
10.	60,000, 9% Preference Shares of	₹ 10 each
11.	Opening Stock	₹ 11,40,000

You are required to CALCULATE:

- Quick Ratio
- Fixed Assets Turnover Ratio
- Proprietary Ratio
- Earnings per Share

(Similar Sum Present in SSEI Book Volume I Question 5 Page 77)

ANSWER:**Workings Notes:**

- i. Net Working Capital = Current Assets – Current Liabilities
 = 2.5 – 1
 = 1.5
- Thus, Current Assets = $\frac{\text{Net Working Capital} \times 2.5}{1.5}$
 = $\frac{\text{₹}13,50,000 \times 2.5}{1.5}$
 = ₹ 22,50,000
- Current Liabilities = ₹ 22,50,000 – ₹ 13,50,000
 = ₹ 9,00,000
- ii. Sales = Total Assets Turnover × Total Assets
 = 2 × (Fixed Assets + Current Assets)
 = 2 × (₹ 30,00,000 + ₹ 22,50,000)
 = ₹ 1,05,00,000
- iii. Cost of Goods Sold = 100% – 20%
 = 80% of Sales
 = 80% of ₹ 1,05,00,000
 = ₹ 84,00,000
- iv. Average Stock = Cost of Good Sold/ Stock Turnover Ratio
 = ₹ 84,00,000/7
 = ₹ 12,00,000
- Closing Stock = (Average Stock × 2) – Opening Stock
 = (₹ 12,00,000 × 2) – ₹ 11,40,000

$$= ₹ 12,60,000$$

Quick Assets = Current Assets – Closing Stock

$$= ₹ 22,50,000 – ₹ 12,60,000$$

$$= ₹ 9,90,000$$

$$\frac{\text{Debt}}{\text{Equity (here Proprietary fund)}} = \frac{1}{1.5}$$

Or Proprietary fund = 1.5 Debt.

Total Asset = Proprietary Fund (Equity) + Debt

Or 52,50,000 = 1.5 Debt + Debt

Or Debt = ₹ 52,50,000 / 2.5

$$= ₹ 21,00,000$$

Proprietary fund = 21,00,000 x 1.5 = ₹ 31,50,000

$$= \frac{₹ 52,50,000 \times 1.5}{2.5}$$

$$= ₹ 31,50,000$$

v. Profit after tax (PAT) = Total Assets × Return on Total Assets

$$= ₹ 52,50,000 \times 15\%$$

$$= ₹ 7,87,500$$

a. Calculation of Quick Ratio

Quick Ratio = Quick Assets / Current Liabilities

$$= ₹ 9,90,000 / ₹ 9,00,000$$

$$= 1.1:1$$

b. Calculation of Fixed Assets Turnover Ratio

Fixed Assets Turnover Ratio = Sales / Fixed Assets

$$= ₹ 1,05,00,000 / ₹ 30,00,000$$

$$= 3.5$$

c. Calculation of Proprietary Ratio

$$\begin{aligned}\text{Proprietary Ratio} &= \text{Proprietary fund/ Total Assets} \\ &= ₹ 31,50,000/ ₹52,50,000 \\ &= 0.6 : 1\end{aligned}$$

d. Calculation of Earnings per Equity Share (EPS)

$$\begin{aligned}\text{Earnings per Equity Share (EPS)} &= \frac{\text{PAT} - \text{Preference Share Dividend}}{\text{Number of Equity Shares}} \\ &= \frac{₹7,87,500 - 54,000 (9\% \text{ of } 6,00,000)}{₹1,80,000} \\ &= ₹ 4.075 \text{ per share}\end{aligned}$$

Chapter 4

COST OF CAPITAL

Practical Problem

QUESTION 1.

ABC Company's equity share is quoted in the market at ₹ 25 per share currently. The company pays a dividend of ₹ 2 per share and the investor's market expects a growth rate of 6% per year.

You are required to:

- i. CALCULATE the company's cost of equity capital.
- ii. If the company issues 10% debentures of face value of ₹100 each and realises ₹ 96 per debenture while the debentures are redeemable after 12 years at a premium of 12%, CALCULATE cost of debenture Using YTM?

ANSWER:**i. Cost of Equity Capital (K_e):**

$$\begin{aligned}
 K_e &= \frac{\text{Expected dividend per share}(D_1)}{\text{Market price per share}(P_0)} + \text{Growth rate}(g) \\
 &= \frac{\text{₹}2 \times 1.06}{\text{₹}25} + 0.06 \\
 &= 0.1448 \text{ or } 14.48\%
 \end{aligned}$$

ii. Cost of Debenture (K_d):

Using Present Value method or YTM)

Identification of relevant cash flows

Year	Cash flows
0	Current market price (P_0) = ₹ 96
1 to 12	Interest net of tax $[I(1-t)] = 10\% \text{ of } ₹ 100 (1 - 0.5) = ₹ 5$
12	Redemption value (RV) = ₹ 100 (1.12) = ₹ 112

Calculation of Net Present Values (NPV) at two discount rates

Year	Cash flows	Discount factor @ 5%(L)	Present Value	Discount factor @ 10% (H)	Present Value
0	(96)	1.000	(96.00)	1.000	(96.00)
1 to 12	5	8.863	44.32	6.814	34.07
12	112	0.557	62.38	0.319	35.73
NPV			+10.7		-26.2

Calculation of IRR

$$\begin{aligned}
 \text{IRR} &= L + \frac{\text{NPV}_L}{\text{NPV}_L - \text{NPV}_H} (H - L) \\
 &= 5\% + \frac{10.7}{10.7 - (-26.2)} (10\% - 5\%) \\
 &= 5\% + \frac{53.6}{36.9} \\
 &= 6.45\%
 \end{aligned}$$

Therefore, $K_d = 6.45\%$

Chapter 5

FINANCING DECISIONS CAPITAL STRUCTURE

Practical Problems

QUESTION 1.

Aaina Ltd. is considering a new project which requires a capital investment of ₹ 9 crores. Interest on term loan is 12% and Corporate Tax rate is 30%. CALCULATE the point of indifference for the project considering the Debt Equity ratio insisted by the financing agencies being 2 : 1.

(Similar Sum Present in SSEI Book Volume I Question 13 Page 213)

ANSWER:

The capital investment can be financed in two ways i.e.

- i. By issuing equity shares only worth ₹ 9 crore or
- ii. By raising capital through taking a term loan of ₹ 6 crores and ₹ 3 crores through issuing equity shares (as the company has to comply with the 2 : 1 Debt Equity ratio insisted by financing agencies).

In first option interest will be Zero and in second option the interest will be ₹ 72,00,000

Point of Indifference between the above two alternatives =

$$\frac{\text{EBIT}_1 \times (1-t)}{\text{No. of equity shares}(N_1)} = \frac{(\text{EBIT}_2 - \text{Interest}) \times (1-t)}{\text{No. of equity shares}(N_2)}$$

Or,

$$\frac{\text{EBIT} (1-0.30)}{90,00,000 \text{ shares}} = \frac{(\text{EBIT} - ₹ 72,00,000) \times (1-0.30)}{30,00,000 \text{ shares}}$$

$$\text{Or, } 0.7 \text{ EBIT} = 2.1 \text{ EBIT} - ₹ 1,51,20,000$$

$$\text{EBIT} = ₹ 1,08,00,000$$

EBIT at point of Indifference will be ₹ 1.08 crore.

(The face value of the equity shares is assumed as ₹ 10 per share. However, indifference point will be same irrespective of face value per share).

QUESTION 2.

Xylo Ltd. is considering two alternative financing plans as follows:

Particulars	Plan – A (₹)	Plan – B (₹)
Equity shares of ₹ 10 each	8,00,000	8,00,000
Preference Shares of ₹ 100 each	-	4,00,000
12% Debentures	4,00,000	-
	12,00,000	12,00,000

The indifference point between the plans is ₹ 4,80,000. Corporate tax rate is 30%. CALCULATE the rate of dividend on preference shares.

(Similar Sum Present in SSEI Book Volume I Question 10 Page 210)

ANSWER:**Computation of Rate of Preference Dividend**

$$\begin{aligned}
 & \frac{(\text{EBIT} - \text{Interest}) (1 - t)}{\text{No. of Equity Shares } (N_1)} & = & \frac{\text{EBIT } (1 - t) - \text{Preference Dividend}}{\text{No. of Equity Shares } (N_1)} \\
 & \frac{(\text{₹ } 4,80,000 - \text{₹ } 48,000) \times (1 - 0.30)}{80,00,000 \text{ shares}} & = & \frac{\text{₹ } 4,80,000 (1 - 0.30) - \text{Preference Dividend}}{80,00,000 \text{ shares}} \\
 & \frac{\text{₹ } 3,02,400}{80,00,000 \text{ shares}} & = & \frac{\text{₹ } 3,36,000 - \text{Preference Dividend}}{80,00,000 \text{ shares}} \\
 & \text{₹ } 3,02,400 & = & \text{₹ } 3,36,000 - \text{Preference Dividend} \\
 & \text{Preference Dividend} & = & \text{₹ } 3,36,000 - \text{₹ } 3,02,400 \\
 & & = & \text{₹ } 33,600 \\
 & \text{Rate of Dividend} & = & \frac{\text{Preference Dividend}}{\text{Preference share capital}} \times 100 \\
 & & = & \frac{\text{₹ } 33,600}{4,00,000} \times 100 \\
 & & = & 8.4\%
 \end{aligned}$$

Chapter 6

FINANCING DECISIONS - LEVERAGES

Theoretical based Questions

QUESTION 1.

Explain the concept of “Double edged sword” in Financial leverage analysis?

(Similar Question Present in SSEI Book Volume I Question 7 Page 300)

ANSWER:

On one hand when cost of ‘fixed cost fund’ is less than the return on investment financial leverage will help to increase return on equity and EPS. The firm will also benefit from the saving of tax on interest on debts etc. However, when cost of debt will be more than the return it will affect return of equity and EPS unfavourably and as a result firm can be under financial distress. This is why financial leverage is known as “**double edged sword**”.

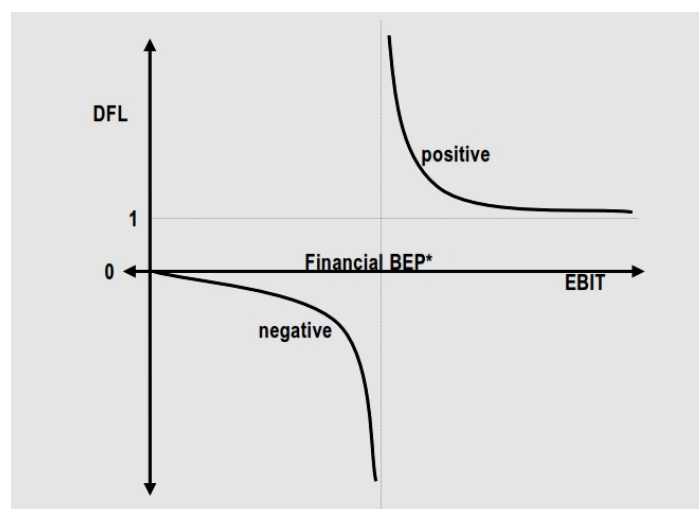
Effect on EPS and ROE:

When, $ROI > \text{Interest}$ – Favourable – Advantage

When, $ROI < \text{Interest}$ – Unfavourable – Disadvantage

When, $ROI = \text{Interest}$ – Neutral – Neither advantage nor disadvantage.

Note: DFL can never be between zero and one. It can be zero or less or it can be one or more.



*Financial BEP is the level of EBIT at which earning per share is zero. If a company has not issued preference shares then Financial BEP is simply equal to amount of Interest.

When EBIT is much higher than Financial BEP, DFL will be slightly more than one. With decrease in EBIT, DFL will increase. At Financial BEP, DFL will be infinite. When EBIT is slightly less than Financial BEP, DFL will be negative infinite. With further reduction in EBIT, DFL will move towards zero. At zero EBIT, DFL will also be zero.

Practical Problems

QUESTION 1.

From the following information extracted from the books of accounts of Imax Ltd., CALCULATE percentage change in earnings per share, if sales increase by 10% and Fixed Operating cost is ₹ 1,57,500:

Particulars	Amount in ₹
EBIT (Earnings before Interest and Tax)	31,50,000
Earnings before Tax (EBT)	14,00,000

ANSWER:

$$\begin{aligned} \text{Operating Leverage (OL)} &= \frac{\text{Contribution}}{\text{EBIT}} = \frac{\text{EBIT} + \text{Fixed Cost}}{\text{EBIT}} \\ &= \frac{\text{₹ } 31,50,000 + \text{₹ } 1,57,500}{\text{₹ } 31,50,000} \\ &= 1.05 \end{aligned}$$

$$\begin{aligned} \text{Financial Leverage (FL)} &= \frac{\text{EBIT}}{\text{EBT}} \\ &= \frac{\text{₹ } 31,50,000}{\text{₹ } 14,00,000} \\ &= 2.25 \end{aligned}$$

$$\begin{aligned} \text{Combined Leverage (CL)} &= 1.05 \times 2.25 \\ &= 2.3625 \end{aligned}$$

Percentage Change in Earnings per share

$$\text{DCL} = \frac{\% \text{ change in EPS}}{\% \text{ change in Sales}}$$

$$2.3625 = \frac{\% \text{ change in EPS}}{10\%}$$

$$\therefore \% \text{ change in EPS} = 23.625\%$$

Hence, if sale is increased by 10%, EPS will be increased by 23.625%.

QUESTION 2.

Consider the following information for Mega Ltd.:

Production level	2,500 units
Contribution per unit	₹ 150
Operating leverage	6
Combined leverage	24
Tax rate	30%

Required:

COMPUTE its earnings after tax.

ANSWER:**Computation of Earnings after tax**

$$\begin{aligned} \text{Contribution} &= ₹ 150 \times 2,500 \\ &= ₹ 3,75,000 \end{aligned}$$

Operating Leverage (OL) \times Financial Leverage (FL) = Combined Leverage (CL)

$$6 \times \text{Financial Leverage} = 24$$

$$\therefore \text{Financial Leverage} = 4$$

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{₹ 3,75,000}{\text{EBIT}} = 6$$

$$\therefore \text{EBIT} = \frac{₹ 3,75,000}{6} = ₹ 62,500$$

$$\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = 4$$

$$\therefore \text{EBT} = \frac{\text{EBIT}}{4} = \frac{62,500}{4} = ₹ 15,625$$

Since tax rate = 30%

Earnings after Tax (EAT) = EBT (1 – 0.30) [30% is tax rate] = ₹ 15,625 (0.70)

$$\therefore \text{Earnings after Tax (EAT)} = ₹ 10,938$$

QUESTION 3.

From the following information, prepare Income Statement of Company A & B:

Particulars	Company A	Company B
Margin of safety	0.20	0.25
Interest	₹ 3000	₹ 2000
Profit volume ratio	25%	33.33%
Financial Leverage	4	3
Tax rate	45%	45%

ANSWER:**Income Statement**

Particulars	(Amount in ₹)	
	Company A	Company B
Sales	80,000	36,000
Less: Variable Cost	60,000	24,000
Contribution	20,000	12,000
Less: Fix Cost	16,000	9,000
EBIT	4,000	3,000
Less: Interest	3,000	2,000
EBT	1,000	1,000
Tax (45%)	450	450
	550	550

Working Notes:**i. Company A**

$$\text{Financial Leverage} = \text{EBIT}/(\text{EBIT} - \text{Interest})$$

$$4/1 = \text{EBIT}/(\text{EBIT} - ₹ 3,000)$$

$$4\text{EBIT} - ₹ 12,000 = \text{EBIT}$$

$$3\text{EBIT} = ₹ 12,000$$

$$\text{EBIT} = ₹ 4,000$$

Company B

$$\text{Financial Leverage} = \text{EBIT}/(\text{EBIT} - \text{Interest})$$

$$3/1 = \text{EBIT}/(\text{EBIT} - ₹ 2,000)$$

$$3\text{EBIT} - ₹ 6000 = \text{EBIT}$$

$$2\text{EBIT} = ₹ 6,000$$

$$\text{EBIT} = ₹ 3,000$$

ii. Company A

$$\begin{aligned} \text{Operating Leverage} &= 1/\text{Margin of Safety} \\ &= 1/0.20 = 5 \\ \text{Operating Leverage} &= \text{Contribution/EBIT} \\ 5 &= \text{Contribution}/\text{₹ 4,000} \\ \text{Contribution} &= \text{₹ 20,000} \end{aligned}$$

Company B

$$\begin{aligned} \text{Operating Leverage} &= 1/\text{Margin of Safety} \\ &= 1/0.25 = 4 \\ \text{Operating Leverage} &= \text{Contribution/EBIT} \\ 4 &= \text{Contribution}/\text{₹ 3,000} \\ \text{Contribution} &= \text{₹ 12,000} \end{aligned}$$

iii. Company A

$$\begin{aligned} \text{Profit Volume Ratio} &= 25\%(\text{Given}) \\ \text{Profit Volume Ratio} &= \text{Contribution/Sales} * 100 \\ 25\% &= \text{₹ 20,000/Sales} \\ \text{Sales} &= \text{₹ 20,000}/25\% \\ \text{Sales} &= \text{₹ 80,000} \end{aligned}$$

Company B

$$\begin{aligned} \text{Profit Volume Ratio} &= 33.33\% \\ \text{Therefore, Sales} &= \text{₹ 12,000}/33.33\% \\ \text{Sales} &= \text{₹ 36,000} \end{aligned}$$

QUESTION 4.

The capital structure of PS Ltd. for the year ended 31st March, 2020 consisted as follows:

Particulars	Amount in ₹
Equity share capital (face value ₹ 100 each)	10,00,000
10% debentures (₹ 100 each)	10,00,000

During the year 2019-20, sales decreased to 1,00,000 units as compared to 1,20,000 units in the previous year. However, the selling price stood at ₹ 12 per unit and variable cost at ₹ 8 per unit for both the years. The fixed expenses were at ₹ 2,00,000 p.a. and the income tax rate is 30%.

You are required to CALCULATE the following:

- The degree of financial leverage at 1,20,000 units and 1,00,000 units.
- The degree of operating leverage at 1,20,000 units and 1,00,000 units.
- The percentage change in EPS.

(Similar Sum Present in SSEI Book Volume I Question 30 Page 286)

ANSWER:

Sales in units	1,20,000 (₹)	1,00,000 (₹)
Sales Value	14,40,000	12,00,000
Variable Cost	(9,60,000)	(8,00,000)
Contribution	4,80,000	4,00,000
Fixed expenses	(2,00,000)	(2,00,000)
EBIT	2,80,000	2,00,000
Debenture Interest	(1,00,000)	(1,00,000)
EBT	1,80,000	1,00,000
Tax @ 30%	(54,000)	(30,000)
Profit after tax (PAT)	1,26,000	70,000
i. Financial Leverage = $\frac{\text{EBIT}}{\text{EBT}}$	$= \frac{₹ 2,80,000}{₹ 1,80,000}$ = 1.56	$= \frac{₹ 2,00,000}{₹ 1,00,000}$ = 2
ii. Operating leverage = $\frac{\text{Contribution}}{\text{EBIT}}$	$= \frac{₹ 4,80,000}{₹ 2,80,000}$ = 1.71	$= \frac{₹ 4,00,000}{₹ 2,00,000}$ = 2
iii. Earnings per share (EPS)	$= \frac{₹ 1,26,000}{₹ 10,000}$ = ₹ 12.6	$= \frac{₹ 70,000}{₹ 10,000}$ = ₹ 7
Decrease in EPS	= ₹ 12.6 – ₹ 7 = ₹ 5.6	
% decrease in EPS	$= \frac{5.6}{12.6} \times 100 = 44.44\%$	

Chapter 7

INVESTMENT DECISIONS

Practical Problems

QUESTION 1.

Following data has been available for a capital project:

Annual cash inflows	₹ 1,00,000
Useful life	4 years
Salvage value	0
Internal rate of return	12%
Profitability index	1.064

You are required to CALCULATE the following for this project:

- i. Cost of project
- ii. Cost of capital
- iii. Net present value
- iv. Payback period

PV factors at different rates are given below:

Discount factor	12%	11%	10%	9%
1 year	0.893	0.901	0.909	0.917
2 year	0.797	0.812	0.826	0.842
3 year	0.712	0.731	0.751	0.772
4 year	0.636	0.659	0.683	0.708

(Similar Sum Present in SSEI Book Volume I Question 14 Page 349)

ANSWER:**i. Cost of the Project**

At 12% internal rate of return (IRR), the sum of total cash inflows = cost of the project i.e initial cash outlay

Annual cash inflows = ₹ 1,00,000

Useful life = 4 years

Considering the discount factor table @ 12%, cumulative present value of cash inflows for 4 years is 3.038 (0.893 + 0.797 + 0.712 + 0.636)

Hence, Total Cash inflows for 4 years for the Project is

₹ 1,00,000 × 3.038 = ₹ 3,03,800

Hence, Cost of the Project = ₹ 3,03,800

ii. Cost of Capital

Profitability index = $\frac{\text{Sum of Discounted Cash in flows}}{\text{Cost of the Project}}$

1.064 = $\frac{\text{Sum of Discounted Cash inflows}}{\text{₹ 3,03,800}}$

∴ Sum of Discounted Cash inflows = ₹ 3,23,243.20

Since, Annual Cash Inflows = ₹ 1,00,000

Hence, cumulative discount factor for 4 years = $\frac{3,23,243.20}{1,00,000}$

= 3.232

From the discount factor table, at discount rate of 9%, the cumulative discount factor for 4 years is 3.239 (0.917 + 0.842 + 0.772 + 0.708)

Hence, Cost of Capital = 9% (approx.)

iii. Net Present Value (NPV)

$$\begin{aligned}\text{NPV} &= \text{Sum of Present Values of Cash inflows} - \text{Cost of the Project} \\ &= ₹ 3,23,243.20 - ₹ 3,03,800 \\ &= ₹ 19,443.20\end{aligned}$$

$$\text{Net Present Value} = ₹ 19,443.20$$

iv. Payback Period

$$\begin{aligned}\text{Payback period} &= \frac{\text{Cost of the Project}}{\text{Annual Cash Inflows}} \\ &= \frac{₹ 3,03,800}{₹ 1,00,000} \\ &= 3.038 \text{ years}\end{aligned}$$

QUESTION 2.

Ae Bee Cee Ltd. is planning to invest in machinery, for which it has to make a choice between the two identical machines, in terms of Capacity, 'X' and 'Y'. Despite being designed differently, both machines do the same job. Further, details regarding both the machines are given below:

Particulars	Machine 'X'	Machine 'Y'
Purchase Cost of the Machine (₹)	15,00,000	10,00,000
Life (years)	3	2
Running cost per year (₹)	4,00,000	6,00,000

The opportunity cost of capital is 9%.

You are required to:

IDENTIFY the machine the company should buy?

The present value (PV) factors at 9% are:

Year	t_1	t_2	t_3
$PVIF_{0.09,t}$	0.917	0.842	0.772

(Similar Sum Present in SSEI Book Volume I Question 12 Page 346)

ANSWER:**Statement Showing the Evaluation of Two Machines**

Particulars	Machine 'X'	Machine 'Y'
i. Purchase Cost	₹ 15,00,000	₹ 10,00,000
ii. Life of Machine	3 years	2 years
iii. Running Cost of Machine per year	₹ 4,00,000	₹ 6,00,000
iv. PVIFA 0.09, 3	2.531	
PVIFA 0.09, 2		1.759
v. PV of Running Cost of Machine {(iii)×(iv)}	₹ 10,12,400	₹ 10,55,400
vi. Cash outflows of Machine {(i) + (v)}	₹ 25,12,400	₹ 20,55,400
vii. Equivalent PV of Annual Cash outflow (vi/iv)	₹ 9,92,651	₹ 11,68,505

Recommendation: Ae Bee Cee Ltd. should buy Machine 'X' since equivalent annual cash outflow is less than that of Machine 'Y'.

QUESTION 3.

Alley Pvt. Ltd. is planning to invest in a machinery that would cost ₹ 1,00,000 at the beginning of year 1. Net cash inflows from operations have been estimated at ₹ 36,000 per annum for 3 years. The company has two options for smooth functioning of the machinery- one is service, and another is replacement of parts. If the company opts to service a part of the machinery at the end of year 1 at ₹ 20,000, in such a case, the scrap value at the end of year 3 will be ₹ 25,000. However, if the company decides not to service the part, then it will have to be replaced at the end of year 2 at ₹ 30,800. And in this case, the machinery will work for the 4th year also and get operational cash inflow of ₹ 36,000 for the 4th year. It will have to be scrapped at the end of year 4 at ₹ 18,000.

Assuming cost of capital at 10% and ignoring taxes, DETERMINE the purchase of this machinery based on the net present value of its cash flows?

If the supplier gives a discount of ₹ 10,000 for purchase, what would be your decision?

Note:

The PV factors at 10% are:

Year	0	1	2	3	4	5	6
PV Factor	1	0.9091	0.8264	0.7513	0.6830	0.6209	0.5645

(Similar Sum Present in SSEI Book Volume I Question 8 Page 341)

ANSWER:**Option I: Purchase Machinery and Service Part at the end of Year 1.**

Net Present value of cash flow @ 10% per annum discount rate.

$$\begin{aligned}
 \text{NPV (in ₹)} &= -1,00,000 + \frac{36,000}{(1.1)} + \frac{36,000}{(1.1)^2} + \frac{36,000}{(1.1)^3} - \frac{20,000}{(1.1)} + \frac{25,000}{(1.1)^3} \\
 &= -1,00,000 + 36,000 (0.9091 + 0.8264 + 0.7513) - (20,000 \times 0.9091) + (25,000 \times 0.7513) \\
 &= -1,00,000 + (36,000 \times 2.4868) - 18,182 + 18,782.5 \\
 &= -1,00,000 + 89,524.8 - 18,182 + 18,782.5 \\
 \text{NPV} &= -9,874.7
 \end{aligned}$$

Since, Net Present Value is negative; therefore, this option is not to be considered.

If Supplier gives a discount of ₹ 10,000 then,

$$\text{NPV (in ₹)} = +10,000 - 9,874.7 = +125.3$$

In this case, Net Present Value is positive but very small; therefore, this option may not be advisable.

Option II: Purchase Machinery and Replace Part at the end of Year 2.

$$\begin{aligned}
 \text{NPV (in ₹)} &= -1,00,000 + \frac{36,000}{(1.1)} + \frac{36,000}{(1.1)^2} + \frac{36,000}{(1.1)^3} - \frac{30,800}{(1.1)^2} + \frac{54,000}{(1.1)^4} \\
 &= -1,00,000 + 36,000 (0.9091 + 0.8264 + 0.7513) - (30,800 \times 0.8264) + (54,000 \times 0.6830) \\
 &= -1,00,000 + 36,000 (2.4868) - 25,453.12 + 36,882 \\
 &= -1,00,000 + 89,524.8 - 25,453.12 + 36,882 \\
 \text{NPV} &= +953.68
 \end{aligned}$$

Net Present Value is positive, but very low as compared to the investment.

If the Supplier gives a discount of ₹ 10,000, then

$$\text{NPV (in ₹)} = 10,000 + 953.68 = 10,953.68$$

Decision: Option II is worth investing as the net present value is positive and higher as compared to Option I.

QUESTION 4.

NavJeevani hospital is considering to purchase a machine for medical projectional radiography which is priced at ₹ 2,00,000. The projected life of the machine is 8 years and has an expected salvage value of ₹ 18,000 at the end of 8th year. The annual operating cost of the machine is ₹ 22,500. It is expected to generate revenues of ₹ 1,20,000 per year for eight years. Presently, the hospital is outsourcing the radiography work to its neighbour Test Center and is earning commission income of ₹ 36,000 per annum, net of taxes.

Required:

ANALYSE whether it would be profitable for the hospital to purchase the machine? Give your recommendation under:

- i. Net Present Value method
- ii. Profitability Index method.

Consider tax @30%. PV factors at 10% are given below:

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
0.909	0.826	0.751	0.683	0.621	0.564	0.513	0.467

(Similar Sum Present in SSEI Book Volume I Question 28 Page 381)

ANSWER:

Determination of Cash inflows	₹
Sales Revenue	1,20,000
Less: Operating Cost	22,500
	97,500
Less: Depreciation (₹ 2,00,000 – ₹ 18,000)/8	22,750
Net Income	74,750
Tax @ 30%	22,425
Earnings after Tax (EAT)	52,325
Add: Depreciation	22,750
Cash inflow after tax per annum	75,075
Less: Loss of Commission Income	36,000
Net Cash inflow after tax per annum	39,075
In 8th Year :	
New Cash inflow after tax	39,075
Add: Salvage Value of Machine	18,000
Net Cash inflow in year 8	57,075

i. Calculation of Net Present Value (NPV)

Year	CFAT (₹)	PV Factor @10%	Present Value of Cash inflows (₹)
1 to 7	39,075	4.867	1,90,178.03
8	57,075	0.467	26,654.03
			2,16,832.06
Less: Cash Outflows			2,00,000.00
NPV			16,832.06

$$\begin{aligned}\text{ii. Profitability Index} &= \frac{\text{Sum of discounted cash in flows}}{\text{Present value of cash out flows}} \\ &= \frac{2,16,832.06}{2,00,000} \\ &= 1.084\end{aligned}$$

Advise: Since the net present value (NPV) is positive and profitability index is also greater than 1, the hospital may purchase the machine.

QUESTION 5.

XYZ Ltd. is planning to introduce a new product with a project life of 8 years. Initial equipment cost will be ₹ 3.5 crores. Additional equipment costing ₹ 25,00,000 will be purchased at the end of the third year from the cash inflow of this year. At the end of 8 years, the original equipment will have no resale value, but additional equipment can be sold for ₹ 2,50,000. A working capital of ₹ 40,00,000 will be needed and it will be released at the end of eighth year. The project will be financed with sufficient amount of equity capital.

The sales volumes over eight years have been estimated as follows:

Year	1	2	3	4 - 5	6 - 8
Units	72,000	1,08,000	2,60,000	2,70,000	1,80,000

A sales price of ₹ 240 per unit is expected and variable expenses will amount to 60% of sales revenue. Fixed cash operating costs will amount ₹ 36,00,000 per year. The loss of any year will be set off from the profits of subsequent two years. The company is subject to 30 per cent tax rate and considers 12 per cent to be an appropriate after tax cost of capital for this project. The company follows straight line method of depreciation.

Required:

CALCULATE the net present value of the project and advise the management to take appropriate decision.

Note:

The PV factors at 12% are

Year	1	2	3	4	5	6	7	8
PV Factor	0.893	0.797	0.712	0.636	0.567	0.507	0.452	0.404

(Similar Sum Present in SSEI Book Volume I Question 26 Page 377)

ANSWER:**Workings:****a. Calculation of annual cash flows**

(₹ in lakh)

Year	Sales	VC	FC	Dep.	Profit	Tax	PAT	Dep.	Cash inflow
1	172.80	103.68	36	43.75	(10.63)	-	-	43.75	33.12
2	259.20	155.52	36	43.75	23.93	3.99*	19.94	43.75	63.69
3	624.00	374.40	36	43.75	169.85	50.955	118.895	43.75	162.645
4-5	648.00	388.80	36	48.25	174.95	52.485	122.465	48.25	170.715
6-8	432.00	259.20	36	48.25	88.55	26.565	61.985	48.25	110.235

b. Calculation of Depreciation:

$$\text{On Initial equipment} = \frac{\text{₹ 350 lakh}}{8 \text{ years}}$$

$$= 43.75 \text{ lakh}$$

$$\text{On additional equipment} = \frac{(\text{₹ 25} - 2.5) \text{ lakh}}{5 \text{ years}}$$

$$= 4.5 \text{ lakh}$$

c. *Calculation of tax in 2nd Year:

	₹ in lakh
Profit for the year	23.93
Less: Set off of unabsorbed depreciation in 1 st year	(10.63)
Taxable profit	13.30
Tax @30%	3.99

d. Calculation of Initial cash outflow

	₹ in lakh
Cost of New Equipment	350
Add: Working Capital	40
Outflow	390

Calculation of NPV

(₹ in lakh)

Year	Cash flows	PV factor @12%	PV of cash-flows	Remark
0	(390)	1.000	(390.00)	Initial equipment cost
1	33.12	0.893	29.57	
2	63.69	0.797	50.76	
3	162.645	0.712	115.80	
3	(25.00)	0.712	(17.80)	Additional equipment cost
4	170.715	0.636	108.57	
5	170.715	0.567	96.79	
6	110.235	0.507	55.89	
7	110.235	0.452	49.83	
8	110.235	0.404	44.53	
8	40.00	0.404	16.16	Release of working capital
Net Present Value			160.10	

Advise: Since the project has a positive NPV, therefore, it should be accepted.

QUESTION 6.

A large profit making company is considering the installation of a machine to process the waste produced by one of its existing manufacturing process to be converted into a marketable product. At present, the waste is removed by a contractor for disposal on payment by the company of ₹ 150 lakh per annum for the next four years. The contract can be terminated upon installation of the aforesaid machine on payment of a compensation of ₹ 90 lakh before the processing operation starts. This compensation is not allowed as deduction for tax purposes.

The machine required for carrying out the processing will cost ₹ 600 lakh to be financed by a loan repayable in 4 equal instalments commencing from end of the year- 1. The interest rate is 14% per annum. At the end of the 4th year, the machine can be sold for ₹ 60 lakh and the cost of dismantling and removal will be ₹ 45 lakh.

Sales and direct costs of the product emerging from waste processing for 4 years are estimated as under:

(₹ In lakh)

Year	1	2	3	4
Sales	966	966	1,254	1,254
Material consumption	90	120	255	255
Wages	225	225	255	300
Other expenses	120	135	162	210
Factory overheads	165	180	330	435
Depreciation (as per income tax rules)	150	114	84	63

Initial stock of materials required before commencement of the processing operations is ₹ 60 lakh at the start of year 1. The stock levels of materials to be maintained at the end of year 1, 2 and 3 will be ₹ 165 lakh and the stocks at the end of year 4 will be nil. The storage of materials will utilise space which would otherwise have been rented out for ₹ 30 lakh per annum. Labour costs include wages of 40 workers, whose transfer to this process will reduce idle time payments of ₹ 45 lakh in the year- 1 and ₹ 30 lakh in the year- 2. Factory overheads include apportionment of general factory overheads except to the extent of insurance charges of ₹ 90 lakh per annum payable on this venture. The company's tax rate is 30%.

Present value factors for four years are as under:

Year	1	2	3	4
PV factors @14%	0.877	0.769	0.674	0.592

ADVISE the management on the desirability of installing the machine for processing the waste. All calculations should form part of the answer.

(Similar Sum Present in SSEI Book Volume I Question 15 Page 350)

ANSWER:**Statement of Operating Profit from processing of waste****(₹ in lakh)**

Year	1	2	3	4
Sales :(A)	966	966	1,254	1,254
Material consumption	90	120	255	255
Wages	180	195	255	300
Other expenses	120	135	162	210
Factory overheads (insurance only)	90	90	90	90
Loss of rent on storage space (opportunity cost)	30	30	30	30
Interest @14%	84	63	42	21
Depreciation (as per income tax rules)	150	114	84	63
Total cost: (B)	744	747	918	969
Profit (C)=(A)-(B)	222	219	336	285
Tax (30%)	66.6	65.7	100.8	85.5
Profit after Tax (PAT)	155.4	153.3	235.2	199.5

Statement of Incremental Cash Flows**(₹ in lakh)**

Year	0	1	2	3	4
Material stock	(60)	(105)	-	-	165
Compensation for contract	(90)	-	-	-	-
Contract payment saved	-	150	150	150	150
Tax on contract payment	-	(45)	(45)	(45)	(45)
Incremental profit	-	222	219	336	285
Depreciation added back	-	150	114	84	63
Tax on profits	-	(66.6)	(65.7)	(100.8)	(85.5)
Loan repayment	-	(150)	(150)	(150)	(150)
Profit on sale of machinery(net)	-	-	-	-	15
Total incremental cash flows	(150)	155.4	222.3	274.2	397.5
Present value factor	1.00	0.877	0.769	0.674	0.592
Present value of cash flows	(150)	136.28	170.95	184.81	235.32
Net present value					577.36

Advice: Since the net present value of cash flows is ₹ 577.36 lakh which is positive the management should install the machine for processing the waste.

Notes:

1. Material stock increases are taken in cash flows.
2. Idle time wages have also been considered
3. Apportioned factory overheads are not relevant only insurance charges of this project are relevant.
4. Interest calculated at 14% based on 4 equal instalments of loan repayment.
5. Sale of machinery- Net income after deducting removal expenses taken. Tax on Capital gains ignored.
6. Saving in contract payment and income tax thereon considered in the cash flows.

Chapter 8

RISK ANALYSIS IN CAPITAL BUDGETING

Practical Problems

QUESTION 1.

PNR Ltd. is considering a project with the following Cash flows:

Years	Cost of Plant (₹)	Running Cost (₹)	Savings (₹)
0	12,00,00,000		
1		4,00,00,000	12,00,00,000
2		5,00,00,000	14,00,00,000
3		6,00,00,000	11,00,00,000

The cost of capital is 12%. Measure the sensitivity of the project to changes in the levels of plant cost, running cost and savings (considering each factor at a time) such that the NPV becomes zero. The P.V. factors at 12% are as under:

Year	0	1	2	3
PV factor @12%	1	0.892	0.797	0.711

DETERMINE the factor which is the most sensitive to affect the acceptability of the project?

ANSWER:**Present value (PV) of Cash Flows**

Year	0	1	2	3	Total
Cost of Plant	(12,00,00,000)				
Running cost	0	(4,00,00,000)	(5,00,00,000)	(6,00,00,000)	
Savings	0	12,00,00,000	14,00,00,000	11,00,00,000	
Net cash inflow	(12,00,00,000)	8,00,00,000	9,00,00,000	5,00,00,000	
PV factor	1	0.892	0.797	0.711	
NPV	(12,00,00,000)	7,13,60,000	7,17,30,000	3,55,50,000	5,86,40,000

Determination of the most Sensitive factor:**i. Sensitivity Analysis w.r.t. Plant cost:**

NPV of the project would be zero when the cost of the plant is increased by ₹5,86,40,000

$$\begin{aligned} \therefore \text{Percentage change in the cost} &= \frac{\text{₹}5,86,40,000}{\text{₹}12,00,00,000} \times 100 \\ &= 48.87\% \end{aligned}$$

ii. Sensitivity Analysis w.r.t. Running cost:

NPV of the project would be zero when the Running cost is increased by ₹5,86,40,000

$$\begin{aligned} \therefore \text{Percentage change in the cost} &= \frac{\text{₹}5,86,40,000}{(0.892 \times 4,00,00,000) + (0.797 \times 5,00,00,000) + (0.711 \times 6,00,00,000)} \times 100 \\ &= \frac{\text{₹}5,86,40,000}{3,56,80,000 + 3,98,50,000 + 4,26,60,000} \times 100 \\ &= \frac{\text{₹}5,86,40,000}{\text{₹}11,81,90,000} \times 100 \\ &= 49.61\% \end{aligned}$$

iii. Sensitivity Analysis w.r.t. Savings:

NPV of the project would be zero when the savings decreased by ₹5,86,40,000

∴ Percentage change in the savings

$$= \frac{₹ 5,86,40,000}{(0.892 \times 12,00,00,000) + (0.797 \times 14,00,00,000) + (0.711 \times 11,00,00,000)} \times 100$$

$$= \frac{₹ 5,86,40,000}{10,70,40,000 + 11,15,80,000 + 7,82,10,000} \times 100$$

$$= \frac{₹ 5,86,40,000}{29,68,30,000} \times 100$$

$$= 19.75\%$$

The **Savings factor** is the most sensitive as only a change beyond 19.75% in savings makes the project unacceptable.

QUESTION 2.

Gauav Ltd. is using certainty-equivalent approach in the evaluation of risky proposals. The following information regarding a new project is as follows:

Year	Expected Cash flow(₹)	Certainty-equivalent quotient
0	(4,00,000)	1.0
1	3,20,000	0.8
2	2,80,000	0.7
3	2,60,000	0.6
4	2,40,000	0.4
5	1,60,000	0.3

Riskless rate of interest on the government securities is 6 per cent. DETERMINE whether the project should be accepted?

(Same Sum Present in SSEI Book Volume I Question 1 Page 435)

ANSWER:**1. Determination of Net Present Value (NPV)**

Year	Expected Cash flow (₹)	Certainty-equivalent (CE)	Adjusted Cash flow (Cash flow × CE) (₹)	PV factor (at 0.06)	Total PV (₹)
0	(4,00,000)	1.0	(4,00,000)	1.000	(4,00,000)
1	3,20,000	0.8	2,56,000	0.943	2,41,408
2	2,80,000	0.7	1,96,000	0.890	1,74,440
3	2,60,000	0.6	1,56,000	0.840	1,31,040
4	2,40,000	0.4	96,000	0.792	76,032
5	1,60,000	0.3	48,000	0.747	35,856
	NPV = (6,58,776 – 4,00,000)				2,58,776

As the Net Present Value is positive the project should be accepted.

QUESTION 3.

Following information have been retrieved from the finance department of Corp Finance Ltd. relating to Projects X, Y and Z:

Particulars	X	Y	Z
Net cash outlays (₹)	42,00,000	24,00,000	20,00,000
Project life	5 years	5 years	5 years
Annual Cash inflow (₹)	14,00,000	8,40,000	6,00,000
Coefficient of variation	2.0	0.8	1.6

You are required to DETERMINE the risk adjusted net present value of the projects considering that the Company selects risk-adjusted rate of discount on the basis of the coefficient of variation:

Coefficient of Variation	Risk-Adjusted Rate of Return	P.V. Factor 1 to 5 years at risk adjusted rate of discount
0.0	8%	3.992
0.4	10%	3.790
0.8	12%	3.604
1.2	14%	3.433
1.6	16%	3.274
2.0	20%	2.990
More than 2.0	22%	2.863

(Similar Sum Present in SSEI Book Volume I Question 2 Page 433)

ANSWER:

Statement showing the determination of the risk adjusted net present value

Projects	Net cash outlays	Coefficient of variation	Risk adjusted discount rate	Annual cash inflow	PV factor 1-5 years	Discounted cash inflow	Net present value
	(₹)			(₹)		(₹)	(₹)
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii) = (v) × (vi)	(viii) = (vii) - (ii)
X	42,00,000	2.0	20%	14,00,000	2.990	41,86,000	-14,000
Y	24,00,000	0.8	12%	8,40,000	3.604	30,27,360	6,27,360
Z	20,00,000	1.6	16%	6,00,000	3.274	19,64,400	-35,600

QUESTION 4.

A&R Ltd. has under its consideration a project with an initial investment of ₹ 90,00,000. Three probable cash inflow scenarios with their probabilities of occurrence have been estimated as below:

Annual cash inflow (₹)	20,00,000	30,00,000	40,00,000
Probability	0.2	0.7	0.1

The project life is 5 years and the desired rate of return is 18%. The estimated terminal values for the project assets under the three probability alternatives, respectively, are ₹ 0, ₹ 20,00,000 and ₹ 30,00,000.

You are required to:

- i. CALCULATE the probable NPV;
- ii. CALCULATE the worst-case NPV and the best-case NPV; and
- iii. STATE the probability occurrence of the worst case, if the cash flows are perfectly positively correlated over time.

ANSWER:**i. Calculation of Net Present Value (NPV)**

Year	Prob. = 0.2		Prob. = 0.7		Prob. = 0.1		Total Cash flow	PVF@ 18%	PV of Total cash flow
	Cash flow	Probable cash flow	Cash flow	Probable cash flow	Cash flow	Probable cash flow			
0							(90,00,000)	1.000	(90,00,000)
1	20,00,000	4,00,000	30,00,000	21,00,000	40,00,000	4,00,000	29,00,000	0.847	24,56,300
2	20,00,000	4,00,000	30,00,000	21,00,000	40,00,000	4,00,000	29,00,000	0.718	20,82,200
3	20,00,000	4,00,000	30,00,000	21,00,000	40,00,000	4,00,000	29,00,000	0.608	17,63,200
4	20,00,000	4,00,000	30,00,000	21,00,000	40,00,000	4,00,000	29,00,000	0.515	14,93,500
5	20,00,000	4,00,000	30,00,000	21,00,000	40,00,000	4,00,000	29,00,000	0.437	12,67,300
5	0	0	20,00,000	14,00,000	30,00,000	3,00,000	17,00,000	0.437	7,42,900
Net Present Value (NPV)									8,05,400

- ii. Worst and Best case is the case where expected annual cash inflows are minimum and maximum respectively.

Calculation of Worst Case and Best Case NPV:

Year	PVF@ 18%	Worst case		Best Case	
		Cash flows	PV of Cash flows	Cash flows	PV of Cash flows
0	1.000	(90,00,000)	(90,00,000)	(90,00,000)	(90,00,000)
1	0.847	20,00,000	16,94,000	40,00,000	33,88,000
2	0.718	20,00,000	14,36,000	40,00,000	28,72,000
3	0.608	20,00,000	12,16,000	40,00,000	24,32,000
4	0.515	20,00,000	10,30,000	40,00,000	20,60,000
5	0.437	20,00,000	8,74,000	40,00,000	17,48,000
5	0.437	0	0	30,00,000	13,11,000
NPV			(27,50,000)		48,11,000

Worst case NPV = ₹ (27,50,000)

Best Case NPV = ₹ 48,11,000

- iii. The cash flows are perfectly positively correlated over time means cash flow in first year will be cash flows in subsequent years. The cash flow of ₹20,00,000 is the worst case cash flow and its probability is 20%, thus, possibility of worst case is 20% or 0.2.

Chapter 9

DIVIDEND DECISIONS

Theoretical based Questions

QUESTION 1.

State the meaning of stock split. Explain its advantages and disadvantages.

ANSWER:

Stock split means splitting **one share into many**, say, one share of ₹ 500 in to 5 shares of ₹100. Stock splits is a tool used by the companies to regulate the prices of shares i.e. if a share price increases beyond a limit, it may become less tradable, for e.g. suppose a company's share price increases from ₹50 to ₹1000 over the years, it is possible that it might goes out of range of many investors.

Advantages of Stock Splits

Various advantages of Stock Splits are as follows:

1. It makes the **share affordable** to small investors.
2. **Number of shares may increase** the number of shareholders; hence the potential of investment may increase.

Limitations of Stock Splits

Various limitations of Stock Splits are as follows:

1. **Additional expenditure** need to be incurred on the process of stock split.
2. **Low share price may attract speculators** or short term investors, which are generally not preferred by any company.

Practical Problems

QUESTION 1.

The following information is given below in case of Aditya Ltd.:

Earnings per share	- ₹ 60
Capitalisation rate	- 15%
Return on investment	- 25% per cent
Dividend payout ratio	- 30%

- i. COMPUTE price per share using Walter's Model
- ii. WHAT would be optimum dividend payout ratio per share under Gordon's Model.

ANSWER:

- i. As per Walter's Model, Price per share is computed by using the following formula:

$$\text{Price}(P) = \frac{D + \frac{r}{K_e}(E - D)}{K_e}$$

Where,

P = Market Price of the share.

E = Earnings per share.

D = Dividend per share.

K_e = Cost of equity/ rate of capitalization/ discount rate.

r = Internal rate of return/ return on investment

Applying the above formula, price per share

$$P = \frac{18 + \frac{0.25}{0.15}(60 - 18)}{0.15}$$

$$\text{Or, } P = \frac{18 + 70}{0.15} \\ = ₹586.67$$

- ii. As per Gordon's model, when $r > K_e$, optimum dividend payout ratio is 'Zero'.

QUESTION 2.

The annual report of XYZ Ltd. provides the following information for the Financial Year 2020-21:

Particulars	Amount (₹)
Net Profit	50 lakhs
Outstanding 15% preference shares	100 lakhs
No. of equity shares	5 lakhs
Return on Investment	20%
Cost of capital i.e. (K_e)	16%

CALCULATE price per share using Gordon's Model when dividend pay-out is-

- i. 25%;
- ii. 50%;
- iii. 100%.

ANSWER:

Price per share according to Gordon's Model is calculated as follows:

Particulars	Amount (₹)
Net Profit	50 lakhs
Less: Preference dividend	15 lakhs
Earnings for equity shareholders	35 lakhs
Therefore, earning per share	35 lakhs/5 lakhs = ₹ 7.00

Price per share according to Gordon's Model is calculated as follows:

$$P_0 = \frac{E_1(1-b)}{K_e - br}$$

Here, $E_1 = 7$, $K_e = 16\%$

i. **When dividend pay-out is 25%**

$$P_0 = \frac{7 \times 0.25}{0.16 - (0.75 \times 0.2)} = \frac{1.75}{0.16 - 0.15} = 175$$

ii. **When dividend pay-out is 50%**

$$P_0 = \frac{7 \times 0.5}{0.16 - (0.5 \times 0.2)} = \frac{3.5}{0.16 - 0.10} = 58.33$$

iii. **When dividend pay-out is 100%**

$$P_0 = \frac{7 \times 1}{0.16 - (0 \times 0.2)} = \frac{7}{0.16} = 43.75$$

QUESTION 3.

A&R Ltd. is a large-cap multinational company listed in BSE in India with a face value of ₹ 100 per share. The company is expected to grow @ 15% p.a. for next four years then 5% for an indefinite period. The shareholders expect 20% return on their share investments. Company paid ₹ 120 as dividend per share for the FY 2020-21. The shares of the company traded at an average price of ₹ 3,122/- on last day. FIND out the intrinsic value of per share and state whether shares are overpriced or underpriced.

ANSWER:

As per Dividend discount model, the price of share is calculated as follows:

$$P = \frac{D_1}{(1+K_e)^1} + \frac{D_2}{(1+K_e)^2} + \frac{D_3}{(1+K_e)^3} + \frac{D_4}{(1+K_e)^4} + \frac{D_4(1+g)}{(K_e - g)} \times \frac{1}{(1+K_e)^4}$$

Where,

P = Price per share

K_e = Required rate of return on equity

g = Growth rate

$$P = \frac{₹ 120 \times 1.15}{(1+0.2)^1} + \frac{₹ 138 \times 1.15}{(1+0.2)^2} + \frac{₹ 158.7 \times 1.15}{(1+0.2)^3} + \frac{₹ 182.5 \times 1.15}{(1+0.2)^4} + \frac{₹ 209.88(1+0.05)}{(0.2 - 0.15)} \times \frac{1}{(1+0.2)^4}$$

$$P = 115 + 110.2 + 105.6 + 101.2 + 2,125.5$$

$$= ₹ 2,557.5$$

Intrinsic value of share is ₹ 2,557.5/- as compared to latest market price of ₹ 3,122/-. Market price of a share is overpriced by ₹ 564.5/-.

QUESTION 4.

In May, 2020 shares of RT Ltd. was sold for ₹ 1,460 per share. A long term earnings growth rate of 7.5% is anticipated. RT Ltd. is expected to pay dividend of ₹ 20 per share.

- i. CALCULATE rate of return an investor can expect to earn assuming that dividends are expected to grow along with earnings at 7.5% per year in perpetuity?
- ii. It is expected that RT Ltd. will earn about 10% on retained earnings and shall retain 60% of earnings. In this case, STATE whether, there would be any change in growth rate and cost of Equity?

ANSWER:

- i. According to Dividend Discount Model approach the firm's expected or required return on equity is computed as follows:

$$K_e = \frac{D_1}{P_0} + g$$

Where,

K_e = Cost of equity share capital

D_1 = Expected dividend at the end of year 1

P_0 = Current market price of the share.

g = Expected growth rate of dividend.

Therefore,

$$\begin{aligned} K_e &= \frac{\text{₹}20(1 + 0.075)}{\text{₹}1,460} + 7.5\% \\ &= 0.0147 + 0.075 \\ &= 0.0897 \end{aligned}$$

Or, $K_e = 8.97\%$

- ii. With rate of return on retained earnings (r) 10% and retention ratio (b) 60%, new growth rate will be as follows:

$$\begin{aligned} g &= br \quad \text{i.e.} \\ &= 0.10 \times 0.60 \\ &= 0.06 \end{aligned}$$

Accordingly, dividend will also get changed and to calculate this, first we shall calculate previous retention ratio (b_1) and then EPS assuming that rate of return on retained earnings (r) is same.

With previous Growth Rate of 7.5% and $r = 10\%$, the retention ratio comes out to be:

$$0.075 = b_1 \times 0.10$$

$$b_1 = 0.75 \text{ and payout ratio} = 0.25$$

With 0.25 payout ratio the EPS will be as follows:

$$\text{₹}20/0.25 = \text{₹}80$$

With new 0.40 (1 – 0.60) payout ratio, the new dividend will be

$$\begin{aligned} D_1 &= \text{₹} 80 \times 0.40 \\ &= \text{₹} 32 \end{aligned}$$

Accordingly, new K_e will be

$$K_e = \frac{32}{1,460} + 6.0\%$$

$$\text{or, } K_e = 8.19\%$$

Chapter 10

MANAGEMENT OF WORKING CAPITAL

Practical Problems

QUESTION 1.

Following information is forecasted by R Limited for the year ending 31st March, 2020:

	Balance as at 31 st March, 2020	Balance as at 31 st March,
	(₹ in lakh)	(₹ in lakh)
Raw Material	65	45
Work-in-progress	51	35
Finished goods	70	60
Receivables	135	112
Payables	71	68
Annual purchases of raw material (all credit)	400	
Annual cost of production	450	
Annual cost of goods sold	525	
Annual operating cost	325	
Annual sales (all credit)	585	

You may take one year as equal to 365 days.

You are required to CALCULATE:

- i. Net operating cycle period.
- ii. Number of operating cycles in the year.
- iii. Amount of working capital requirement.

(Similar Sum Present in SSEI Book Volume II Question 5 Page 80)

ANSWER:**Working Notes:****1. Raw Material Storage Period (R)**

$$\begin{aligned}
 &= \frac{\text{Average Stock of Raw Material}}{\text{Annual Consumption of Raw Material}} \times 365 \\
 &= \frac{\text{₹45} + \text{₹65}}{\text{₹380}} \times 365 \\
 &= 52.83 \text{ or } 53 \text{ days}
 \end{aligned}$$

Annual Consumption of Raw Material

$$\begin{aligned}
 &= \text{Opening Stock} + \text{Purchases} - \text{Closing Stock} \\
 &= \text{₹45} + \text{₹400} - \text{₹65} = \text{₹380 lakh}
 \end{aligned}$$

2. Work – in - Progress (WIP) Conversion Period (W)

$$\begin{aligned}
 \text{WIP Conversion Period} &= \frac{\text{Average Stock of WIP}}{\text{Annual Cost of Production}} \times 365 \\
 &= \frac{\text{₹35} + \text{₹51}}{\text{₹450}} \times 365 \\
 &= 34.87 \text{ or } 35 \text{ days}
 \end{aligned}$$

3. Finished Stock Storage Period (F)

$$\begin{aligned}
 &= \frac{\text{Average Stock of Finished Goods}}{\text{Cost of Goods Sold}} \times 365 \\
 &= \frac{\text{₹60} + \text{₹70}}{\text{₹525}} \times 365 \\
 &= 45.19 \text{ or } 45 \text{ days.}
 \end{aligned}$$

4. Receivables (Debtors) Collection Period (D)

$$\begin{aligned}
 &= \frac{\text{Average Receivables}}{\text{Annual Credit Sales}} \times 365 \\
 &= \frac{\text{₹112} + \text{₹135}}{2} \times 365 \\
 &= \frac{\text{₹585}}{2} \times 365 \\
 &= 77.05 \text{ or } 77 \text{ days}
 \end{aligned}$$

5. Payables (Creditors) Payment Period (C)

$$\begin{aligned}
 &= \frac{\text{Average Payables for materials}}{\text{Annual Credit purchases}} \times 365 \\
 &= \frac{\text{₹68} + \text{₹71}}{2} \times 365 \\
 &= \frac{\text{₹400}}{2} \times 365 \\
 &= 63.41 \text{ or } 64 \text{ days}
 \end{aligned}$$

i. Net Operating Cycle Period

$$\begin{aligned}
 &= R + W + F + D - C \\
 &= 53 + 35 + 45 + 77 - 64 \\
 &= 146 \text{ days}
 \end{aligned}$$

ii. Number of Operating Cycles in the Year

$$\begin{aligned}
 &= \frac{365}{\text{Operating Cycle Period}} \\
 &= \frac{365}{146} \\
 &= 2.5 \text{ times}
 \end{aligned}$$

iii. Amount of Working Capital Required

$$\begin{aligned}
 &= \frac{\text{Annual Operating Cost}}{\text{Number of Operating Cycles}} \\
 &= \frac{\text{₹325}}{2.48} \\
 &= \text{₹ } 130 \text{ lakh}
 \end{aligned}$$

QUESTION 2.

The following figures and ratios are related to a company:

i.	Sales for the year (all credit)	₹ 90,00,000
ii.	Gross Profit ratio	35 percent
iii.	Fixed assets turnover (based on cost of goods sold)	1.5
iv.	Stock turnover (based on cost of goods sold)	6
v.	Liquid ratio	1.5:1
vi.	Current ratio	2.5:1
vii.	Receivables (Debtors) collection period	1 month
viii.	Reserves and surplus to Share capital	1:1.5
ix.	Capital gearing ratio	0.7875
x.	Fixed assets to net worth	1.3 : 1

You are required to PREPARE:

- Balance Sheet of the company on the basis of above details.
- The statement showing working capital requirement, if the company wants to make a provision for contingencies @15 percent of net working capital.

(Similar Sum Present in SSEI Book Volume II Question 7 Page 84)

ANSWER:**Working Notes:**

- i. **Cost of Goods Sold** = Sales – Gross Profit (35% of Sales)
 = ₹ 90,00,000 – ₹ 31,50,000
 = ₹ 58,50,000
- ii. **Closing Stock** = Cost of Goods Sold / Stock Turnover
 = ₹ 58,50,000/6
 = ₹ 9,75,000
- iii. **Fixed Assets** = Cost of Goods Sold / Fixed Assets Turnover
 = ₹ 58,50,000/1.5
 = ₹ 39,00,000
- iv. **Current Assets :**
- Current Ratio = 2.5 and
 Liquid Ratio = 1.5
 Inventories (Stock) = 2.5 – 1.5
 = 1
- Current Assets = Amount of Inventories (Stock) × 2.5/1
 = ₹ 9,75,000 × 2.5/1 = ₹ 24,37,500
- Or
- Current Ratio / Quick Ratio = Current Assets / Quick Assets
 2.5 / 1.5 = Current Assets / (Current Assets – Inventory)
 2.5/1.5 Current Assets – 2.5/1.5 × ₹ 9,75,000 = Current Assets
 Hence, Current Assets = ₹ 24,37,500

v. Liquid Assets (Receivables and Cash)

$$\begin{aligned}
 &= \text{Current Assets} - \text{Inventories (Stock)} \\
 &= ₹ 24,37,500 - ₹ 9,75,000 \\
 &= ₹ 14,62,500
 \end{aligned}$$

vi. Receivables (Debtors)

$$\begin{aligned}
 &= \text{Sales} \times \text{Debtors Collection period} / 12 \\
 &= ₹ 90,00,000 \times 1/12 \\
 &= ₹ 7,50,000
 \end{aligned}$$

vii. Cash

$$\begin{aligned}
 &= \text{Liquid Assets} - \text{Receivables (Debtors)} \\
 &= ₹ 14,62,500 - ₹ 7,50,000 \\
 &= ₹ 7,12,500
 \end{aligned}$$

viii. Net worth

$$\begin{aligned}
 &= \text{Fixed Assets} / 1.3 \\
 &= ₹ 39,00,000 / 1.3 \\
 &= ₹ 30,00,000
 \end{aligned}$$

ix. Reserves and Surplus

$$\begin{aligned}
 \text{Reserves and Share Capital} &= \text{Net worth} \\
 \text{Net worth} &= 1 + 1.5 = 2.5 \\
 \text{Reserves and Surplus} &= ₹ 30,00,000 \times 1/1.5 \\
 &= ₹ 20,00,000
 \end{aligned}$$

x. Share Capital

$$\begin{aligned}
 &= \text{Net worth} - \text{Reserves and Surplus} \\
 &= ₹ 30,00,000 - ₹ 20,00,000 \\
 &= ₹ 10,00,000
 \end{aligned}$$

xi. Current Liabilities

$$\begin{aligned}
 &= \text{Current Assets} / \text{Current Ratio} \\
 &= ₹ 24,37,500 / 2.5 \\
 &= ₹ 9,75,000
 \end{aligned}$$

xii. Long-term Debts

Capital Gearing Ratio = Long-term Debts / Equity Shareholders' Fund

Long-term Debts = ₹30,00,000 × 0.7875

= ₹23,62,500

a. Balance Sheet of the Company

Particulars	Figures as the end of 31-03-2020 (₹)	Figures as the end of 31-03-2019 (₹)
I. EQUITY AND LIABILITIES		
Shareholders' funds		
(a) Share capital	10,00,000	-
(b) Reserves and surplus	20,00,000	-
Non-current liabilities		
(a) Long-term borrowings	23,62,500	-
Current liabilities	9,75,000	-
TOTAL	63,37,500	-
II. ASSETS		
Non-current assets		
Fixed assets	39,00,000	-
Current assets		
Inventories	9,75,000	-
Trade receivables	7,50,000	-
Cash and cash equivalents	7,12,500	-
TOTAL	63,37,500	-

b. Statement Showing Working Capital Requirement

	(₹)	(₹)
A. Current Assets		
(i) Inventories (Stocks)		9,75,000
(ii) Receivables (Debtors)		7,50,000
(iii) Cash in hand & at bank		7,12,500
Total Current Assets		24,37,500

B. Current Liabilities:		
Total Current Liabilities		9,75,000
Net Working Capital (A – B)		14,62,500
Add: Provision for contingencies (15% of Net Working Capital)		2,19,375
Working capital requirement		16,81,875