4 Financing Decisions

BASIC CONCEPTS AND FORMULAE

<table>
<thead>
<tr>
<th>Cost of Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cost of Capital</td>
</tr>
<tr>
<td>Cost of capital is the return expected by the providers of capital (i.e. shareholders, lenders and the debt-holders) to the business as a compensation for their contribution to the total capital. It is also known as Discount rate, Minimum rate of return etc. It can also be stated as the opportunity cost of an investment, i.e. the rate of return that a company would otherwise be able to earn at the same risk level as the investment that has been selected.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sources of Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Sources of Capital</td>
</tr>
<tr>
<td>Sources of capital may include:</td>
</tr>
<tr>
<td>(i) Equity shares</td>
</tr>
<tr>
<td>(ii) Preference shares</td>
</tr>
<tr>
<td>(iii) Debentures/Bond/ other debt instruments</td>
</tr>
<tr>
<td>(iv) Loan from financial institutions etc.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cost of Debt</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Cost of Debt</td>
</tr>
<tr>
<td>(a) Cost of Debt: A debt may be in the form of Bond or Debenture.</td>
</tr>
<tr>
<td>(i) Cost of Debentures: The cost of debentures and long term loans is the contractual interest rate adjusted further for the tax liability of the company.</td>
</tr>
<tr>
<td>• Cost of Irredeemable Debentures: Cost of debentures not redeemable during the life time of the company.</td>
</tr>
<tr>
<td>[ K_d = \frac{I}{NP} (1-t) ]</td>
</tr>
<tr>
<td>• Cost of Redeemable Debentures: If the debentures are redeemable after the expiry of a fixed period, the cost of debentures would be:</td>
</tr>
</tbody>
</table>
Financing Decisions

| 4. Amortisation of Bond | A bond may be amortised every year i.e. principal is repaid every year rather than at maturity. In such a situation, the principal will go down with annual payments and interest will be computed on the outstanding amount. 

\[ V_B = \sum_{t=1}^{n} \frac{C_t}{(1+k_d)^t} \] |

| 5. Cost of Preference Share | The cost of preference share capital is the dividend expected by its holders. 

- **Cost of Irredeemable Preference Shares**

  Cost of irredeemable preference shares \( (K_{cp}) = \frac{PD}{P_0} \)

- **Cost of Redeemable Preference Shares**: If the preference shares are redeemable after the expiry of a fixed period the cost of preference shares would be: 

  \[ K_p = \frac{PD + (RV - NP) / n}{RV + NP} \]

---

This formula to calculate cost of debt is used where, only interest on debt is tax deductible.

Or

This formula to calculate cost of debt is used where not only interest on debt but discount on issue of debt and premium on redemption of debt are also tax deductible.

_In absence of any specific information, students may use any of the above formulae to calculate the Cost of Debt \((K_d)\) with logical assumption._
### 6. Cost of Equity

Cost of equity capital is the rate of return which equates the present value of expected dividends with the market share price.

**Methods for Computation of Cost of Equity Capital**

- **Dividend Price Approach**: Here, cost of equity capital is computed by dividing the expected dividend by market share price.
  \[
  K_e = \frac{D_t}{P_o}
  \]

- **Earning/ Price Approach**: The advocates of this approach co-relate the earnings of the company with the market price of its share.
  \[
  K_e = \frac{E}{P}
  \]

- **Realized Yield Approach**: According to this approach, the average rate of return realized in the past few years is historically regarded as ‘expected return’ in the future. The yield of equity for the year is:
  \[
  Y_e = \frac{D_t + P_r}{P_{i+1}}
  \]

- **Capital Asset Pricing Model Approach (CAPM)**: CAPM model describes the risk-return trade-off for securities. It describes the linear relationship between risk and return for securities.
  \[
  K_e = R_f + \beta (R_m - R_f)
  \]

If personal tax rate \((t_p)\) is given, then \(K_s = K_e(1-t_p)\)

### 7. Cost of Retained Earnings

It is the opportunity cost of dividends foregone by shareholders.

- **DCF**
  \[
  DCF = K_s = \frac{D_t}{P_o} + g
  \]

- **CAPM**
  \[
  K_s = R_f + \beta (R_m - R_d)
  \]

### 8. Weighted Average Cost of Capital (WACC)

It is an average rate of return expected by all contributors of capital taking the weight of each element of capital to total capital

\[
WACC\ (K_w) = (\% \text{ Debt} \times K_d) + (\% \text{ Pref. capital} \times K_p) + (\% \text{ Equity capital} \times K_e)
\]
<table>
<thead>
<tr>
<th>9. Marginal Cost of Capital</th>
<th>It may be defined as “the cost of raising an additional rupee of capital”. To calculate the marginal cost of capital, the intended financing proportion should be applied as weights to marginal component costs. The marginal cost of capital should, therefore, be calculated in the composite sense. The marginal weights represent the proportion of funds the firm intends to employ.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capital Structure Theories</strong></td>
<td></td>
</tr>
<tr>
<td>10. Capital Structure</td>
<td>Capital structure refers to the mix of a firm’s capitalisation (i.e. mix of long term sources of funds such as debentures, preference share capital, equity share capital and retained earnings for meeting total capital requirement). While choosing a suitable financing pattern, certain factors like cost, risk, control, flexibility and other considerations like nature of industry, competition in the industry etc. should be considered.</td>
</tr>
</tbody>
</table>
| 11. Optimal Capital Structure (EBIT-EPS Analysis) | The basic objective of financial management is to design an appropriate capital structure which can provide the highest earnings per share (EPS) over the firm’s expected range of earnings before interest and taxes (EBIT). EBIT-EPS analysis is a vital tool for designing the optimal capital structure of a firm. The objective of this analysis is to find the EBIT level that will equate EPS regardless of the financing plan chosen. 
\[
\frac{(EBIT - I_1)(1-t)}{E_1} = \frac{(EBIT - I_2)(1-t)}{E_2}
\] |
| 12. Net Income (NI) Approach | According to this approach, capital structure decision is relevant to the value of the firm. The value of the firm on the basis of NI approach can be ascertained as follows: 
\[
V = S + D
\] |
| 13. Net Operating Income (NOI) Approach | NOI means earnings before interest and tax. According to this approach, capital structure decisions of the firm are irrelevant. The value of the firm on this basis is calculated as follows: 
\[
V = \frac{NOI}{K_o}
\] |
Modigliani-Miller derived the following three propositions:

(i) Total market value of a firm is equal to its expected net operating income divided by the discount rate appropriate to its risk class decided by the market.

(ii) The expected yield on equity is equal to the risk free rate plus a premium determined as per the following equation:

\[ K_e = K_o + (K_o - K_d) \frac{\text{Debt}}{\text{Equity}} \]

(iii) Average cost of capital is not affected by financial decision.

In 1963, MM model was amended by incorporating tax, they recognised that the value of the firm will increase or cost of capital will decrease where corporate taxes exist. The value of a levered firm will be greater than the value of unlevered firm by an amount equal to amount of debt multiplied by corporate tax rate.

MM has developed the formulae for computation of cost of capital (\(K_o\)), cost of equity (\(K_e\)) for the levered firm.

(i) Value of a levered company = Value of an unlevered company + Tax benefit

\[ (K_{eq}) = K_{eu} + (K_{eu} - K_d) \frac{\text{Debt}(1-t)}{\text{Equity}} \]

(ii) Cost of equity in a levered company

\[ (K_{eq}) = K_{eu}(1-tL) \]

The principle implication of this approach is that the cost of capital is dependent on the capital structure and there is an optimal capital structure which minimises cost of capital.

It is a situation where a firm has more capital than it needs or in other words assets are worth less than its issued share capital, and earnings are insufficient to pay dividend and interest.

It is just reverse of over-capitalisation. It is a state, when its actual capitalization is lower than its proper capitalization as warranted by its earning capacity.

In financial analysis, leverage represents the influence of one financial variable over some other related financial variable. These financial variables may be costs, output, sales revenue, Earnings Before Interest and Tax (EBIT), Earnings per share (EPS) etc.
### 20. Operating Leverage

Operating leverage (OL) maybe defined as the employment of an asset with a fixed cost in the hope that sufficient revenue will be generated to cover all the fixed and variable costs.

The use of assets for which a company pays a fixed cost is called operating leverage.

\[
\text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}}
\]

### 21. Degree of Operating Leverage

The operating leverage may also be defined as “the firm’s ability to use fixed operating cost to magnify the effects of changes in sales on its earnings before interest and taxes.”

\[
\text{Degree of Operating Leverage (DOL)} = \frac{\%\text{change in EBIT}}{\%\text{change in Sales}}
\]

### 22. Financial Leverage

Financial leverage (FL) maybe defined as ‘the use of funds with a fixed cost in order to increase earnings per share.’ In other words, it is the use of company funds on which it pays a limited return. Financial leverage involves the use of funds obtained at a fixed cost in the hope of increasing the return to common stockholders.

\[
\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}}
\]

### 23. Degree of Financial Leverage

Degree of financial leverage is the ratio of the percentage increase in earnings per share (EPS) to the percentage increase in earnings before interest and taxes (EBIT). Financial Leverage (FL) is also defined as “the ability of a firm to use fixed financial charges to magnify the effect of changes in EBIT on EPS.

\[
\text{Degree of Financial Leverage (DFL)} = \frac{\%\text{change in EPS}}{\%\text{change in EBIT}}
\]

### 24. Combined Leverage

Combined leverage maybe defined as the potential use of fixed costs, both operating and financial, which magnifies the effect of sales volume change on the earning per share of the firm.

Degree of Combined Leverage = DOL × DFL

### 25. Degree of Combined Leverage

Degree of combined leverage (DCL) is the ratio of percentage change in earning per share to the percentage change in sales. It indicates the effect the sales changes will have on EPS.

\[
\text{Degree of Combined Leverage (DCL)} = \frac{\%\text{Change in EPS}}{\%\text{Change in Sales}}
\]
Question 1

What is meant by weighted average cost of capital? Illustrate with an example.

Answer

Meaning of Weighted Average Cost of Capital (WACC) and an Example: The composite or overall cost of capital of a firm is the weighted average of the costs of the various sources of funds. Weights are taken to be in the proportion of each source of fund in the capital structure. While making financial decisions this overall or weighted cost is used. Each investment is financed from a pool of funds which represents the various sources from which funds have been raised. Any decision of investment, therefore, has to be made with reference to the overall cost of capital and not with reference to the cost of a specific source of fund used in the investment decision.

The weighted average cost of capital is calculated by:

(i) Calculating the cost of specific source of fund e.g. cost of debt, equity etc;
(ii) Multiplying the cost of each source by its proportion in capital structure; and
(iii) Adding the weighted component cost to get the firm’s WACC represented by $K_0$.

$$K_0 = K_1 W_1 + K_2 W_2 + \ldots$$

Where,

$K_1, K_2$ are component costs and $W_1, W_2$ are weights.

Example of WACC

Capital structure of a firm is given as under:

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity Capital</td>
<td>5,00,000</td>
</tr>
<tr>
<td>Reserves</td>
<td>2,00,000</td>
</tr>
<tr>
<td>Debt</td>
<td>3,00,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10,00,000</strong></td>
</tr>
</tbody>
</table>

The component costs (before tax) are: Equity Capital 18% and Debt 10%.

Tax Rate is 35%. WACC is required to be computed.

Cost of Debt = 10% $(1 - 0.35) = 6.5$

Cost of Retained Earnings is taken to be same as cost of equity.
Computation of WACC

<table>
<thead>
<tr>
<th>Source</th>
<th>Proportion</th>
<th>After-tax Cost</th>
<th>WACC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity Capital</td>
<td>0.50</td>
<td>0.18</td>
<td>0.09</td>
</tr>
<tr>
<td>Retained Earnings</td>
<td>0.20</td>
<td>0.18</td>
<td>0.036</td>
</tr>
<tr>
<td>Debt</td>
<td>0.30</td>
<td>0.065</td>
<td>0.195</td>
</tr>
</tbody>
</table>

Weighted Average Cost of Capital = 14.55%.

(Note: The above example is just illustrative in nature.)

Question 2

Discuss the dividend-price approach, and earnings price approach to estimate cost of equity capital.

Answer

In dividend price approach, cost of equity capital is computed by dividing the current dividend by average market price per share. This ratio expresses the cost of equity capital in relation to what yield the company should pay to attract investors. It is computed as:

\[ K_e = \frac{D_1}{P_0} \]

Where,

- \( D_1 \) = Dividend per share in period 1
- \( P_0 \) = Market price per share today

Whereas, on the other hand, the advocates of earnings price approach co-relate the earnings of the company with the market price of its share. Accordingly, the cost of ordinary share capital would be based upon the expected rate of earnings of a company. This approach is similar to dividend price approach, only it seeks to nullify the effect of changes in dividend policy.

SECTION-B

Question 1

A Company issues ₹10,00,000, 12% debentures of ₹100 each. The debentures are redeemable after the expiry of fixed period of 7 years. The Company is in 35% tax bracket.

Required:

(i) Calculate the cost of debt after tax, if debentures are issued at

(a) Par;  (b) 10% Discount;  (c) 10% Premium.
(ii) If brokerage is paid at 2%, what will be the cost of debentures, if issue is at par?

**Answer**

(i) Calculation of Cost of Debt after tax:

Cost of Debt \( (K_d) = \frac{I(1-t) + \frac{RV - NP}{n}}{\frac{RV + NP}{2}} \)

Where,

- \( I \) = Annual Interest Payment
- \( NP \) = Net proceeds of debentures
- \( RV \) = Redemption value of debentures
- \( t \) = Income tax rate
- \( n \) = Life of debentures

(a) Cost of 12% Debentures, if issued at par:

\[
K_d = \frac{12,00,000(1-0.35) + 10,00,000 - 10,00,000}{7 \text{ years}} = \frac{78,000}{10,00,000} = 0.078 \text{ or } 7.8\%
\]

(b) Cost of 12% Debentures, if issued at 10% discount:

\[
K_d = \frac{12,00,000(1-0.35) + 9,00,000 - 9,00,000}{7 \text{ years}} = \frac{78,000 + 14,286}{9,50,000} = 0.0971 \text{ or } 9.71\%
\]

(c) Cost of 12% Debentures, if issued at 10% Premium:

\[
K_d = \frac{12,00,000(1-0.35) + 11,00,000 - 11,00,000}{7 \text{ years}} = \frac{78,000 - 14,286}{10,50,000} = 0.0607 \text{ or } 6.07\%
\]
(ii) Cost of 12% Debentures, if brokerage is paid at 2% and debentures are issued at par:

\[
K_d = \left(1 - \frac{12}{100}\right) \times \frac{10,00,000 - 9,80,000}{7 \text{ years}} + \frac{9,80,000}{2} = \frac{80,857}{9,90,000} = 0.0817 \text{ or } 8.17% \\
\]

* Net Proceeds = Par value of shares – 2% Brokerage of par value
  = ₹10,00,000 – 2% of ₹10,00,000 = ₹9,80,000

**Question 2**

Y Ltd. retains ₹7,50,000 out of its current earnings. The expected rate of return to the shareholders, if they had invested the funds elsewhere is 10%. The brokerage is 3% and the shareholders come in 30% tax bracket. Calculate the cost of retained earnings.

**Answer**

**Computation of Cost of Retained Earnings (K_r)**

\[
K_r = k (1 - t_p) - \text{Brokerage} \\
\]

Where, \(k\) = Opportunity cost; \(t_p\) = Shareholders' personal tax

\[
K_r = 0.10 (1- 0.30) - 0.03 = 0.04 \text{ or } 4% \\
\]

**Alternatively**

Cost of Retained earnings is equal to opportunity cost for benefits forgone by the shareholders

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings before tax (10% of ₹75,000)</td>
<td>75,000</td>
</tr>
<tr>
<td>Less: Tax (30% of ₹75,000)</td>
<td>(22,500)</td>
</tr>
<tr>
<td>After tax earnings</td>
<td>52,500</td>
</tr>
<tr>
<td>Less: Brokerage (3% of ₹75,000)</td>
<td>(22,500)</td>
</tr>
<tr>
<td>Net earnings</td>
<td>30,000</td>
</tr>
<tr>
<td>Total Investment</td>
<td>7,50,000</td>
</tr>
<tr>
<td>Effective Rate of earnings (\left(\frac{30,000}{7,5,000} \times 100\right))</td>
<td>4%</td>
</tr>
</tbody>
</table>
4.11 Financial Management

Question 3

PQR Ltd. has the following capital structure on October 31, 2015:

<table>
<thead>
<tr>
<th>Sources of capital</th>
<th>(`)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity Share Capital (2,00,000 Shares of ₹10 each)</td>
<td>20,00,000</td>
</tr>
<tr>
<td>Reserves &amp; Surplus</td>
<td>20,00,000</td>
</tr>
<tr>
<td>12% Preference Shares</td>
<td>10,00,000</td>
</tr>
<tr>
<td>9% Debentures</td>
<td>30,00,000</td>
</tr>
<tr>
<td></td>
<td>80,00,000</td>
</tr>
</tbody>
</table>

The market price of equity share is ₹30. It is expected that the company will pay next year a dividend of ₹3 per share, which will grow at 7% forever. Assume 40% income tax rate.

You are required to compute weighted average cost of capital using market value weights.

Answer

Workings:

(i) Cost of Equity (Ke) = \( \frac{D_t}{P_o} + g = \frac{₹3}{₹30} + 0.07 = 0.1 \times 0.07 = 0.17 = 17% \)

(ii) Cost of Debentures (Kd) = I (1 - t) = 0.09 (1 - 0.4) = 0.054 or 5.4%

Computation of Weighted Average Cost of Capital (WACC using market value weights)

<table>
<thead>
<tr>
<th>Source of capital</th>
<th>Market Value of capital (`)</th>
<th>Weight</th>
<th>Cost of capital (%)</th>
<th>WACC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9% Debentures</td>
<td>30,00,000</td>
<td>0.30</td>
<td>5.40</td>
<td>1.62</td>
</tr>
<tr>
<td>12% Preference Shares</td>
<td>10,00,000</td>
<td>0.10</td>
<td>12.00</td>
<td>1.20</td>
</tr>
<tr>
<td>Equity Share Capital</td>
<td>60,00,000</td>
<td>0.60</td>
<td>17.00</td>
<td>10.20</td>
</tr>
<tr>
<td>(`30 × 2,00,000 shares)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1,00,00,000</td>
<td>1.00</td>
<td></td>
<td>13.02</td>
</tr>
</tbody>
</table>

Question 4

A company issued 40,000, 12% Redeemable Preference Share of ₹100 each at a premium of ₹5 each, redeemable after 10 years at a premium of ₹10 each. The floatation cost of each share is ₹2.

You are required to calculate cost of preference share capital ignoring dividend tax.
**Answer**

**Calculation of Cost of Preference Shares (K_p)**

- **Preference Dividend (PD)**
  \[ \text{PD} = 100 \times 40,000 \text{ shares} \times 0.12 = 4,80,000 \]

- **Floatation Cost**
  \[ \text{Floatation Cost} = 40,000 \text{ shares} \times 2 = 80,000 \]

- **Net Proceeds (NP)**
  \[ \text{NP} = 105 \times 40,000 \text{ shares} - 80,000 = 41,20,000 \]

- **Redemption Value (RV)**
  \[ \text{RV} = 40,000 \text{ shares} \times 110 = 44,00,000 \]

**Cost of Redeemable Preference Shares**

\[ K_p = \frac{\text{PD} + (\text{RV} - \text{NP})}{\text{RV} + \text{NP}} \]

\[ = \frac{4,80,000 + (44,00,000 - 41,20,000)}{44,00,000 + 41,20,000} \]

\[ = \frac{4,80,000 + 2,80,000}{85,20,000} \times \frac{1}{10 \text{ years}} \]

\[ = \frac{5,08,000}{42,60,000} \]

\[ = 0.1192 \text{ or } 11.92\% \]

**Question 5**

The following is the capital structure of Simons Company Ltd. as on 31.12.20X5:

<table>
<thead>
<tr>
<th></th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity shares :</td>
<td>10,00,000</td>
</tr>
<tr>
<td>10,000 shares (of ₹100 each)</td>
<td></td>
</tr>
<tr>
<td>10% Preference Shares</td>
<td>4,00,000</td>
</tr>
<tr>
<td>(of ₹100 each)</td>
<td></td>
</tr>
<tr>
<td>12% Debentures</td>
<td>6,00,000</td>
</tr>
<tr>
<td></td>
<td>20,00,000</td>
</tr>
</tbody>
</table>

The market price of the company’s share is ₹110 and it is expected that a dividend of ₹10 per share would be declared for the year 20X6. The dividend growth rate is 6%:

(i) If the company is in the 50% tax bracket, compute the weighted average cost of capital.

(ii) Assuming that in order to finance an expansion plan, the company intends to borrow a fund of ₹10 lakhs bearing 14% rate of interest, what will be the company’s revised weighted average cost of capital? This financing decision is expected to increase dividend from ₹10 to ₹12 per share. However, the market price of equity share is expected to decline from ₹110 to ₹105 per share.
### Answer

(i) **Computation of the weighted average cost of capital (using market value weights*)**

<table>
<thead>
<tr>
<th>Source of finance</th>
<th>Market Value of capital (₹)</th>
<th>Weight</th>
<th>After tax Cost of capital (%)</th>
<th>WACC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity share (Working note 1)</td>
<td>11,00,000</td>
<td>0.5238</td>
<td>15.09</td>
<td>7.9041</td>
</tr>
<tr>
<td>10% Preference share</td>
<td>4,00,000</td>
<td>0.1905</td>
<td>10.00</td>
<td>1.9050</td>
</tr>
<tr>
<td>12% Debentures</td>
<td>6,00,000</td>
<td>0.2857</td>
<td>6.00</td>
<td>1.7142</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>21,00,000</strong></td>
<td><strong>1.0000</strong></td>
<td></td>
<td><strong>11.5233</strong></td>
</tr>
</tbody>
</table>

(ii) **Computation of Revised Weighted Average Cost of Capital (using market value weights*)**

<table>
<thead>
<tr>
<th>Source of finance</th>
<th>Market Value of capital (₹)</th>
<th>Weight</th>
<th>After tax Cost of capital (%)</th>
<th>WACC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity shares (Working note 2)</td>
<td>10,50,000</td>
<td>0.3443</td>
<td>17.43</td>
<td>6.0011</td>
</tr>
<tr>
<td>10% Preference shares</td>
<td>4,00,000</td>
<td>0.1311</td>
<td>10.00</td>
<td>1.3110</td>
</tr>
<tr>
<td>12% Debentures</td>
<td>6,00,000</td>
<td>0.1967</td>
<td>6.00</td>
<td>1.1802</td>
</tr>
<tr>
<td>14% Loan</td>
<td>10,00,000</td>
<td>0.3279</td>
<td>7.00</td>
<td>2.2953</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30,50,000</strong></td>
<td><strong>1.0000</strong></td>
<td></td>
<td><strong>10.7876</strong></td>
</tr>
</tbody>
</table>

(* This can also be calculated using book value weights.)

**Working Notes:**

1. Cost of equity shares ($K_e$)

   $$K_e = \frac{\text{Dividend per share (D)}}{\text{Market price per share (P)}} + \text{Growthrate (g)}$$

   $$= \frac{\text{₹10}}{\text{₹110}} + 0.06 = 0.1509 \text{ or } 15.09\%$$

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(2) Revised cost of equity shares (Ke)

Revised Ke = \frac{12}{105} + 0.06 = 0.1742 or 17.43%

Question 6

XYZ Ltd. has the following book value capital structure:

- **Equity Capital (in shares of ₹ 10 each, fully paid up- at par)**: ₹ 15 crores
- **11% Preference Capital (in shares of ₹ 100 each, fully paid up- at par)**: ₹ 1 crore
- **Retained Earnings**: ₹ 20 crores
- **13.5% Debentures (of ₹ 100 each)**: ₹ 10 crores
- **15% Term Loans**: ₹ 12.5 crores

The next expected dividend on equity shares per share is ₹ 3.60; the dividend per share is expected to grow at the rate of 7%. The market price per share is ₹ 40.

Preference stock, redeemable after ten years, is currently selling at ₹ 75 per share.

Debentures, redeemable after six years, are selling at ₹ 80 per debenture.

The Income tax rate for the company is 40%.

(i) Required

Calculate the current weighted average cost of capital using:

(a) book value proportions; and
(b) market value proportions.

(ii) Define the weighted marginal cost of capital schedule for the company, if it raises ₹ 10 crores next year, given the following information:

(a) the amount will be raised by equity and debt in equal proportions;
(b) the company expects to retain ₹ 1.5 crores earnings next year;
(c) the additional issue of equity shares will result in the net price per share being fixed at ₹ 32;
(d) the debt capital raised by way of term loans will cost 15% for the first ₹ 2.5 crores and 16% for the next ₹ 2.5 crores.
Answer

(i) (a) Statement showing computation of weighted average cost of capital by using Book value proportions

<table>
<thead>
<tr>
<th>Source of finance</th>
<th>Amount (Book value) (£ in crores)</th>
<th>Weight (Book value proportion) (a)</th>
<th>Cost of capital (%) (b)</th>
<th>Weighted cost of capital (%) (c) = (a)x(b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity capital (W.N.1)</td>
<td>15.00</td>
<td>0.256</td>
<td>16.00</td>
<td>4.096</td>
</tr>
<tr>
<td>11% Preference capital (W.N.2)</td>
<td>1.00</td>
<td>0.017</td>
<td>15.43</td>
<td>0.262</td>
</tr>
<tr>
<td>Retained earnings (W.N.1)</td>
<td>20.00</td>
<td>0.342</td>
<td>16.00</td>
<td>5.472</td>
</tr>
<tr>
<td>13.5% Debentures (W.N.3)</td>
<td>10.00</td>
<td>0.171</td>
<td>12.70</td>
<td>2.171</td>
</tr>
<tr>
<td>15% term loans (W.N.4)</td>
<td>12.50</td>
<td>0.214</td>
<td>9.00</td>
<td>1.926</td>
</tr>
<tr>
<td></td>
<td>58.50</td>
<td>1.000</td>
<td></td>
<td>13.927</td>
</tr>
</tbody>
</table>

(b) Statement showing computation of weighted average cost of capital by using market value proportions

<table>
<thead>
<tr>
<th>Source of finance</th>
<th>Amount (£ in crores)</th>
<th>Weight (Market value proportions) (a)</th>
<th>Cost of capital (%) (b)</th>
<th>Weighted cost of capital (%) (c) = (a) x (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity capital (W.N.1)</td>
<td>60.00 (1.5 crores x ₹ 40)</td>
<td>0.739</td>
<td>16.00</td>
<td>11.824</td>
</tr>
<tr>
<td>11% Preference capital (W.N.2)</td>
<td>0.75 (1 lakh x ₹ 75)</td>
<td>0.009</td>
<td>15.43</td>
<td>0.138</td>
</tr>
<tr>
<td>13.5% Debentures (W.N.3)</td>
<td>8.00 (10 lakhs x ₹ 80)</td>
<td>0.098</td>
<td>12.70</td>
<td>1.245</td>
</tr>
<tr>
<td>15% Term loans (W.N.4)</td>
<td>12.50</td>
<td>0.154</td>
<td>9.00</td>
<td>1.386</td>
</tr>
<tr>
<td></td>
<td>81.25</td>
<td>1.000</td>
<td></td>
<td>14.593</td>
</tr>
</tbody>
</table>

Note: Since retained earnings are treated as equity capital for purposes of calculation of cost of specific source of finance, the market value of the ordinary shares may be taken to represent the combined market value of equity shares and retained earnings. The separate market values of retained earnings and ordinary shares may also be worked out by allocating
to each of these a percentage of total market value equal to their percentage share of the total based on book value.]

**Working Notes (W.N.):**

1. **Cost of equity capital and retained earnings ($K_e$)**

   \[ K_e = \frac{D_1}{P_0} + g \]

   Where,  
   - $K_e$ = Cost of equity capital  
   - $D_1$ = Expected dividend at the end of year 1  
   - $P_0$ = Current market price of equity share  
   - $g$ = Growth rate of dividend

   Now, it is given that $D_1 = \text{₹} 3.60$, $P_0 = \text{₹} 40$ and $g = 7\%$

   Therefore,  
   \[ K_e = \frac{3.60}{40} + 0.07 \]

   or  
   \[ K_e = 16\% \]

2. **Cost of preference capital ($K_p$)**

   \[ K_p = \frac{PD + \left[ \frac{RV - NP}{n} \right]}{RV + NP} \]

   Where,  
   - $PD$ = Preference dividend  
   - $RV$ = Redeemable value of preference shares  
   - $NP$ = Current market price of preference shares  
   - $n$ = Redemption period of preference shares

   Now, it is given that $PD = 11\%$, $RV = \text{₹} 100$, $NP = \text{₹} 75$ and $n = 10$ years

   Therefore  
   \[ K_p = \frac{11 + \left[ \frac{100 - 75}{10} \right]}{100 + 75} \times 100 = 15.43\% \]
3. Cost of debentures ($K_d$)

$$K_d = \frac{I(1-t) \left[ \frac{RV - NP}{n} \right]}{2 (RV + NP)}$$

Where,

- $I$ = Interest payment
- $t$ = Tax rate applicable to the company
- $RV$ = Redeemable value of debentures
- $NP$ = Current market price of debentures
- $n$ = Redemption period of debentures

Now it is given that $I = 13.5$, $t = 40\%$, $RV = ₹ 100$, $NP = ₹ 80$ and $n = 6$ years

Therefore, $K_d = \frac{13.5(1-0.40) + \left[ \frac{100 - 80}{6} \right]}{\left[ \frac{100 + 80}{2} \right]} \times 100 = 12.70\%$

4. Cost of Term loans ($K_t$)

$$K_t = r(1-t)$$

Where,

- $r$ = Rate of interest on term loans
- $t$ = Tax rate applicable to the company

Now, $r = 15\%$ and $t = 40\%$

Therefore, $K_t = 15\% \times (1 - 0.40) = 9\%$

(ii) Statement showing weighted marginal cost of capital schedule for the company, if it raises ₹ 10 crores next year, given the following information:

<table>
<thead>
<tr>
<th>Source of finance</th>
<th>Amount (₹ in crores)</th>
<th>Weight</th>
<th>After tax Cost of capital (%)</th>
<th>Weighted Average cost of capital (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity shares (W.N.5)</td>
<td>3.5</td>
<td>0.35</td>
<td>18.25</td>
<td>6.387</td>
</tr>
<tr>
<td>Retained earnings</td>
<td>1.5</td>
<td>0.15</td>
<td>18.25</td>
<td>2.737</td>
</tr>
<tr>
<td>15% Debt (W.N.6)</td>
<td>2.5</td>
<td>0.25</td>
<td>9.00</td>
<td>2.250</td>
</tr>
<tr>
<td>16% of Debt (W.N.6)</td>
<td>2.5</td>
<td>0.25</td>
<td>9.60</td>
<td>2.400</td>
</tr>
<tr>
<td></td>
<td>10.0</td>
<td>1.00</td>
<td>13.774</td>
<td></td>
</tr>
</tbody>
</table>

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Working Notes (W.N.):

5. Cost of equity share \((K_e)\) (including fresh issue of equity shares)
   \[ K_e = \frac{D_1}{P_0} + g \]
   Now, \(D_1 = \text{₹} 3.60, P_0 = \text{₹} 32\) and \(g = 0.07\)
   Therefore, \(K_e = \left[ \frac{\text{₹} 3.60}{\text{₹} 32} \right] + 0.07 = 18.25\%\)

6. Cost of debt \((K_d)\) = \(r(1 - t)\)
   (For first \(2.5\) crores)
   \(r = 15\%\) and \(t = 40\%\)
   Therefore, \(K_d = 15\% (1 - 40\%) = 9\%\)
   (For the next \(2.5\) crores)
   \(r = 16\%\) and \(t = 40\%\)
   Therefore, \(K_d = 16\% (1 - 40\%) = 9.6\%\)

Question 7

JKL Ltd. has the following book-value capital structure as on March 31, 20X5.

<table>
<thead>
<tr>
<th></th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity share capital (2,00,000 shares)</td>
<td>40,00,000</td>
</tr>
<tr>
<td>11.5% Preference shares</td>
<td>10,00,000</td>
</tr>
<tr>
<td>10% Debentures</td>
<td>30,00,000</td>
</tr>
<tr>
<td></td>
<td>80,00,000</td>
</tr>
</tbody>
</table>

The equity shares of the company are sold for ₹ 20. It is expected that the company will pay next year a dividend of ₹ 2 per equity share, which is expected to grow by 5\% p.a. forever. Assume a 35\% corporate tax rate.

Required:

(i) Compute weighted average cost of capital (WACC) of the company based on the existing capital structure.

(ii) Compute the new WACC, if the company raises an additional ₹ 20 lakhs debt by issuing 12\% debentures. This would result in increasing the expected equity dividend to ₹ 2.40
and leave the growth rate unchanged, but the price of equity share will fall to ₹ 16 per share.

Answer

(i) Computation of Weighted Average Cost of Capital based on existing capital structure

<table>
<thead>
<tr>
<th>Source of Capital</th>
<th>Existing Capital structure (₹)</th>
<th>Weights (a)</th>
<th>After tax cost of capital (%) (b)</th>
<th>WACC (%) (a) × (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity share capital (W.N.1)</td>
<td>40,00,000</td>
<td>0.500</td>
<td>15.00</td>
<td>7.500</td>
</tr>
<tr>
<td>11.5% Preference share capital (W.N.2)</td>
<td>10,00,000</td>
<td>0.125</td>
<td>11.50</td>
<td>1.437</td>
</tr>
<tr>
<td>10% Debentures (W.N.3)</td>
<td>30,00,000</td>
<td>0.375</td>
<td>6.50</td>
<td>2.438</td>
</tr>
<tr>
<td></td>
<td>80,00,000</td>
<td>1.000</td>
<td></td>
<td>11.375</td>
</tr>
</tbody>
</table>

Working Notes (W.N.):

1. **Cost of equity capital:**

\[ K_e = \frac{\text{Expected Dividend} (D)}{\text{Current Market Price per share} (P)} + \text{Growth (g)} \]

\[ = \frac{\text{₹ 2}}{\text{₹ 20}} + 0.05 = 0.15 \text{ or } 15\% \]

2. **Cost of preference share capital:**

\[ = \frac{\text{Annual preference share dividend} (PD)}{\text{Net proceeds in the issue of preference share (NP)}} \]

\[ = \frac{\text{₹ 1,15,000}}{\text{₹ 10,00,000}} = 0.115 \text{ or } 11.5\% \]

3. **Cost of 10% Debentures:**

\[ = \frac{I(1-t)}{\text{NP}} = \frac{\text{₹ 3,00,000}(1 - 0.35)}{\text{₹ 30,00,000}} = 0.065 \text{ or } 6.5\% \]
(ii) Computation of Weighted Average Cost of Capital based on new capital structure

<table>
<thead>
<tr>
<th>Source of Capital</th>
<th>New Capital structure (₹)</th>
<th>Weights (b)</th>
<th>After tax cost of capital (%) (a)</th>
<th>WACC (%) (a) × (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity share capital (W.N. 4)</td>
<td>40,00,000</td>
<td>0.40</td>
<td>20.00</td>
<td>8.00</td>
</tr>
<tr>
<td>Preference share (W.N. 2)</td>
<td>10,00,000</td>
<td>0.10</td>
<td>11.50</td>
<td>1.15</td>
</tr>
<tr>
<td>10% Debentures (W.N. 3)</td>
<td>30,00,000</td>
<td>0.30</td>
<td>6.50</td>
<td>1.95</td>
</tr>
<tr>
<td>12% Debentures (W.N. 5)</td>
<td>20,00,000</td>
<td>0.20</td>
<td>7.80</td>
<td>1.56</td>
</tr>
<tr>
<td></td>
<td>1,00,00,000</td>
<td>1.00</td>
<td></td>
<td>12.66</td>
</tr>
</tbody>
</table>

Working Notes (W.N.):

4. Cost of equity capital:

\[ K_e = \frac{\text{Expected Dividend} (D)}{\text{Current Market Price per share} (P)} + \text{Growth} (g) \]

\[ = \frac{₹ 2.40}{₹ 16} + 5\% = 20\% \]

5. Cost of 12% Debentures

\[ K_d = \frac{₹ 2,40,000(1 - 0.35)}{₹ 20,00,000} = 0.078 \text{ or } 7.8\% \]

Question 8

ABC Limited has the following book value capital structure:

- **Equity Share Capital (150 million shares, ₹10 par)**: ₹ 1,500 million
- **Reserves and Surplus**: ₹ 2,250 million
- **10.5% Preference Share Capital (1 million shares, ₹100 par)**: ₹ 100 million
- **9.5% Debentures (1.5 million debentures, ₹1,00 par)**: ₹ 1,500 million
- **8.5% Term Loans from Financial Institutions**: ₹ 500 million

The debentures of ABC Limited are redeemable after three years and are quoting at ₹ 981.05 per debenture. The applicable income tax rate for the company is 35%.

The current market price per equity share is ₹ 60. The prevailing default-risk free interest rate on 10-year GOI Treasury Bonds is 5.5%. The average market risk premium is 8%. The beta of the company is 1.1875.

The preferred stock of the company is redeemable after 5 years is currently selling at ₹ 98.15 per preference share.
4.21 Financial Management

Required:

(i) Calculate weighted average cost of capital of the company using market value weights.

(ii) Define the marginal cost of capital schedule for the firm if it raises ₹750 million for a new project. The firm plans to have a debt of 20% of the newly raised capital. The beta of new project is 1.4375. The debt capital will be raised through term loans, it will carry interest rate of 9.5% for the first ₹100 million and 10% for the next ₹50 million.

Answer

Working Notes:

(1) Computation of cost of debentures (K_d):

\[ K_d = \frac{95(1-0.35) + (1,000 - 981.05)}{1,000 + 981.05} / 2 = 6.872\% \]

(2) Computation of cost of term loans (K_T):

\[ = r (1 - t) \]

\[ = 0.085 (1 - 0.35) = 0.05525 \text{ or } 5.525\% \]

(3) Computation of cost of preference capital (K_P):

\[ K_p = \frac{10.5 + (100 - 98.15) / 5}{(100 + 98.15) / 2} = 0.1097 = 10.97\% \]

(4) Computation of cost of equity (K_e):

\[ = R_f + \beta(R_m - R_f) \]

\[ = 0.055 + (1.1875 \times 0.08) = 0.15 \text{ or } 15\% \]

(i) Calculation of Weighted Average cost of capital Using market value weights

<table>
<thead>
<tr>
<th>Source of Capital</th>
<th>Market value of capital structure (₹ in millions)</th>
<th>Weights</th>
<th>After tax cost of capital (%)</th>
<th>WACC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity share capital</td>
<td>9,000</td>
<td>0.813</td>
<td>15.000</td>
<td>12.195</td>
</tr>
<tr>
<td>10.5% Preference share capital</td>
<td>98.15</td>
<td>0.0089</td>
<td>10.970</td>
<td>0.098</td>
</tr>
<tr>
<td>9.5% Debentures</td>
<td>1,471.575</td>
<td>0.1329</td>
<td>6.872</td>
<td>0.913</td>
</tr>
</tbody>
</table>
Financing Decisions 4.22

(1.5 million × ₹981.05)

<table>
<thead>
<tr>
<th>Term loans</th>
<th>500</th>
<th>0.0452</th>
<th>5.525</th>
<th>0.249</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11,069.725</td>
<td>1.000</td>
<td>13.455</td>
<td></td>
</tr>
</tbody>
</table>

(ii) Marginal cost of capital (MCC) schedule:

New capital of ₹750 million will be raised in proportion of 20% Debt and 80% equity share capital i.e. ₹150 million debt and ₹600 million equity.

Cost of equity shares ($K_e$) = Risk free rate + (Beta × Risk premium)
= 0.055 + (1.4375 × 0.08) = 0.17 or 17%

Cost of Debt ($K_d$):
for first ₹100 million = 9.5% × (1 - 0.35) = 6.175%
for next ₹50 million = 10% × (1 - 0.35) = 6.5%

Marginal Cost of Capital = 0.17 × ₹600m/₹750m + 0.06175 × ₹100m/₹750m + 0.065 × ₹50m/₹750m
= 0.136 + (0.008 + 0.004) = 0.148 or 14.8%

Question 9

The R&G Ltd. has following capital structure at 31st December 2015, which is considered to be optimum:

<table>
<thead>
<tr>
<th></th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13% Debenture</td>
<td>3,60,000</td>
</tr>
<tr>
<td>11% Preference share capital</td>
<td>1,20,000</td>
</tr>
<tr>
<td>Equity share capital (2,00,000 shares)</td>
<td>19,20,000</td>
</tr>
</tbody>
</table>

The company’s share has a current market price of ₹27.75 per share. The expected dividend per share in next year is 50 percent of the 2015 EPS. The EPS of last 10 years is as follows. The past trends are expected to continue:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EPS (₹)</td>
<td>1.00</td>
<td>1.120</td>
<td>1.254</td>
<td>1.405</td>
<td>1.574</td>
<td>1.762</td>
<td>1.974</td>
<td>2.211</td>
<td>2.476</td>
<td>2.773</td>
</tr>
</tbody>
</table>

The company can issue 14 percent new debenture. The company’s debenture is currently selling at ₹98. The new preference issue can be sold at a net price of ₹9.80, paying a dividend of ₹1.20 per share. The company’s marginal tax rate is 50%.
4.23 Financial Management

(i) Calculate the after tax cost (a) of new debts and new preference share capital, (b) of ordinary equity, assuming new equity comes from retained earnings.

(ii) Calculate the marginal cost of capital.

(iii) How much can be spent for capital investment before new ordinary share must be sold? (Assuming that retained earnings available for next year’s investment is 50% of 2015 earnings.)

(iv) What will be marginal cost of capital (cost of fund raised in excess of the amount calculated in part (iii) if the company can sell new ordinary shares to net ₹20 per share? The cost of debt and of preference capital is constant.

Answer

(i) Calculation of after tax cost of the followings:

(a) New 14% Debentures ($K_d$) = \[ \frac{14(1-0.5)}{98} = 0.0714 \text{ or } 7.14\% \]

(b) New 12% Preference Shares ($K_p$) = \[ \frac{1.20}{9.80} = 0.1224 \text{ or } 12.24\% \]

(ii) Calculation of marginal cost of capital (on the basis of existing capital structure):

<table>
<thead>
<tr>
<th>Source of capital</th>
<th>Weight (a)</th>
<th>After tax Cost of capital (%) (b)</th>
<th>WACC (%) (a) × (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14% Debenture</td>
<td>0.15</td>
<td>7.14</td>
<td>1.071</td>
</tr>
<tr>
<td>12% Preference shares</td>
<td>0.05</td>
<td>12.24</td>
<td>0.612</td>
</tr>
<tr>
<td>Equity shares</td>
<td>0.80</td>
<td>17.00</td>
<td>13.600</td>
</tr>
<tr>
<td>Marginal cost of capital</td>
<td></td>
<td></td>
<td>15.283</td>
</tr>
</tbody>
</table>

(iii) The company can spent for capital investment before issuing new equity shares and without increasing its marginal cost of capital:
Retained earnings can be available for capital investment

= 50% of 2015 EPS × equity shares outstanding

= 50% of ₹ 2.773 × 2,00,000 shares = ₹ 2,77,300

Since, marginal cost of capital is to be maintained at the current level i.e. 15.28%, the retained earnings should be equal to 80% of total additional capital for investment.

Thus investment before issuing equity \[\frac{2,77,300 \times 100}{80} \times 100 = ₹ 3,46,625\]

The remaining capital of ₹ 69,325 i.e. ₹ 3,46,625 – ₹ 2,77,300 shall be financed by issuing 14% Debenture and 12% preference shares in the ratio of 3 : 1 respectively.

(iv) If the company spends more than ₹ 3,46,625 as calculated in part (iii) above, it will have to issue new shares at ₹ 20 per share.

The cost of new issue of equity shares will be:

\[K_e = \frac{\text{Expected dividend}(D_i)}{\text{Current market price}(P_i)} + \text{Growth rate}(g) = \frac{50\% \times 2.773}{20} + 0.12 = 0.1893 \text{ or } 18.93\%\]

Calculation of marginal cost of capital (assuming the existing capital structure will be maintained):

<table>
<thead>
<tr>
<th>Source of capital</th>
<th>Weight (a)</th>
<th>Cost (%) (b)</th>
<th>WACC (%) (a) × (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14% Debenture</td>
<td>0.15</td>
<td>7.14</td>
<td>1.071</td>
</tr>
<tr>
<td>12% Preference shares</td>
<td>0.05</td>
<td>12.24</td>
<td>0.612</td>
</tr>
<tr>
<td>Equity shares</td>
<td>0.80</td>
<td>18.93</td>
<td>15.144</td>
</tr>
<tr>
<td>Marginal cost of capital</td>
<td></td>
<td></td>
<td>16.827</td>
</tr>
</tbody>
</table>

**Question 10**

You are required to determine the weighted average cost of capital of a firm using (i) book-value weights and (ii) market value weights. The following information is available for your perusal:

Present book value of the firm’s capital structure is:

<table>
<thead>
<tr>
<th></th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debentures of ₹ 100 each</td>
<td>8,00,000</td>
</tr>
<tr>
<td>Preference shares of ₹ 100 each</td>
<td>2,00,000</td>
</tr>
<tr>
<td>Equity shares of ₹ 10 each</td>
<td>10,00,000</td>
</tr>
<tr>
<td></td>
<td>20,00,000</td>
</tr>
</tbody>
</table>
All these securities are traded in the capital markets. Recent prices are:

Debentures @ ₹110, Preference shares @ ₹120 and Equity shares @ ₹22.

Anticipated external financing opportunities are as follows:

(i) ₹100 per debenture redeemable at par: 20 years maturity 8% coupon rate, 4% flotation costs, sale price ₹100.

(ii) ₹100 preference share redeemable at par: 15 years maturity, 10% dividend rate, 5% flotation costs, sale price ₹100.

(iii) Equity shares: ₹2 per share flotation costs, sale price ₹22.

In addition, the dividend expected on the equity share at the end of the year is ₹2 per share; the anticipated growth rate in dividends is 5% and the firm has the practice of paying all its earnings in the form of dividend. The corporate tax rate is 50%.

Answer

Working Notes:

Determination of Cost of capital:

(i) Cost of Debentures (K_d)

\[ K_d = \frac{I(1-t) + \frac{RV - NP}{n}}{\frac{RV + NP}{2}} \]

Where,

I = Annual Interest Payment
NP = Net proceeds of debentures net of flotation costs
RV = Redemption value of debentures
\( t \) = Income tax rate
n = Life of debentures

\[ K_d = \frac{8(1-0.5) + \frac{100-96}{20 \text{ years}}}{\frac{100+96}{2}} = \frac{4.20}{98} = 0.0429 \text{ or } 4.29\% \]

* Net Proceeds = Par value per shares - 4% Flotation cost per share
= ₹100 - 4% of ₹100 = ₹96
(ii) Cost of Preference Shares ($K_p$)

$$K_p = \frac{PD + \frac{RV - NP}{n}}{\frac{RV + NP}{2}}$$

Where,

- $PD = $ Preference Dividend per share
- $NP = $ Net proceeds of share net of flotation costs
- $RV = $ Redemption value of shares
- $n = $ Life of preference shares

$$K_p = \frac{\text{Rs} 10 + \frac{\text{Rs} 100 - \text{Rs} 95 \times 15}{\text{Rs} 97.5}}{2} = \text{Rs} 0.106 \text{ or } 10.60\%$$

* Net Proceeds = Par value per shares - 5% Flotation cost per share
  = $100 - 5\% \text{ of } $100 = $95

(iii) Cost of Equity ($K_e$)

$$K_e = \frac{\text{Expected dividend } (D_e) + \text{Growth rate } (g)}{\text{Current market price } (P_e)} = \frac{\text{Rs} 2}{\text{Rs} 22 - \text{Rs} 2} + 0.05 = 0.15 \text{ or } 15\%$$

(i) Computation of Weighted Average Cost of Capital based on Book Value Weights

<table>
<thead>
<tr>
<th>Source of Capital</th>
<th>Book Value (₹)</th>
<th>Weights to Total Capital</th>
<th>After tax Cost of capital (%)</th>
<th>WACC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debentures</td>
<td>8,00,000</td>
<td>0.40</td>
<td>4.29</td>
<td>1.716</td>
</tr>
<tr>
<td>Preference Shares</td>
<td>2,00,000</td>
<td>0.10</td>
<td>10.60</td>
<td>1.060</td>
</tr>
<tr>
<td>Equity Shares</td>
<td>10,00,000</td>
<td>0.50</td>
<td>15.00</td>
<td>7.500</td>
</tr>
<tr>
<td></td>
<td>20,00,000</td>
<td>1.00</td>
<td></td>
<td>10.276</td>
</tr>
</tbody>
</table>

(ii) Computation of Weighted Average Cost of Capital based on Market Value Weights

<table>
<thead>
<tr>
<th>Source of Capital</th>
<th>Market Value (₹)</th>
<th>Weights to Total Capital</th>
<th>After tax Cost of capital (%)</th>
<th>WACC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debentures (8,000 units × Rs 110)</td>
<td>8,80,000</td>
<td>0.2651</td>
<td>4.29</td>
<td>1.137</td>
</tr>
<tr>
<td>Pref. Shares (2,000 shares × Rs 120)</td>
<td>2,40,000</td>
<td>0.0723</td>
<td>10.60</td>
<td>0.766</td>
</tr>
<tr>
<td>Equity Shares (1,00,000 shares × Rs 22)</td>
<td>22,00,000</td>
<td>0.6626</td>
<td>15.00</td>
<td>9.939</td>
</tr>
<tr>
<td></td>
<td>33,20,000</td>
<td>1.00</td>
<td></td>
<td>11.842</td>
</tr>
</tbody>
</table>
Question 11

The following is the capital structure of a Company:

<table>
<thead>
<tr>
<th>Source of capital</th>
<th>Book value (₹)</th>
<th>Market value (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity shares @ ₹ 100 each</td>
<td>80,00,000</td>
<td>1,60,00,000</td>
</tr>
<tr>
<td>9% Cumulative preference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>shares @ ₹ 100 each</td>
<td>20,00,000</td>
<td>24,00,000</td>
</tr>
<tr>
<td>11% Debentures</td>
<td>60,00,000</td>
<td>66,00,000</td>
</tr>
<tr>
<td>Retained earnings</td>
<td>40,00,000</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>2,00,00,000</td>
<td>2,50,00,000</td>
</tr>
</tbody>
</table>

The current market price of the company’s equity share is ₹200. For the last year the company had paid equity dividend at 25 per cent and its dividend is likely to grow 5 per cent every year. The corporate tax rate is 30 per cent and shareholders personal income tax rate is 20 per cent.

You are required to calculate:

(i) Cost of capital for each source of capital.
(ii) Weighted average cost of capital on the basis of book value weights.
(iii) Weighted average cost of capital on the basis of market value weights.

Answer

(i) Calculation of Cost of Capital for each source of capital:
   (a) Cost of Equity share capital:
   
   \[
   K_e = \frac{D_e (1 + g)}{Market \, Price \, per \, share \, (P_0)} + g = \frac{25\% \times ₹100(1+0.05)}{₹200} + 0.05
   \]
   
   \[
   = \frac{₹26.25}{₹200} + 0.05 = 0.18125 \text{ or } 18.125\%
   \]
   
   (b) Cost of Preference share capital \((K_p) = 9\%
   
   (c) Cost of Debentures \((K_d) = r (1 - t)
   
   = 11\% (1 - 0.3) = 7.7\%.
   
   (d) Cost of Retained Earnings: \(K_s = K_e (1 - t_p) = 18.125 (1 - 0.2) = 14.5\%.\)
(ii) **Weighted Average Cost of Capital on the basis of book value weights**

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount (₹)</th>
<th>Weights (a)</th>
<th>After tax Cost of Capital (%) (b)</th>
<th>WACC (%) (c) = (a) × (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity share</td>
<td>80,00,000</td>
<td>0.40</td>
<td>18.125</td>
<td>7.25</td>
</tr>
<tr>
<td>9% Preference share</td>
<td>20,00,000</td>
<td>0.10</td>
<td>9.000</td>
<td>0.90</td>
</tr>
<tr>
<td>11% Debentures</td>
<td>60,00,000</td>
<td>0.30</td>
<td>7.700</td>
<td>2.31</td>
</tr>
<tr>
<td>Retained earnings</td>
<td>40,00,000</td>
<td>0.20</td>
<td>14.500</td>
<td>2.90</td>
</tr>
<tr>
<td></td>
<td>2,00,00,000</td>
<td>1.00</td>
<td></td>
<td>13.36</td>
</tr>
</tbody>
</table>

(iii) **Weighted Average Cost of Capital on the basis of market value weights**

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount (₹)</th>
<th>Weights (a)</th>
<th>After tax Cost of Capital (%) (b)</th>
<th>WACC (%) (c) = (a) × (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity share</td>
<td>1,60,00,000</td>
<td>0.640</td>
<td>18.125</td>
<td>11.60</td>
</tr>
<tr>
<td>9% Preference share</td>
<td>24,00,000</td>
<td>0.096</td>
<td>9.000</td>
<td>0.864</td>
</tr>
<tr>
<td>11% Debentures</td>
<td>66,00,000</td>
<td>0.264</td>
<td>7.700</td>
<td>2.033</td>
</tr>
<tr>
<td></td>
<td>2,50,00,000</td>
<td>1.000</td>
<td></td>
<td>14.497</td>
</tr>
</tbody>
</table>

**Question 12**

The capital structure of a company as on 31st March, 20X5 is as follows:

<table>
<thead>
<tr>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity share capital : 6,00,000 equity shares of ₹ 100 each</td>
</tr>
<tr>
<td>Reserve and surplus</td>
</tr>
<tr>
<td>12% Debenture of ₹ 100 each</td>
</tr>
</tbody>
</table>

For the year ended 31st March, 20X5 the company has paid equity dividend @24%. Dividend is likely to grow by 5% every year. The market price of equity share is ₹ 600 per share. Corporate tax rate applicable to the company is 30%.

**Required:**

(i) Compute the current weighted average cost of capital.

(ii) The company has plan to raise a further ₹ 3,00,00,000 by way of long-term loan at 18% interest. If loan is raised, the market price of equity share is expected to fall to ₹ 500 per share. What will be the new weighted average cost of capital of the company?
### Answer

#### (i) Computation of Current Weighted Average Cost of Capital

(a) Cost of 12% Debentures \( (K_d) \quad = \quad \frac{I(1-t)}{NP} = \frac{\text{₹}12(1-0.3)}{\text{₹}100} = 0.084 \text{ or } 8.4\% \)

(b) Cost of Equity Share Capital \( (K_e) \quad = \quad \frac{D_0(1+g)}{P_0} + g = \frac{\text{₹}100 \times 24\% (1+0.05)}{\text{₹}600} + 0.05 \)
\[= \frac{\text{₹}25.2}{\text{₹}600} + 0.05 = 0.092 \text{ or } 9.2\% \]

<table>
<thead>
<tr>
<th>Source of capital</th>
<th>Amount (₹)</th>
<th>Weight</th>
<th>After tax Cost of Capital (%)</th>
<th>WACC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity share capital (including Reserve &amp; Surplus)</td>
<td>7,20,00,000</td>
<td>0.80</td>
<td>9.20</td>
<td>7.36</td>
</tr>
<tr>
<td>12% Debentures</td>
<td>1,80,00,000</td>
<td>0.20</td>
<td>8.40</td>
<td>1.68</td>
</tr>
<tr>
<td><strong>Weighted Average Cost of Capital</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>9.04</strong></td>
</tr>
</tbody>
</table>

#### (ii) Computation of New Weighted Average Cost of Capital

(a) Cost of Existing 12% Debentures \( (K_d) \quad = \quad 8.4\% \text{ (as calculated above)} \)

(b) Cost of Term Loan \( (K_t) \quad = \quad \text{Rate of Interest} \times (1-\text{tax rate}) \)
\[= 0.18 (1-0.03) = 0.126 \text{ or } 12.6\% \]

(c) Cost of Equity Share Capital \( (K_e) \quad = \quad \frac{\text{₹}24(1.05)}{\text{₹}500} + 0.05 = \frac{\text{₹}25.2}{\text{₹}500} + 0.05 \)
\[= 0.0504 + 0.05 = 0.1004 = 10.04\% \]

<table>
<thead>
<tr>
<th>Source of capital</th>
<th>Amount (₹)</th>
<th>Weight</th>
<th>After tax Cost of Capital (%)</th>
<th>WACC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity share capital (including Reserve &amp; Surplus)</td>
<td>7,20,00,000</td>
<td>0.60</td>
<td>10.04</td>
<td>6.02</td>
</tr>
<tr>
<td>12% Debentures</td>
<td>1,80,00,000</td>
<td>0.15</td>
<td>8.40</td>
<td>1.26</td>
</tr>
<tr>
<td>18% Term loan</td>
<td>3,00,00,000</td>
<td>0.25</td>
<td>12.60</td>
<td>3.15</td>
</tr>
<tr>
<td><strong>Weighted Average Cost of Capital</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>10.43</strong></td>
</tr>
</tbody>
</table>

[WACC for the company can also be calculated using market value weights]
Question 13
The capital structure of a company consists of equity shares of ₹50 lakhs; 10 percent preference shares of ₹10 lakhs and 12 percent debentures of ₹30 lakhs. The cost of equity capital for the company is 14.7 percent and income-tax rate for this company is 30 percent.
You are required to calculate the Weighted Average Cost of Capital (WACC).

Answer

Calculation of Weighted Average Cost of Capital (WACC)

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount (₹)</th>
<th>Weight</th>
<th>Cost of Capital after tax</th>
<th>WACC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity Capital</td>
<td>50,00,000</td>
<td>0.5556</td>
<td>0.147</td>
<td>0.0817</td>
</tr>
<tr>
<td>10% Preference Capital</td>
<td>10,00,000</td>
<td>0.1111</td>
<td>0.100</td>
<td>0.0111</td>
</tr>
<tr>
<td>12% Debentures</td>
<td>30,00,000</td>
<td>0.3333</td>
<td>0.084*</td>
<td>0.0280</td>
</tr>
<tr>
<td>Total</td>
<td>90,00,000</td>
<td>1.0000</td>
<td></td>
<td>0.1208</td>
</tr>
</tbody>
</table>

* Cost of Debentures (after tax) = 12% (1 – 0.30) = 8.4% = 0.084

Weighted Average Cost of Capital = 0.1208 = 12.08%

Question 14

ABC Ltd. wishes to raise additional finance of ₹20 lakhs for meeting its investments plan. The company has ₹4,00,000 in the form of retained earnings available for investment purposes. The following are the further details:
- Debt equity ratio 25 : 75.
- Cost of debt at the rate of 10% (before tax) upto ₹2,00,000 and 13% (before tax) beyond that.
- Earnings per share ₹12.
- Dividend payout 50% of earnings.
- Expected growth rate in dividend 10%.
- Current market price per share, ₹60.
- Company’s tax rate is 30% and shareholder’s personal tax rate is 20%.

Required:
(i) Calculate the post tax average cost of additional debt.
(ii) Calculate the cost of retained earnings and cost of equity.
(iii) Calculate the overall weighted average (after tax) cost of additional finance.
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Answer

Pattern of raising Capital:

Portion of Debt = ₹ 20,00,000 × 25% = ₹ 5,00,000 and

Portion of Equity = ₹ 20,00,000 × 75% = ₹ 15,00,000, of this ₹ 4,00,000 is from retained earnings and ₹11,00,000 by issuing fresh equity shares.

(i) Cost of Debt \( (K_d) \) = \( \frac{\text{Total Interest}(1-t)}{\text{Debt}} \)

\[
= \frac{(10\% \text{ of } ₹2,00,000 + 13\% \text{ of } ₹3,00,000)(1-0.3)}{₹5,00,000} = \frac{₹59,000(1-0.3)}{₹5,00,000} = 0.0826 \text{ or } 8.26\%
\]

(ii) Cost of Equity \( (K_e) \) = \( \frac{\text{EPS} \times \text{Payout ratio}(1+g)}{P_0} + g \)

\[
= \frac{₹12 \times 0.5(1+0.1)}{₹60} + 0.1 = 0.11 + 0.10 = 0.21 \text{ or } 21\%
\]

Cost of retained earnings \( (K_s) = K_e (1-t_p) = 0.21(1-0.2) = 0.168 \text{ or } 16.8\% \)

(iii) Weighted average cost of capital \( (K_o) \)

<table>
<thead>
<tr>
<th>Source of capital</th>
<th>Amount (₹)</th>
<th>Proportion of total Capital</th>
<th>Cost of Capital (%)</th>
<th>WACC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity Capital</td>
<td>11,00,000</td>
<td>0.55</td>
<td>21.00</td>
<td>11.550</td>
</tr>
<tr>
<td>Retained earnings</td>
<td>4,00,000</td>
<td>0.20</td>
<td>16.80</td>
<td>3.360</td>
</tr>
<tr>
<td>Debt</td>
<td>5,00,000</td>
<td>0.25</td>
<td>8.26</td>
<td>2.065</td>
</tr>
<tr>
<td>Total</td>
<td>20,00,000</td>
<td>1.00</td>
<td></td>
<td>16.975</td>
</tr>
</tbody>
</table>

Question 15

The capital structure of MNP Ltd. is as under:

- 9% Debenture ₹2,75,000
- 11% Preference shares ₹2,25,000
- Equity shares (face value : ₹10 per share) ₹5,00,000
  ₹10,00,000

Additional information:

(i) ₹ 100 per debenture redeemable at par has 2% floatation cost and 10 years of maturity. The market price per debenture is ₹ 105.
Financing Decisions 4.32

(ii) ₹ 100 per preference share redeemable at par has 3% floatation cost and 10 years of maturity. The market price per preference share is ₹ 106.

(iii) Equity share has ₹ 4 floatation cost and market price per share of ₹ 24. The next year expected dividend is ₹ 2 per share with annual growth of 5%. The firm has a practice of paying all earnings in the form of dividends.

(iv) Corporate Income-tax rate is 35%.

Required: Calculate Weighted Average Cost of Capital (WACC) using market value weights.

Answer

Workings:

(i) Cost of Equity (K_e)

\[ K_e = \frac{D_1}{P_0 - \text{Floatation cost}} + g = \frac{2}{24 - 4} + 0.05 = 0.15 \text{ or } 15\% \]

(ii) Cost of Debt (K_d)

\[ K_d = \frac{\left(1 - t\right) + \frac{RV - NP}{n}}{\frac{RV + NP}{2}} = \frac{\left(1 - 0.35\right) + \frac{100 - 98}{10 \text{ years}}}{\frac{100 + 98}{2}} \]

\[ = \frac{0.52 + 0.20}{99} = 0.0611 \text{ or } 6.11\% \]

* NP = ₹100 – 2% of ₹100 = ₹98

(iii) Cost of Preference Shares (K_p)

\[ K_p = \frac{PD + \frac{RV - NP}{n}}{\frac{RV + NP}{2}} = \frac{11 + \frac{100 - 97}{10 \text{ years}}}{\frac{100 + 97}{2}} = \frac{11 + 0.3}{98.5} = 0.1147 \text{ or } 11.47\% \]

* NP = ₹100 – 3% of ₹100 = ₹97

Calculation of WACC using Market Value Weights

<table>
<thead>
<tr>
<th>Source of Capital</th>
<th>Market Value (₹)</th>
<th>Weights to Total Capital</th>
<th>After tax cost of capital (%)</th>
<th>WACC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9% Debentures (₹105 × 2,750 debentures)</td>
<td>2,88,750</td>
<td>0.1672</td>
<td>6.11</td>
<td>1.02</td>
</tr>
<tr>
<td>11% Preference Shares</td>
<td>2,38,500</td>
<td>0.1381</td>
<td>11.47</td>
<td>1.58</td>
</tr>
</tbody>
</table>

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4.33  Financial Management

\[
\begin{array}{|c|c|c|c|}
\hline
\text{(₹106 × 2,250 preference share)} & 12,00,000 & 0.6947 & 15.00 & 10.42 \\
\text{(₹ 24 × 50,000 shares)} & 17,27,250 & 1.00 & 13.02 \\
\hline
\end{array}
\]

**Question 16**

SK Limited has obtained funds from the following sources, the specific cost are also given against them:

<table>
<thead>
<tr>
<th>Source of funds</th>
<th>Amount (₹)</th>
<th>Cost of Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity shares</td>
<td>30,00,000</td>
<td>15 percent</td>
</tr>
<tr>
<td>Preference shares</td>
<td>8,00,000</td>
<td>8 percent</td>
</tr>
<tr>
<td>Retained earnings</td>
<td>12,00,000</td>
<td>11 percent</td>
</tr>
<tr>
<td>Debentures</td>
<td>10,00,000</td>
<td>9 percent (before tax)</td>
</tr>
</tbody>
</table>

You are required to calculate weighted average cost of capital. Assume that Corporate tax rate is 30 percent.

**Answer**

**Calculation of Weighted Average Cost of Capital (WACC)**

<table>
<thead>
<tr>
<th>Sources of Funds</th>
<th>Amount (₹)</th>
<th>Weight</th>
<th>Cost of Capital (%)</th>
<th>WACC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity Shares</td>
<td>30,00,000</td>
<td>0.500</td>
<td>15.00</td>
<td>7.50</td>
</tr>
<tr>
<td>Preference Shares</td>
<td>8,00,000</td>
<td>0.133</td>
<td>8.00</td>
<td>1.06</td>
</tr>
<tr>
<td>Retained Earnings</td>
<td>12,00,000</td>
<td>0.200</td>
<td>11.00</td>
<td>2.20</td>
</tr>
<tr>
<td>Debentures</td>
<td>10,00,000</td>
<td>0.167</td>
<td>6.30*</td>
<td>1.05</td>
</tr>
<tr>
<td>Total</td>
<td>60,00,000</td>
<td>1.000</td>
<td></td>
<td>11.81</td>
</tr>
</tbody>
</table>

*Cost of Debentures (K_d) = K_d (before tax) × (1 – t) = 9% (1 - 0.3) = 6.30%

**Question 17**

Beeta Ltd. has furnished the following information:

- Earning per share (ESP) ₹ 4
- Dividend payout ratio 25%
- Market price per share ₹ 40
- Rate of tax 30%
- Growth rate of dividend 8%
The company wants to raise additional capital of ₹ 10 lakhs including debt of ₹ 4 lakhs. The cost of debt (before tax) is 10% up to ₹ 2 lakhs and 15% beyond that.

Compute the after tax cost of equity and debt and the weighted average cost of capital.

Answer

(i) Cost of Equity Share Capital \( (K_e) \)

\[
K_e = \frac{D_0(1+g)}{P_0} + g = \frac{25\% \text{ of } ₹4 \ (1+0.08)}{₹40} + 0.08 = \frac{₹1.08}{₹40} + 0.08 = 0.107 \text{ or } 10.7\
\]

(ii) Cost of Debt \( (K_d) \)

\[
K_d = \frac{\text{Interest}}{\text{Net Proceeds}} \times 100 \times (1-t)
\]

Interest on first ₹ 2,00,000 @ 10% = 20,000
Interest on next ₹ 2,00,000 @ 15% = 30,000

\[
K_d = \frac{50,000}{4,00,000} \times (1-0.3) = 0.0875 \text{ or } 8.75\%
\]

(iii) Weighted Average Cost of Capital \( (WACC) \)

<table>
<thead>
<tr>
<th>Source of capital</th>
<th>Amount (₹)</th>
<th>Weights</th>
<th>Cost of Capital (%)</th>
<th>WACC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity shares</td>
<td>6,00,000</td>
<td>0.60</td>
<td>10.70</td>
<td>6.42</td>
</tr>
<tr>
<td>Debt</td>
<td>4,00,000</td>
<td>0.40</td>
<td>8.75</td>
<td>3.50</td>
</tr>
<tr>
<td>Total</td>
<td>10,00,000</td>
<td>1.00</td>
<td></td>
<td>9.92</td>
</tr>
</tbody>
</table>
UNIT – II : CAPITAL STRUCTURE DECISIONS

SECTION-A

Question 1

What is ‘Optimum Capital Structure’?

Answer

**Optimum Capital Structure:** The capital structure is said to be optimum when the firm has selected such a combination of equity and debt so that the wealth of firm is maximum. At this capital structure, the cost of capital is minimum and the market price per share is maximum.

Question 2

Explain in brief the assumptions of Modigliani-Miller theory.

Answer

**Assumptions of Modigliani – Miller Theory**

(a) Capital markets are perfect. All information is freely available and there is no transaction cost.
(b) All investors are rational.
(c) No existence of corporate taxes.
(d) Firms can be grouped into “equivalent risk classes” on the basis of their business risk.

Question 3

What is optimum capital structure? Explain.

Answer

**Optimum Capital Structure:** Optimum capital structure deals with the issue of right mix of debt and equity in the long-term capital structure of a firm. According to this, if a company takes on debt, the value of the firm increases up to a certain point. Beyond that value of the firm will start to decrease. If the company is unable to pay the debt within the specified period then it will affect the goodwill of the company in the market. Therefore, company should select its appropriate capital structure with due consideration of all factors.

Question 4

What is Net Operating Income (NOI) theory of capital structure? Explain the assumptions of Net Operating Income approach theory of capital structure.

Answer

Net Operating Income (NOI) Theory of Capital Structure
According to NOI approach, there is no relationship between the cost of capital and value of the firm i.e. the value of the firm is independent of the capital structure of the firm.

Assumptions
(a) The corporate income taxes do not exist.
(b) The market capitalizes the value of the firm as whole. Thus the split between debt and equity is not important.
(c) The increase in proportion of debt in capital structure leads to change in risk perception of the shareholders.
(d) The overall cost of capital ($K_o$) remains constant for all degrees of debt equity mix.

**Question 5**

*Explain the principles of “Trading on equity”.*

**Answer**

The term trading on equity means debts are contracted and loans are raised mainly on the basis of equity capital. Those who provide debt have a limited share in the firm’s earnings and hence want to be protected in terms of earnings and values represented by equity capital. Since fixed charges do not vary with firms earnings before interest and tax, a magnified effect is produced on earning per share. Whether the leverage is favourable, in the sense, increase in earnings per share more proportionately to the increased earnings before interest and tax, depends on the profitability of investment proposal. If the rate of returns on investment exceeds their explicit cost, financial leverage is said to be positive.

**Question 6**

*Discuss the concept of Debt-Equity or EBIT-EPS indifference point, while determining the capital structure of a company.*

**Answer**

The determination of optimum level of debt in the capital structure of a company is a formidable task and is a major policy decision. It ensures that the firm is able to service its debt as well as contain its interest cost. Determination of optimum level of debt involves equalizing between return and risk.

EBIT – EPS analysis is a widely used tool to determine level of debt in a firm. Through this analysis, a comparison can be drawn for various methods of financing by obtaining indifference point. It is a point to the EBIT level at which EPS remains unchanged irrespective of debt-equity mix. The indifference point for the capital mix (equity share capital and debt) can be determined as follows:

\[
\frac{(EBIT - I_1)(1 - T)}{E_1} = \frac{(EBIT - I_2)(1 - T)}{E_2}
\]
Question 7

Discuss financial break-even and EBIT-EPS indifference analysis.

Answer

Financial Break-even and EBIT-EPS Indifference Analysis

Financial break-even point is the minimum level of EBIT needed to satisfy all the fixed financial charges i.e. interest and preference dividend. It denotes the level of EBIT for which firm’s EPS equals zero. If the EBIT is less than the financial break even point, then the EPS will be negative but if the expected level of EBIT is more than the breakeven point, then more fixed costs financing instruments can be taken in the capital structure, otherwise, equity would be preferred.

EBIT-EPS analysis is a vital tool for designing the optimal capital structure of a firm. The objective of this analysis is to find the EBIT level that will equate EPS regardless of the financing plan chosen.

\[
\frac{(EBIT - I_1)(1-T)}{E_1} = \frac{(EBIT - I_2)(1-T)}{E_2}
\]

Where,

- EBIT = Indifference point
- \(E_1\) = Number of equity shares in Alternative 1
- \(E_2\) = Number of equity shares in Alternative 2
- \(I_1\) = Interest charges in Alternative 1
- \(I_2\) = Interest charges in Alternative 2
- \(T\) = Tax-rate

Question 8

Explain, briefly, Modigliani and Miller approach (without tax) on Cost of Capital.

Answer

This approach describes, in a perfect capital market where there is no transaction cost and no taxes, the value and cost of capital of a company remain unchanged irrespective of change in the capital structure. The approach is based on further additional assumptions like:

- Capital markets are perfect. All information is freely available and there are no transaction costs.
- All investors are rational.
- Firms can be grouped into ‘Equivalent risk classes’ on the basis of their business risk.
- Non-existence of corporate taxes.

Based on the above assumptions, Modigliani-Miller derived the following three propositions:
Financing Decisions

(i) Total market value of a firm is equal to its expected net operating income divided by the discount rate appropriate to its risk class decided by the market.

\[
\text{Value of levered firm } (V_g) = \text{Value of unlevered firm } (V_u) = \frac{\text{Net Operating Income (NOI)}}{K_d}
\]

(ii) A firm having debt in capital structure has higher cost of equity than an unlevered firm. The cost equity will be include risk premium for the financial risk. The cost of equity in a levered firm is determined as under:

\[
K_e = K_o + \frac{(K_o - K_d)}{\text{Equity}} \cdot \frac{\text{Debt}}{\text{Equity}}
\]

(iii) The structure of the capital (financial leverage) does not effect the overall cost of capital. The cost of capital is only affected by the business risk.

**Question 9**

Discuss the relationship between the financial leverage and firms required rate of return to equity shareholders as per Modigliani and Miller (with tax) Proposition II.

**Answer**

Relationship between the financial leverage and firm’s required rate of return to equity shareholders with corporate taxes is given by the following relation:

\[
\text{Cost of equity in a levered company } (K_{eq}) = K_{eu} + \frac{(K_{eu} - K_d)}{\text{Equity}} \cdot \frac{\text{Debt}(1-t)}{\text{Equity}}
\]

Where,

- \(K_{eq}\) = Cost of equity in a levered company
- \(K_{eu}\) = Cost of equity in an unlevered company
- \(K_d\) = Cost of debt
- \(t\) = Tax rate

**Question 10**

Discuss the major considerations in capital structure planning.

**Answer**

There are three major considerations, i.e. risk, cost of capital and control, which help the finance manager in determining the proportion in which he can raise funds from various sources.

**Risk**: The finance manager attempts to design the capital structure in such a manner, so that risk and cost are the least and the control of the existing management is diluted to the least extent. However, there are also secondary factors also like – marketability of the issue,
manoeuvrability and flexibility of the capital structure, timing of raising the funds. Risk is of two kinds, i.e., Financial risk and Business risk. Here, we are concerned primarily with the financial risk. Financial risk also is of two types:

- Risk of cash insolvency
- Risk of variation in the expected earnings available to equity share-holders

**Cost of Capital:** Cost is an important consideration in capital structure decisions. It is obvious that a business should be at least capable of earning enough revenue to meet its cost of capital and finance its growth. Hence, along with a risk as a factor, the finance manager has to consider the cost aspect carefully while determining the capital structure.

**Control:** Along with cost and risk factors, the control aspect is also an important consideration in planning the capital structure. When a company issues further equity shares, it automatically dilutes the controlling interest of the present owners. Similarly, preference shareholders can have voting rights, in case dividends on such shares are not paid for consecutive years. Financial institutions normally stipulate that they shall have one or more directors on the Boards. Hence, when the management agrees to raise loans from financial institutions, by implication it agrees to forego a part of its control over the company. It is obvious, therefore, that decisions concerning capital structure are taken after keeping the control factor in mind.

**Question 11**

*List the fundamental principles governing capital structure.*

**Answer**

**Fundamental Principles Governing Capital Structure**

The fundamental principles are:

(i) **Cost Principle:** According to this principle, an ideal pattern or capital structure is one that minimises cost of capital structure and maximises earnings per share (EPS).

(ii) **Risk Principle:** According to this principle, reliance is placed more on common equity for financing capital requirements than excessive use of debt. Use of more and more debt means higher commitment in form of interest payout. This would lead to erosion of shareholders value in unfavourable business situation.

(iii) **Control Principle:** While designing a capital structure, the finance manager may also keep in mind that existing management control and ownership remains undisturbed.

(iv) **Flexibility Principle:** It means that the management chooses such a combination of sources of financing which it finds easier to adjust according to changes in need of funds in future too.

(v) **Other Considerations:** Besides above principles, other factors such as nature of industry, timing of issue and competition in the industry should also be considered.
Question 12

*What is Over-capitalisation? State its causes and consequences.*

**Answer**

Over-capitalization and its Causes and Consequences

It is a situation where a firm has more capital than it needs or in other words assets are worth less than its issued share capital, and earnings are insufficient to pay dividend and interest.

Causes of Over Capitalization

Over-capitalisation arises due to following reasons:

(i) Raising more money through issue of shares or debentures than company can employ profitably.

(ii) Borrowing huge amount at higher rate than rate at which company can earn.

(iii) Excessive payment for the acquisition of fictitious assets such as goodwill etc.

(iv) Improper provision for depreciation, replacement of assets and distribution of dividends at a higher rate.

(v) Wrong estimation of earnings and capitalization.

Consequences of Over-Capitalisation

Over-capitalisation results in the following consequences:

(i) Considerable reduction in the rate of dividend and interest payments.

(ii) Reduction in the market price of shares.

(iii) Resorting to “window dressing”.

(iv) Some companies may opt for reorganization. However, sometimes the matter gets worse and the company may go into liquidation.

**SECTION-B**

Question 1

*Calculate the level of earnings before interest and tax (EBIT) at which the EPS indifference point between the following financing alternatives will occur.*

(i) Equity share capital of ₹ 6,00,000 and 12% debentures of ₹ 4,00,000.

Or

(ii) Equity share capital of ₹ 4,00,000, 14% preference share capital of ₹ 2,00,000 and 12% debentures of ₹ 4,00,000.
Assume the corporate tax rate is 35% and par value of equity share is ₹10 in each case.

Answer

Computation of level of earnings before interest and tax (EBIT)

In case alternative (i) is accepted, then the EPS of the firm would be:

\[
\text{EPS Alternative (i)} = \frac{(\text{EBIT} - \text{Interest})(1 - \text{tax rate})}{\text{No. of equity shares}}
\]

\[
= \frac{(\text{EBIT} - 0.12 \times ₹4,00,000)(1 - 0.35)}{60,000\text{ shares}}
\]

In case the alternative (ii) is accepted, then the EPS of the firm would be

\[
\text{EPS Alternative (ii)} = \frac{(\text{EBIT} - 0.12 \times ₹4,00,000)(1 - 0.35) - (0.14 \times ₹2,00,000)}{40,000\text{ shares}}
\]

In order to determine the indifference level of EBIT, the EPS under the two alternative plans should be equated as follows:

\[
\frac{(\text{EBIT} - 0.12 \times ₹4,00,000)(1 - 0.35)}{60,000\text{ shares}} = \frac{(\text{EBIT} - 0.12 \times ₹4,00,000)(1 - 0.35) - (0.14 \times ₹2,00,000)}{40,000\text{ shares}}
\]

Or

\[
\frac{0.65 \text{ EBIT} - ₹31,200}{3} = \frac{0.65 \text{ EBIT} - ₹59,200}{2}
\]

Or

\[
1.30 \text{ EBIT} - ₹62,400 = 1.95 \text{ EBIT} - ₹1,77,600
\]

Or

\[
(1.95 - 1.30) \text{ EBIT} = ₹1,77,600 - ₹62,400 = ₹1,15,200
\]

Or

\[
\text{EBIT} = \frac{₹1,15,200}{0.65}
\]

Or

\[
\text{EBIT} = ₹1,77,231
\]

Question 2

A new project is under consideration in Zip Ltd., which requires a capital investment of ₹4.50 crores. Interest on term loan is 12% and Corporate Tax rate is 50%. If the Debt Equity ratio insisted by the financing agencies is 2 : 1, calculate the point of indifference for the project.

Answer

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

(i) By issuing equity shares only worth ₹4.5 crores or
(ii) By raising capital through taking a term loan of ₹ 3 crores and ₹ 1.50 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 ₹ 36,00,000

Point of Indifference between the above two alternatives =

\[ \frac{\text{EBIT} \times (1 - t)}{\text{No. of equity shares (N)}_1} = \frac{(\text{EBIT} - \text{Interest}) \times (1 - t)}{\text{No. of equity shares (N)}_2} \]

Or,

\[ \frac{\text{EBIT}(1 - 0.50)}{45,00,000 \text{ shares}} = \frac{(\text{EBIT} - ₹ 36,00,000) \times (1 - 0.50)}{15,00,000 \text{ shares}} \]

Or, 0.5 EBIT = 1.5 EBIT – ₹ 54,00,000

EBIT = ₹ 54,00,000

EBIT at point of Indifference will be ₹ 54 Lakhs.

(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 3**

There are two firms P and Q which are identical except P does not use any debt in its capital structure while Q has ₹ 8,00,000, 9% debentures in its capital structure. Both the firms have earnings before interest and tax of ₹ 2,60,000 p.a. and the capitalization rate is 10%. Assuming the corporate tax of 30%, calculate the value of these firms according to MM Hypothesis.

**Answer**

**Calculation of Value of Firms P and Q according to MM Hypothesis**

Market Value of Firm P (Unlevered)

\[ V_u = \frac{\text{EBIT} \times (1 - t)}{K_e} = \frac{2,60,000 \times (1 - 0.30)}{10 \%} = \frac{1,82,000}{10 \%} = ₹ 18,20,000 \]

Market Value of Firm Q (Levered)

\[ V_l = V_u + TB \]

\[ = ₹ 18,20,000 + (₹ 8,00,000 \times 0.30) = ₹ 18,20,000 + ₹ 2,40,000 = ₹ 20,60,000 \]
4.43 Financial Management

Question 4

X Ltd. is considering the following two alternative financing plans:

<table>
<thead>
<tr>
<th></th>
<th>Plan – I (₹)</th>
<th>Plan – II (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity shares of ₹ 10 each</td>
<td>4,00,000</td>
<td>4,00,000</td>
</tr>
<tr>
<td>12% Debentures</td>
<td>2,00,000</td>
<td></td>
</tr>
<tr>
<td>Preference Shares of ₹ 100 each</td>
<td>-</td>
<td>2,00,000</td>
</tr>
<tr>
<td></td>
<td>6,00,000</td>
<td>6,00,000</td>
</tr>
</tbody>
</table>

The indifference point between the plans is ₹ 2,40,000. Corporate tax rate is 30%. Calculate the rate of dividend on preference shares.

Answer

Computation of Rate of Preference Dividend

\[
\frac{(\text{EBIT} - \text{Interest}) \times (1-t)}{\text{No. of Equity Shares (N)}} = \frac{\text{EBIT (1- t)} - \text{Preference Dividend}}{\text{No. of Equity Shares (N2)}}
\]

\[
\frac{(₹2,40,000 - ₹24,000)(1 - 0.30)}{40,000 \text{ shares}} = \frac{₹2,40,000 (1 - 0.30) - \text{Preference Dividend}}{40,000 \text{ shares}}
\]

\[
\frac{₹2,16,000 (1 - 0.30)}{40,000 \text{ shares}} = \frac{₹1,68,000 - \text{Preference Dividend}}{40,000 \text{ shares}}
\]

₹ 1,51,200 = ₹ 1,68,000 – Preference Dividend

Preference Dividend = ₹ 1,68,000 – ₹ 1,51,200 = ₹ 16,800

Rate of Dividend = \( \frac{\text{Preference Dividend}}{\text{Preference share capital}} \times 100 = \frac{₹16,800}{₹2,00,000} \times 100 = 8.4\% \)

Question 5

Z Ltd.'s operating income (before interest and tax) is ₹ 9,00,000. The firm's cost of debt is 10 per cent and currently firm employs ₹ 30,00,000 of debt. The overall cost of capital of firm is 12 per cent.

Required: Calculate cost of equity.

Answer

Value of a firm (V) = \( \frac{\text{EBIT}}{\text{Overall cost of capital}(K_i)} \) or, \( \frac{₹9,00,000}{0.12} = ₹75,00,000 \)
Market value of equity (S) = Value of the firm (V) – Value of Debts (D)
= ₹75,00,000 – ₹30,00,000 = ₹45,00,000

Calculation of Cost of Equity

Overall Cost of Capital (K₀) = \( K_e \left( \frac{S}{V} \right) + K_d \left( \frac{D}{V} \right) \)

Or, \( K_0 \times V = (K_e \times S) + (K_d \times D) \)  Or,  \( K_e = \frac{(K_e \times V) - (K_d \times D)}{S} \)

Or,  \( \frac{(0.12 \times ₹75,00,000) - (0.10 \times ₹30,00,000)}{₹45,00,000} = \frac{₹9,00,000 - ₹3,00,000}{₹45,00,000} = 0.1333 \) or 13.33%

Question 6

RES Ltd. is an all equity financed company with a market value of ₹25,00,000 and cost of equity (Kₑ) 21%. The company wants to buyback equity shares worth ₹5,00,000 by issuing and raising 15% perpetual debt of the same amount. Rate of tax may be taken as 30%. After the capital restructuring and applying MM Model (with taxes), you are required to calculate:

(i) Market value of RES Ltd.
(ii) Cost of Equity (Kₑ)
(iii) Weighted average cost of capital (using market weights) and comment on it.

Answer

Value of a company (V) = Value of equity (S) + Value of debt (D)

₹ 25,00,000 = \( \frac{\text{Net Income (NI)}}{K_e} \) + ₹ 5,00,000

Or, Net Income (NI) = 0.21 (₹25,00,000 – ₹5,00,000)

Market Value of Equity = 25,00,000

Kₑ = 21%

\( \frac{\text{Net income (NI) for equity holders}}{K_e} = \text{Market Value of Equity} \)

\( \frac{\text{Net income (NI) for equity holders}}{0.21} = 25,00,000 \)

Net income for equity holders = 5,25,000

EBIT= 5,25,000/0.7 = 7,50,000
4.45 Financial Management

<table>
<thead>
<tr>
<th></th>
<th>All Equity</th>
<th>Debt and Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBIT</td>
<td>7,50,000</td>
<td>7,50,000</td>
</tr>
<tr>
<td>Interest to debt-holders</td>
<td>-</td>
<td>75,000</td>
</tr>
<tr>
<td>EBT</td>
<td>7,50,000</td>
<td>6,75,000</td>
</tr>
<tr>
<td>Taxes (30%)</td>
<td>2,25,000</td>
<td>2,02,500</td>
</tr>
<tr>
<td>Income available to equity shareholders</td>
<td>5,25,000</td>
<td>4,72,500</td>
</tr>
<tr>
<td>Income to debt holders plus income available to shareholders</td>
<td>5,25,000</td>
<td>5,47,500</td>
</tr>
</tbody>
</table>

Present value of tax-shield benefits = ₹ 5,00,000 × 0.30 = ₹ 1,50,000

(i) Value of Restructured firm

\[ \text{Value of Restructured firm} = ₹25,00,000 + ₹1,50,000 = ₹26,50,000 \]

(ii) Cost of Equity \((K_e)\)

\[ K_e = \frac{\text{Income to debt holders plus income available to shareholders}}{\text{Value of Equity}} = \frac{5,25,000}{21,50,000} = 0.219 = 21.98\% \]

(iii) WACC (on market value weight)

Cost of Debt (after tax) = 15% \((1 - 0.3) = 0.15 \times 0.70 = 0.105 = 10.5\% \]

<table>
<thead>
<tr>
<th>Components of Costs</th>
<th>Amount</th>
<th>Cost of Capital (%)</th>
<th>Weight</th>
<th>WACC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity</td>
<td>21,50,000</td>
<td>21.98</td>
<td>0.81</td>
<td>17.80</td>
</tr>
<tr>
<td>Debt</td>
<td>5,00,000</td>
<td>10.50</td>
<td>0.19</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>26,50,000</td>
<td></td>
<td></td>
<td>19.80</td>
</tr>
</tbody>
</table>

Comment: At present the company is all equity financed. So, \(K_o = K_e\) i.e. 21%. However after restructuring, the \(K_o\) would be reduced to 19.80% and \(K_e\) would increase from 21% to 21.98%.

Question 7

*D Ltd. is foreseeing a growth rate of 12% per annum in the next two years. The growth rate is likely to be 10% for the third and fourth year. After that the growth rate is expected to stabilise at 8% per annum. If the last dividend was ₹1.50 per share and the investor’s required rate of return is 16%, determine the current value of equity share of the company.*

The P.V. factors at 16%
Financing Decisions

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.V. Factor</td>
<td>0.862</td>
<td>0.743</td>
<td>0.641</td>
<td>0.552</td>
</tr>
</tbody>
</table>

Answer

The current value of equity share of D Ltd. is sum of the following:

(i) Presently value (PV) of dividends payments during 1 - 4 years; and

(ii) Present value (PV) of expected market price at the end of the fourth year based on constant growth rate of 8 per cent.

Present value of dividends for the year 1- 4

<table>
<thead>
<tr>
<th>Year</th>
<th>Dividend (₹)</th>
<th>PV factor at 16%</th>
<th>PV (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.50 ((1 + 0.12) = 1.68)</td>
<td>0.862</td>
<td>1.45</td>
</tr>
<tr>
<td>2</td>
<td>1.68 ((1 + 0.12) = 1.88)</td>
<td>0.743</td>
<td>1.40</td>
</tr>
<tr>
<td>3</td>
<td>1.88 ((1 + 0.10) = 2.07)</td>
<td>0.641</td>
<td>1.33</td>
</tr>
<tr>
<td>4</td>
<td>2.07 ((1 + 0.10) = 2.28)</td>
<td>0.552</td>
<td>1.26</td>
</tr>
</tbody>
</table>

Total | 5.44 |

Present value of the market price \((MP_4)\): end of the fourth year:

\[
MP_4 = \frac{D(1+g)}{K_e - g} = \frac{2.28(1+0.08)}{0.16 - 0.08} = \frac{2.46}{0.08} = 30.75
\]

PV of $30.75 = $30.75 \times 0.552 = $16.97

Hence, Value of equity shares = $5.44 + $16.97 = $22.41

Question 8

A Company earns a profit of $3,00,000 per annum after meeting its Interest liability of $1,20,000 on 12% debentures. The Tax rate is 50%. The number of Equity Shares of $10 each are 80,000 and the retained earnings amount to $12,00,000. The company proposes to take up an expansion scheme for which a sum of $4,00,000 is required. It is anticipated that after expansion, the company will be able to achieve the same return on investment as at present. The funds required for expansion can be raised either through debt at the rate of 12% or by issuing Equity Shares at par.

Required:

(i) Compute the Earnings per Share (EPS), if:
   - The additional funds were raised as debt
   - The additional funds were raised by issue of equity shares.
(ii) Advise the company as to which source of finance is preferable.

Answer

Working Notes:

1. Capital employed before expansion plan:

<table>
<thead>
<tr>
<th></th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity shares (₹10 x 80,000 shares)</td>
<td>8,00,000</td>
</tr>
<tr>
<td>Debentures ((₹ 1,20,000/12) x 100)</td>
<td>10,00,000</td>
</tr>
<tr>
<td>Retained earnings</td>
<td>12,00,000</td>
</tr>
<tr>
<td>Total capital employed</td>
<td>30,00,000</td>
</tr>
</tbody>
</table>

2. Earnings before the payment of interest and tax (EBIT):

<table>
<thead>
<tr>
<th></th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit (EBT)</td>
<td>3,00,000</td>
</tr>
<tr>
<td>Interest</td>
<td>1,20,000</td>
</tr>
<tr>
<td>EBIT</td>
<td>4,20,000</td>
</tr>
</tbody>
</table>

3. Return on Capital Employed (ROCE):

\[
ROCE = \frac{EBIT}{\text{Capital employed}} \times 100 = \frac{₹4,20,000}{₹30,00,000} \times 100 = 14\%
\]

4. Earnings before interest and tax (EBIT) after expansion scheme:

After expansion, capital employed = ₹ 30,00,000 + ₹4,00,000 = ₹ 34,00,000

Desired EBIT = 14% x ₹34,00,000 = ₹4,76,000

(i) Computation of Earnings Per Share (EPS) under the following options:

<table>
<thead>
<tr>
<th></th>
<th>Present situation</th>
<th>Expansion scheme Additional funds raised as</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>₹</td>
<td>₹</td>
</tr>
<tr>
<td>Earnings before Interest and Tax (EBIT)</td>
<td>4,20,000</td>
<td>4,76,000</td>
</tr>
<tr>
<td>Less: Interest - Old capital</td>
<td>1,20,000</td>
<td>1,20,000</td>
</tr>
<tr>
<td>- New capital</td>
<td>--</td>
<td>48,000</td>
</tr>
<tr>
<td>(₹4,00,000 x 12%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earnings before Tax (EBT)</td>
<td>3,00,000</td>
<td>3,08,000</td>
</tr>
</tbody>
</table>
(ii) **Advise to the Company:** When the expansion scheme is financed by additional debt, the EPS is higher. Hence, the company should finance the expansion scheme by raising debt.

**Question 9**

A Ltd. and B Ltd. are identical in every respect except capital structure. A Ltd. does not employ debts in its capital structure whereas B Ltd. employs 12% Debentures amounting to ₹ 10 lakhs.

Assuming that:

(i) All assumptions of M-M model are met;
(ii) Income-tax rate is 30%;
(iii) EBIT is ₹ 2,50,000 and
(iv) The Equity capitalization rate of ‘A’ Ltd. is 20%.

Calculate the value of both the companies and also find out the Weighted Average Cost of Capital for both the companies.

**Answer**

(i) **Calculation of Value of Firms ‘A Ltd.’ and ‘B Ltd’ according to MM Hypothesis**

**Market Value of ‘A Ltd.’ (Unlevered)**

\[ V_u = \frac{EBIT (1 - t)}{K_e} = \frac{2,50,000 (1 - 0.30)}{20\%} = \frac{1,75,000}{20\%} = \text{₹} 8,75,000 \]

**Market Value of ‘B Ltd.’ (Levered)**

\[ V_l = V_u + TB = \text{₹} 8,75,000 + (\text{₹} 10,00,000 \times 0.30) = \text{₹} 8,75,000 + \text{₹} 3,00,000 = \text{₹} 11,75,000 \]

(ii) **Computation of Weighted Average Cost of Capital (WACC)**

WACC of ‘A Ltd.’ = 20% (i.e. \( K_e = K_o \))
WACC of ‘B Ltd.’

<table>
<thead>
<tr>
<th>component of capital</th>
<th>amount</th>
<th>weight</th>
<th>cost of capital</th>
<th>WACC</th>
</tr>
</thead>
<tbody>
<tr>
<td>equity</td>
<td>1,75,000</td>
<td>0.149</td>
<td>0.52</td>
<td>0.0775</td>
</tr>
<tr>
<td>debt</td>
<td>10,00,000</td>
<td>0.851</td>
<td>0.084*</td>
<td>0.0715</td>
</tr>
<tr>
<td>total</td>
<td>11,75,000</td>
<td></td>
<td></td>
<td>0.1490</td>
</tr>
</tbody>
</table>

*Kd = 12% (1- 0.3) = 12% × 0.7 = 8.4%

WACC = 14.90%

Question 10

The management of Z Company Ltd. wants to raise its funds from market to meet out the financial demands of its long-term projects. The company has various combinations of proposals to raise its funds. You are given the following proposals of the company:

<table>
<thead>
<tr>
<th>proposal</th>
<th>equity shares (%)</th>
<th>debts (%)</th>
<th>preference shares (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>100</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Q</td>
<td>50</td>
<td>50</td>
<td>-</td>
</tr>
<tr>
<td>R</td>
<td>50</td>
<td>-</td>
<td>50</td>
</tr>
</tbody>
</table>

(i) Cost of debt and preference shares is 10% each.
(ii) Tax rate – 50%
(iii) Equity shares of the face value of ₹ 10 each will be issued at a premium of ₹ 10 per share.
(iv) Total investment to be raised ₹ 40,00,000.
(v) Expected earnings before interest and tax ₹ 18,00,000.
From the above proposals the management wants to take advice from you for appropriate plan after computing the following:

- Earnings per share
- Financial break-even-point
- Compute the EBIT range among the plans for indifference. Also indicate if any of the plans dominate.

Answer

(i) Computation of Earnings per Share (EPS)

<table>
<thead>
<tr>
<th>Plans</th>
<th>P (₹)</th>
<th>Q (₹)</th>
<th>R (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings before interest &amp; tax (EBIT)</td>
<td>18,00,000</td>
<td>18,00,000</td>
<td>18,00,000</td>
</tr>
<tr>
<td>Less: Interest charges</td>
<td>--</td>
<td>(2,00,000)</td>
<td>--</td>
</tr>
<tr>
<td>Earnings before tax (EBT)</td>
<td>18,00,000</td>
<td>16,00,000</td>
<td>18,00,000</td>
</tr>
<tr>
<td>Less : Tax @ 50%</td>
<td>(9,00,000)</td>
<td>(8,00,000)</td>
<td>(9,00,000)</td>
</tr>
<tr>
<td>Earnings after tax (EAT)</td>
<td>9,00,000</td>
<td>8,00,000</td>
<td>9,00,000</td>
</tr>
<tr>
<td>Less : Preference share dividend</td>
<td>--</td>
<td>--</td>
<td>(2,00,000)</td>
</tr>
<tr>
<td>Earnings available for equity shareholders</td>
<td>9,00,000</td>
<td>8,00,000</td>
<td>7,00,000</td>
</tr>
<tr>
<td>No. of equity shares</td>
<td>2,00,000</td>
<td>1,00,000</td>
<td>1,00,000</td>
</tr>
<tr>
<td>E.P.S</td>
<td>4.5</td>
<td>8</td>
<td>7</td>
</tr>
</tbody>
</table>

(ii) Computation of Financial Break-even Points

Proposal ‘P’ = 0
Proposal ‘Q’ = ₹ 2,00,000 (Interest charges)
Proposal ‘R’ = Earnings required for payment of preference share dividend i.e. ₹ 2,00,000 \div 0.5 (Tax Rate) = ₹ 4,00,000

(iii) Computation of Indifference Point between the Proposals

Combination of Proposals

(a) Indifference point where EBIT of proposal “P” and proposal ‘Q’ is equal

\[
\frac{\text{EBIT}(1-0.5)}{2,00,000 \text{ shares}} = \frac{(\text{EBIT} - ₹2,00,000)(1-0.5)}{1,00,000 \text{ shares}}
\]

\[
0.5 \text{ EBIT} = \text{EBIT} - ₹2,00,000
\]

\[
\text{EBIT} = ₹4,00,000
\]
(b) Indifference point where EBIT of proposal ‘P’ and proposal ‘R’ is equal:

\[
\frac{\text{EBIT}(1-0.50)}{2,00,000 \text{ shares}} = \frac{\text{EBIT}(1-0.50) - 2,00,000}{1,00,000 \text{ shares}}
\]

\[
\frac{0.5 \text{ EBIT}}{2,00,000 \text{ shares}} = \frac{0.5 \text{ EBIT} - 2,00,000}{1,00,000 \text{ shares}}
\]

\[
0.25 \text{ EBIT} = 0.5 \text{ EBIT} - 2,00,000
\]

\[
\text{EBIT} = \frac{2,00,000}{0.25} = 8,00,000
\]

(c) Indifference point where EBIT of proposal ‘Q’ and proposal ‘R’ are equal

\[
\frac{(\text{EBIT} - 2,00,000)(1-0.5)}{1,00,000 \text{ shares}} = \frac{\text{EBIT}(1-0.5) - 2,00,000}{1,00,000 \text{ shares}}
\]

\[
0.5 \text{ EBIT} - 1,00,000 = 0.5 \text{ EBIT} - 2,00,000
\]

There is no indifference point between proposal ‘Q’ and proposal ‘R’

Analysis: It can be seen that financial proposal ‘Q’ dominates proposal ‘R’, since the financial break-even-point of the former is only ₹ 2,00,000 but in case of latter, it is ₹ 4,00,000.

Question 11

A Company needs ₹ 31,25,000 for the construction of a new plant. The following three plans are feasible:

I. The Company may issue 3,12,500 equity shares at ₹ 10 per share.

II. The Company may issue 1,56,250 equity shares at ₹ 10 per share and 15,625 debentures of ₹ 100 denomination bearing an 8% rate of interest.

III. The Company may issue 1,56,250 equity shares at ₹ 10 per share and 15,625 cumulative preference shares at ₹ 100 per share bearing an 8% rate of dividend.

(i) if the Company’s earnings before interest and taxes are ₹ 62,500, ₹ 1,25,000, ₹ 2,50,000, ₹ 3,75,000 and ₹ 6,25,000, what are the earnings per share under each of three financial plans? Assume a Corporate Income tax rate of 40%.

(ii) Which alternative would you recommend and why?

(iii) Determine the EBIT-EPS indifference points by formulae between Financing Plan I and Plan II and Plan I and Plan III.
Answer

(i) Computation of EPS under three-financial plans.

**Plan I: Equity Financing**

<table>
<thead>
<tr>
<th></th>
<th>₹</th>
<th>₹</th>
<th>₹</th>
<th>₹</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBIT</td>
<td>62,500</td>
<td>1,25,000</td>
<td>2,50,000</td>
<td>3,75,000</td>
<td>6,25,000</td>
</tr>
<tr>
<td>Interest</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>EBT</td>
<td>62,500</td>
<td>1,25,000</td>
<td>2,50,000</td>
<td>3,75,000</td>
<td>6,25,000</td>
</tr>
<tr>
<td>Less: Tax @ 40%</td>
<td>25,000</td>
<td>50,000</td>
<td>1,00,000</td>
<td>1,50,000</td>
<td>2,50,000</td>
</tr>
<tr>
<td>PAT</td>
<td>37,500</td>
<td>75,000</td>
<td>1,50,000</td>
<td>2,25,000</td>
<td>3,75,000</td>
</tr>
<tr>
<td>No. of equity shares</td>
<td>3,12,500</td>
<td>3,12,500</td>
<td>3,12,500</td>
<td>3,12,500</td>
<td>3,12,500</td>
</tr>
<tr>
<td>EPS</td>
<td>0.12</td>
<td>0.24</td>
<td>0.48</td>
<td>0.72</td>
<td>1.20</td>
</tr>
</tbody>
</table>

**Plan II: Debt – Equity Mix**

<table>
<thead>
<tr>
<th></th>
<th>₹</th>
<th>₹</th>
<th>₹</th>
<th>₹</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBIT</td>
<td>62,500</td>
<td>1,25,000</td>
<td>2,50,000</td>
<td>3,75,000</td>
<td>6,25,000</td>
</tr>
<tr>
<td>Less: Interest</td>
<td>1,25,000</td>
<td>1,25,000</td>
<td>1,25,000</td>
<td>1,25,000</td>
<td>1,25,000</td>
</tr>
<tr>
<td>EBT</td>
<td>(62,500)</td>
<td>0</td>
<td>1,25,000</td>
<td>2,50,000</td>
<td>5,00,000</td>
</tr>
<tr>
<td>Less: Tax @ 40%</td>
<td>25,000*</td>
<td>0</td>
<td>50,000</td>
<td>1,00,000</td>
<td>2,00,000</td>
</tr>
<tr>
<td>PAT</td>
<td>(37,500)</td>
<td>0</td>
<td>75,000</td>
<td>1,50,000</td>
<td>3,00,000</td>
</tr>
<tr>
<td>No. of equity shares</td>
<td>1,56,250</td>
<td>1,56,250</td>
<td>1,56,250</td>
<td>1,56,250</td>
<td>1,56,250</td>
</tr>
<tr>
<td>EPS</td>
<td>(0.24)</td>
<td>0</td>
<td>0.48</td>
<td>0.96</td>
<td>1.92</td>
</tr>
</tbody>
</table>

* The Company can set off losses against the overall business profit or may carry forward it to next financial years.

**Plan III: Preference Shares – Equity Mix**

<table>
<thead>
<tr>
<th></th>
<th>₹</th>
<th>₹</th>
<th>₹</th>
<th>₹</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBIT</td>
<td>62,500</td>
<td>1,25,000</td>
<td>2,50,000</td>
<td>3,75,000</td>
<td>6,25,000</td>
</tr>
<tr>
<td>Less: Interest</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>EBT</td>
<td>62,500</td>
<td>1,25,000</td>
<td>2,50,000</td>
<td>3,75,000</td>
<td>6,25,000</td>
</tr>
<tr>
<td>Less: Tax @ 40%</td>
<td>25,000</td>
<td>50,000</td>
<td>1,00,000</td>
<td>1,50,000</td>
<td>2,50,000</td>
</tr>
<tr>
<td>PAT</td>
<td>37,500</td>
<td>75,000</td>
<td>1,50,000</td>
<td>2,25,000</td>
<td>3,75,000</td>
</tr>
<tr>
<td>Less: Pref. dividend</td>
<td>1,25,000*</td>
<td>1,25,000*</td>
<td>1,25,000</td>
<td>1,25,000</td>
<td>1,25,000</td>
</tr>
<tr>
<td>PAT after Pref. dividend.</td>
<td>(87,500)</td>
<td>(50,000)</td>
<td>25,000</td>
<td>1,00,000</td>
<td>2,50,000</td>
</tr>
<tr>
<td>No. of Equity shares</td>
<td>1,56,250</td>
<td>1,56,250</td>
<td>1,56,250</td>
<td>1,56,250</td>
<td>1,56,250</td>
</tr>
<tr>
<td>EPS</td>
<td>(0.56)</td>
<td>(0.32)</td>
<td>0.16</td>
<td>0.64</td>
<td>1.60</td>
</tr>
</tbody>
</table>

* In case of cumulative preference shares, the company has to pay cumulative dividend to preference shareholders, when company earns sufficient profits.
(iii) From the above EPS computations tables under the three financial plans we can see that when EBIT is ₹ 2,50,000 or more, Plan II: Debt-Equity mix is preferable over the Plan I and Plan III, as rate of EPS is more under this plan. On the other hand an EBIT of less than ₹2,50,000, Plan I: Equity Financing has higher EPS than Plan II and Plan III. Plan III Preference share-Equity mix is not acceptable at any level of EBIT, as EPS under this plan is lower.

The choice of the financing plan will depend on the performance of the company and other macro economic conditions. If the company is expected to have higher operating profit Plan II: Debt – Equity Mix is preferable. Moreover, debt financing gives more benefit due to availability of tax shield.

(iii) **EBIT – EPS Indifference point : Plan I and Plan II**

\[
\frac{\text{EBIT}_1 \times (1- t)}{3,12,500 \text{ shares}} = \frac{(\text{EBIT}_2 - \text{Interest}) \times (1- t)}{1,56,250 \text{ shares}}
\]

\[
\text{EBIT}_1 (1- 0.40) = (\text{EBIT}_2 - ₹1,25,000) (1- 0.40)
\]

\[
0.6 \text{ EBIT} = 1.2 \text{ EBIT} - ₹1,50,000
\]

\[
\text{EBIT} = \frac{₹1,50,000}{0.6} = ₹ 2,50,000
\]

Indifference points between Plan I and Plan II is ₹ 2,50,000

**EBIT – EPS Indifference Point: Plan I and Plan III**

\[
\frac{\text{EBIT}_1 \times (1- t)}{3,12,500 \text{ shares}} = \frac{\text{EBIT}_3 \times (1- t) - \text{Pref. dividend}}{1,56,250 \text{ shares}}
\]

\[
\text{EBIT}_1 (1- 0.40) = \text{EBIT}_3 (1- 0.40) - ₹1,25,000
\]

\[
0.6 \text{ EBIT} = 1.2 \text{ EBIT} - ₹ 2,50,000
\]

\[
\text{EBIT} = \frac{₹2,50,000}{0.6} = ₹ 4,16,667
\]

Indifference points between Plan I and Plan III is ₹ 4,16,667.
UNIT – III : BUSINESS RISK AND FINANCIAL RISK

SECTION-A

Question 1

_Differentiate between Business risk and Financial risk._

**Answer**

**Business Risk and Financial Risk:** Business risk refers to the risk associated with the firm’s operations. It is an unavoidable risk because of the environment in which the firm has to operate and the business risk is represented by the variability of earnings before interest and tax (EBIT). The variability in turn is influenced by revenues and expenses. Revenues and expenses are affected by demand of firm’s products, variations in prices and proportion of fixed cost in total cost. Whereas, Financial risk refers to the additional risk placed on firm’s shareholders as a result of debt use in financing. Companies that issue more debt instruments would have higher financial risk than companies financed mostly by equity. Financial risk can be measured by ratios such as firm’s financial leverage multiplier, total debt to assets ratio etc.

Question 2

_“Operating risk is associated with cost structure whereas financial risk is associated with capital structure of a business concern.”_ Critically examine this statement.

**Answer**

_“Operating risk is associated with cost structure whereas financial risk is associated with capital structure of a business concern.”_

Operating risk refers to the risk associated with the firm’s operations. It is represented by the variability of earnings before interest and tax (EBIT). The variability in turn is influenced by revenues and expenses, which are affected by demand of firm’s products, variations in prices and proportion of fixed cost in total cost. If there is no fixed cost, there would be no operating risk. Whereas financial risk refers to the additional risk placed on firm’s shareholders as a result of debt and preference shares used in the capital structure of the concern. Companies that issue more debt instruments would have higher financial risk than companies financed mostly by equity.

Question 3

_Explain the concept of leveraged lease._

**Answer**

**Concept of Leveraged Lease:** Leveraged lease involves lessor, lessee and financier. In leveraged lease, the lessor makes a substantial borrowing, even upto 80 per cent of the assets
purchase price. He provides remaining amount – about 20 per cent or so – as equity to become the owner. The lessor claims all tax benefits related to the ownership of the assets. Lenders, generally large financial institutions, provide loans on a non-recourse basis to the lessor. Their debt is served exclusively out of the lease proceeds. To secure the loan provided by the lenders, the lessor also agrees to give them a mortgage on the asset. Leveraged lease are called so because the high non-recourse debt creates a high degree of leverage.

**Question 4**

Discuss the impact of financial leverage on shareholders wealth by using return-on-assets (ROA) and return-on-equity (ROE) analytic framework.

**Answer**

The impact of financial leverage on ROE is positive, if cost of debt (after-tax) is less than ROA. But it is a double-edged sword.

\[
\text{ROA} = \frac{\text{NOPAT}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Capital employed}}
\]

\[
\text{ROE} = \text{ROA} + \frac{\text{D}}{\text{E}} (\text{ROA} - \text{Kd})
\]

Where,

- NOPAT i.e. Net Operating profit after tax = EBIT * (1 – Tc)
- Capital employed = Shareholders funds + Loan funds
- D = Debt amount in capital structure
- E = Equity capital amount in capital structure
- Kd = Interest rate * (1 – Tc) in case of fresh loans of a company.
- Kd = Yield to maturity *(1–Tc) in case of existing loans of a company.

**SECTION-B**

**Question 1**

Consider the following information for Omega Ltd.:

<table>
<thead>
<tr>
<th>Earnings before Interest and Tax</th>
<th>EBIT (Earnings before Interest and Tax)</th>
<th>15,750</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings before Tax (EBT):</td>
<td></td>
<td>7,000</td>
</tr>
<tr>
<td>Fixed Operating costs:</td>
<td></td>
<td>1,575</td>
</tr>
</tbody>
</table>
Required:

Calculate percentage change in earnings per share, if sales increase by 5%.

Answer

Operating Leverage (OL)

\[
\text{OL} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{\text{EBIT} + \text{Fixed Cost}}{\text{EBIT}} = \frac{\text{\₹ 15,750 + \₹ 1,575 \text{ EBIT}}}{\text{15,750 \text{ EBIT}}} = 1.1
\]

Financial Leverage (FL)

\[
\text{FL} = \frac{\text{EBIT}}{\text{EBT}} = \frac{15,750}{7,000} = 2.25
\]

Combined Leverage (CL)

\[
\text{CL} = \text{OL} \times \text{FL} = 1.1 \times 2.25 = 2.475
\]

Percentage Change in Earnings per share

\[
\text{DCL} = \frac{\% \text{ change in EPS}}{\% \text{ change in Sales}} = \frac{\% \text{ change in EPS}}{5\%} = 2.475
\]

\[
\therefore \% \text{ change in EPS} = 12.375\%.
\]

Hence if sales is increased by 5%, EPS will be increased by 12.375%.

Question 2

A company operates at a production level of 5,000 units. The contribution is ₹ 60 per unit, operating leverage is 6, combined leverage is 24. If tax rate is 30%, what would be its earnings after tax?

Answer

Computation of Earnings after tax (EAT) or Profit after tax (PAT)

Total contribution = 5,000 units x ₹ 60/unit = ₹ 3,00,000

Operating leverage (OL) x Financial leverage (FL) = Combined leverage (CL)

\[
6 \times \text{FL} = 24 \therefore \text{FL} = 4
\]
4.57 Financial Management

\[ \text{OL} = \frac{\text{Contribution}}{\text{EBIT}} \quad \therefore 6 = \frac{\text{₹} 3,00,000}{\text{EBIT}} \quad \therefore \text{EBIT} = \text{₹} 50,000 \]

\[ \text{FL} = \frac{\text{EBIT}}{\text{EBT}} \quad \therefore 4 = \frac{\text{₹} 50,000}{\text{EBT}} \quad \therefore \text{EBT} = \text{₹} 12,500 \]

Since tax rate is 30%, therefore, Earnings after tax = 12,500 x 0.70 = ₹ 8,750

Earnings after tax (EAT) = ₹ 8,750

Question 3

A firm has Sales of ₹ 40 lakhs; Variable cost of ₹ 25 lakhs; Fixed cost of ₹ 6 lakhs; 10% debt of ₹ 30 lakhs; and Equity Capital of ₹ 45 lakhs.

Required:

Calculate operating and financial leverage.

Answer

Calculation of Operating and Financial Leverage

<table>
<thead>
<tr>
<th></th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>40,00,000</td>
</tr>
<tr>
<td>Less: Variable cost</td>
<td>25,00,000</td>
</tr>
<tr>
<td>Contribution (C)</td>
<td>15,00,000</td>
</tr>
<tr>
<td>Less: Fixed cost</td>
<td>6,00,000</td>
</tr>
<tr>
<td>EBIT</td>
<td>9,00,000</td>
</tr>
<tr>
<td>Less: Interest</td>
<td>3,00,000</td>
</tr>
<tr>
<td>EBT</td>
<td>6,00,000</td>
</tr>
</tbody>
</table>

Operating leverage = \[ \frac{\text{C}}{\text{EBIT}} = \frac{\text{₹} 15,00,000}{\text{₹} 9,00,000} = 1.67 \]

Financial leverage = \[ \frac{\text{EBIT}}{\text{EBT}} = \frac{\text{₹} 9,00,000}{\text{₹} 6,00,000} = 1.50 \]

Question 4

The following data relate to RT Ltd:

<table>
<thead>
<tr>
<th></th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings before interest and tax (EBIT)</td>
<td>10,00,000</td>
</tr>
<tr>
<td>Fixed cost</td>
<td>20,00,000</td>
</tr>
<tr>
<td>Earnings Before Tax (EBT)</td>
<td>8,00,000</td>
</tr>
</tbody>
</table>

Required: Calculate combined leverage.
Answer
Contribution:

\[ C = S - V \]
\[ EBIT = C - F \]

\[ 10,00,000 = C - 20,00,000 \]
\[ \therefore C = 30,00,000 \]

[C- Contribution, S- Sales, V- Variable cost, F- Fixed Cost]

Operating leverage (OL) = \( \frac{C}{EBIT} = \frac{30,00,000}{10,00,000} = 3 \) times

Financial leverage (FL) = \( \frac{EBIT}{EBT} = \frac{10,00,000}{8,00,000} = 1.25 \) times

Combined leverage (CL) = OL × FL = \( 3 \times 1.25 = 3.75 \) times

Question 5

A company operates at a production level of 1,000 units. The contribution is ₹ 60 per unit, operating leverage is 6, and combined leverage is 24. If tax rate is 30%, what would be its earnings after tax?

Answer

Computation of Earnings after tax

Contribution = ₹ 60 × 1,000 = ₹ 60,000

Operating Leverage (OL) × Financial Leverage (FL) = Combined Leverage (CL)

\[ 6 \times \text{Financial Leverage} = 24 \]
\[ \therefore \text{Financial Leverage} = 4 \]

Operating Leverage = \( \frac{\text{Contribution}}{EBIT} = \frac{60,000}{EBIT} = 6 \)

\[ \therefore EBIT = \frac{60,000}{6} = ₹10,000 \]

Financial Leverage = \( \frac{EBIT}{EBT} = 4 \)

\[ \therefore EBT = \frac{EBIT}{4} = \frac{10,000}{4} = ₹2,500 \]

EBIT- Earnings before Interest and tax.

EBT- Earnings before tax.

Since tax rate = 30%
Earnings after Tax (EAT) = EBT \( (1 - 0.30) \) [30% is tax rate] 
= ₹2,500 (0.70) 
∴ Earnings after Tax (EAT) = ₹1,750

Question 6

X Limited has estimated that for a new product its break-even point is 20,000 units if the item is sold for ₹14 per unit and variable cost ₹9 per unit. Calculate the degree of operating leverage for sales volume 25,000 units and 30,000 units.

Answer

Computation of Operating Leverage (OL)

Selling Price = ₹14 per unit
Variable Cost = ₹9 per unit

Fixed Cost = BEP \times (Selling price – Variable cost) = 20,000 \times (14 - 9) = 20,000 \times 5 = 1,00,000

<table>
<thead>
<tr>
<th>Particulars</th>
<th>For 25,000 units (₹)</th>
<th>For 30,000 units (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales ( @ ₹14 /unit)</td>
<td>3,50,000</td>
<td>4,20,000</td>
</tr>
<tr>
<td>Less: Variable Cost ( @ 9 unit )</td>
<td>2,25,000</td>
<td>2,70,000</td>
</tr>
<tr>
<td>Contribution</td>
<td>1,25,000</td>
<td>1,50,000</td>
</tr>
<tr>
<td>Less: Fixed Cost</td>
<td>1,00,000</td>
<td>1,00,000</td>
</tr>
<tr>
<td>Earnings before Interest and tax (EBIT)</td>
<td>25,000</td>
<td>50,000</td>
</tr>
<tr>
<td>( \frac{\text{Contribution}}{\text{EBIT}} )</td>
<td>( \frac{1,25,000}{25,000} )</td>
<td>( \frac{1,50,000}{50,000} )</td>
</tr>
<tr>
<td>( \frac{\text{Contribution}}{\text{EBIT}} )</td>
<td>5 times</td>
<td>3 times</td>
</tr>
</tbody>
</table>

Question 7

Consider the following information for Strong Ltd:

<table>
<thead>
<tr>
<th>₹in lakh</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBIT</td>
</tr>
<tr>
<td>PBT</td>
</tr>
<tr>
<td>Fixed Cost</td>
</tr>
</tbody>
</table>

Calculate the percentage of change in earnings per share, if sales increased by 5 per cent.
Answer

Percentage change in earning per share to the percentage change in sales is calculated through degree of combined leverage.

Hence, Computation of percentage of change in earnings per share, if sales increased by 5%

Degree of Combined leverage (DCL) = \[ \frac{\% \text{ change in Earning per share (EPS)}}{\% \text{ change in sales}} \]

Moreover, Degree of operating leverage (DOL) \times Degree of Financial Leverage (DFL) = Degree of combined leverage (DCL)

Or, DOL \times DFL = \[ \frac{\% \text{ change in Earning per share (EPS)}}{\% \text{ change in sales}} \]

Or, 1.625 \times 3.5 = \[ \frac{\% \text{ change in Earning per share (EPS)}}{5} \]

Or, 5.687 = \[ \frac{\% \text{ change in Earning per share (EPS)}}{5} \]

Or, \% change in EPS = 5.687 \times 5 = 28.4375\%

So, If sales is increased by 5 percent, Percentage of change in earning per share will be 28.4375 \%

Working Notes:

(i) Degree of operating leverage (DOL) = \[ \text{Contribution}}\text{ EBIT} = \frac{(\text{\text₹ 1,120 +\text₹ 700 lakhs})}{\text{\text₹ 1,120 lakhs}} = 1.625 \]

(ii) Degree of financial leverage (DFL) = \[ \frac{\text{EBIT}}{\text{PBT}} = \frac{\text{\text₹ 1,120}}{\text{\text₹ 320}} = 3.5 \]

Question 8

The data relating to two companies are as given below:

<table>
<thead>
<tr>
<th></th>
<th>Company A</th>
<th>Company B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity Capital</td>
<td>\text₹ 6,00,000</td>
<td>\text₹ 3,50,000</td>
</tr>
<tr>
<td>12% Debentures</td>
<td>\text₹ 4,00,000</td>
<td>\text₹ 6,50,000</td>
</tr>
<tr>
<td>Output (units) annum</td>
<td>60,000</td>
<td>15,000</td>
</tr>
<tr>
<td>Selling price/ unit</td>
<td>\text₹ 30</td>
<td>\text₹ 250</td>
</tr>
<tr>
<td>Fixed Costs per annum</td>
<td>\text₹ 7,00,000</td>
<td>\text₹ 14,00,000</td>
</tr>
<tr>
<td>Variable Cost per unit</td>
<td>\text₹ 10</td>
<td>\text₹ 75</td>
</tr>
</tbody>
</table>

You are required to calculate the Operating leverage, Financial leverage and Combined leverage of two Companies.
Answer

Computation of degree of Operating leverage, Financial leverage and Combined leverage of two companies

<table>
<thead>
<tr>
<th></th>
<th>Company A</th>
<th>Company B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output units per annum</td>
<td>60,000</td>
<td>15,000</td>
</tr>
<tr>
<td>Selling price / unit</td>
<td>₹30</td>
<td>₹250</td>
</tr>
<tr>
<td>Sales revenue</td>
<td>₹1,80,000</td>
<td>₹3,75,000</td>
</tr>
<tr>
<td>Less: Variable costs</td>
<td>₹6,00,000</td>
<td>₹1,12,500</td>
</tr>
<tr>
<td>Contribution (C)</td>
<td>₹1,20,000</td>
<td>₹2,62,500</td>
</tr>
<tr>
<td>Less: Fixed costs</td>
<td>₹7,00,000</td>
<td>₹1,40,000</td>
</tr>
<tr>
<td>EBIT (Earnings before Interest and tax)</td>
<td>₹5,00,000</td>
<td>₹1,22,500</td>
</tr>
<tr>
<td>Less: Interest @ 12% on debentures</td>
<td>₹48,000</td>
<td>₹78,000</td>
</tr>
<tr>
<td>PBT</td>
<td>₹4,52,000</td>
<td>₹1,14,700</td>
</tr>
</tbody>
</table>

Operating Leverage = \( \frac{\text{Contribution}}{\text{EBIT}} \)

Financial Leverage = \( \frac{\text{EBIT}}{\text{PBT}} \)

Combined Leverage = \( \text{DOL} \times \text{DFL} \)

Question 9

The net sales of A Ltd. is ₹30 crores. Earnings before interest and tax of the company as a percentage of net sales is 12%. The capital employed comprises ₹10 crores of equity, ₹2 crores of 13% Cumulative Preference Share Capital and 15% Debentures of ₹6 crores. Income-tax rate is 40%.

(i) Calculate the Return-on-equity for the company and indicate its segments due to the presence of Preference Share Capital and Borrowing (Debentures).

(ii) Calculate the Operating Leverage of the Company given that combined leverage is 3.
Answer

(i) Net Sales : ₹ 30 crores

EBIT = 12% on sales = ₹ 3.6 crores

Return on Capital Employed (pre-tax) = \( \frac{\text{EBIT}}{\text{Capital Employed}} = \frac{3.6}{10 + 2 + 6} \times 100 = 20\% \)

After tax it will be = 20% (1 - 0.4) = 12%.

<table>
<thead>
<tr>
<th>Particulars</th>
<th>₹ in crores</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBIT</td>
<td>3.6</td>
</tr>
<tr>
<td>Less: Interest on Debt (15% of 6 crores)</td>
<td>0.9</td>
</tr>
<tr>
<td>EBT</td>
<td>2.7</td>
</tr>
<tr>
<td>Less : Tax @ 40%</td>
<td>1.08</td>
</tr>
<tr>
<td>EAT</td>
<td>1.62</td>
</tr>
<tr>
<td>Less : Preference dividend</td>
<td>0.26</td>
</tr>
<tr>
<td>Earnings available for Equity Shareholders</td>
<td>1.36</td>
</tr>
<tr>
<td>Return on equity = 1.36/10 × 100 = 13.6%</td>
<td></td>
</tr>
</tbody>
</table>

Segments due to the presence of Preference Share capital and Borrowing (Debentures)

Segment of ROE due to preference capital : (12% - 13%) × ₹ 2 Crore = - 2%
Segment of ROE due to Debentures: (12% - 9%) × ₹ 6 Crores = 18%
Total = -2% + 18% = 16%
Cost of debenture (after tax) = 15% (1 - 0.4) = 9%
The weighted average cost of capital is as follows

<table>
<thead>
<tr>
<th>Source</th>
<th>Proportion</th>
<th>Cost (%)</th>
<th>WACC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Equity</td>
<td>10/18</td>
<td>13.60</td>
<td>7.56</td>
</tr>
<tr>
<td>(ii) Preference shares</td>
<td>2/18</td>
<td>13.00</td>
<td>1.44</td>
</tr>
<tr>
<td>(iii) Debt</td>
<td>6/18</td>
<td>9.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>12.00</td>
</tr>
</tbody>
</table>

(ii) Financial Leverage = \( \frac{\text{EBIT}}{\text{EBT}} = \frac{3.6}{2.7} = 1.33 \)

Combined Leverage = FL × OL

3 = 1.33 × OL Or, OL = \( \frac{3}{1.33} \) Or, Operating Leverage = 2.26
Question 10

The following summarises the percentage changes in operating income, percentage changes in revenues, and betas for four pharmaceutical firms.

<table>
<thead>
<tr>
<th>Firm</th>
<th>Change in revenue</th>
<th>Change in operating income</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>PQR Ltd.</td>
<td>27%</td>
<td>25%</td>
<td>1.00</td>
</tr>
<tr>
<td>RST Ltd.</td>
<td>25%</td>
<td>32%</td>
<td>1.15</td>
</tr>
<tr>
<td>TUV Ltd.</td>
<td>23%</td>
<td>36%</td>
<td>1.30</td>
</tr>
<tr>
<td>WXY Ltd.</td>
<td>21%</td>
<td>40%</td>
<td>1.40</td>
</tr>
</tbody>
</table>

Required:

(i) Calculate the degree of operating leverage for each of these firms. Comment also.

(ii) Use the operating leverage to explain why these firms have different beta.

Answer

(i) Degree of operating leverage = \( \frac{\% \text{ Change in Operating income}}{\% \text{ Change in Revenues}} \)

- PQR Ltd. = \( \frac{25}{27} = 0.9259 \)
- RST Ltd. = \( \frac{32}{25} = 1.28 \)
- TUV Ltd. = \( \frac{36}{23} = 1.5652 \)
- WXY Ltd. = \( \frac{40}{21} = 1.9048 \)

(ii) High operating leverage leads to high beta. So when operating leverage is lowest i.e. 0.9259, Beta is minimum (1) and when operating leverage is maximum i.e. 1.9048, beta is highest i.e. 1.40

Question 11

A Company had the following Balance Sheet as on March 31, 2006:

<table>
<thead>
<tr>
<th>Liabilities and Equity</th>
<th>₹ (in crores)</th>
<th>Assets</th>
<th>₹ (in crores)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity Share Capital</td>
<td>10</td>
<td>Fixed Assets (Net)</td>
<td>25</td>
</tr>
<tr>
<td>(one crore shares of ₹10 each)</td>
<td></td>
<td>Current Assets</td>
<td>15</td>
</tr>
<tr>
<td>Reserves and Surplus</td>
<td>2</td>
<td>Current Liabilities</td>
<td>8</td>
</tr>
<tr>
<td>15% Debentures</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Liabilities</td>
<td>40</td>
<td></td>
<td>40</td>
</tr>
</tbody>
</table>
The additional information given is as under:

- **Fixed Costs per annum (excluding interest)**: ₹ 8 crores
- **Variable operating costs ratio**: 65%
- **Total Assets turnover ratio**: 2.5
- **Income-tax rate**: 40%

**Required:**

Calculate the following and comment:

(i) **Earnings per share**

(ii) **Operating Leverage**

(iii) **Financial Leverage**

(iv) **Combined Leverage.**

**Answer**

Total Assets = ₹ 40 crores

Total Asset Turnover Ratio i.e. \( \frac{\text{Total Sales}}{\text{Total Assets}} \) = 2.5

Hence, Total Sales = 40 \times 2.5 = ₹ 100 crores

**Computation of Profits after Tax (PAT)**

<table>
<thead>
<tr>
<th></th>
<th>(₹ in crores)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>100</td>
</tr>
<tr>
<td>Less: Variable operating cost @ 65%</td>
<td>65</td>
</tr>
<tr>
<td>Contribution</td>
<td>35</td>
</tr>
<tr>
<td>Less: Fixed cost (other than Interest)</td>
<td>8</td>
</tr>
<tr>
<td>EBIT (Earning before interest and tax)</td>
<td>27</td>
</tr>
<tr>
<td>Less: Interest on debentures (15% \times 20)</td>
<td>3</td>
</tr>
<tr>
<td>EBT (Earning before tax)</td>
<td>24</td>
</tr>
<tr>
<td>Less: Tax 40%</td>
<td>9.6</td>
</tr>
<tr>
<td>EAT (Earning after tax)</td>
<td>14.4</td>
</tr>
</tbody>
</table>

(i) **Earnings per share**

\[ \text{EPS} = \frac{₹ 14.4 \text{ crores}}{1 \text{ crore equity shares}} = ₹ 14.40 \]
(ii) Operating Leverage

\[
\text{Operating leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{35}{27} = 1.296
\]

It indicates fixed cost in cost structure. It indicates sensitivity of earnings before interest and tax (EBIT) to change in sales at a particular level.

(iii) Financial Leverage

\[
\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{27}{24} = 1.125
\]

The financial leverage is very comfortable since the debt service obligation is small vis-à-vis EBIT.

(iv) Combined Leverage

\[
\text{Combined Leverage} = \frac{\text{Contribution}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{EBT}} = 1.296 \times 1.125 = 1.458
\]

The combined leverage studies the choice of fixed cost in cost structure and choice of debt in capital structure. It studies how sensitive the change in EPS is vis-à-vis change in sales.

The leverages – operating, financial and combined are measures of risk.

**Question 12**

Annual sales of a company is ₹60,00,000. Sales to variable cost ratio is 150 per cent and Fixed cost other than interest is ₹5,00,000 per annum. Company has 11 per cent debentures of ₹30,00,000.

You are required to calculate the operating, financial and combined leverage of the company.

**Answer**

**Calculation of Leverages**

<table>
<thead>
<tr>
<th>Particulars</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>60,00,000</td>
</tr>
<tr>
<td>Less: Variable Cost ((\text{Sales} \times \frac{100}{150}))</td>
<td>40,00,000</td>
</tr>
<tr>
<td>Contribution</td>
<td>20,00,000</td>
</tr>
<tr>
<td>Less: Fixed Cost</td>
<td>5,00,000</td>
</tr>
<tr>
<td>EBIT</td>
<td>15,00,000</td>
</tr>
<tr>
<td>Less: Interest on Debentures</td>
<td>3,30,000</td>
</tr>
<tr>
<td>EBT</td>
<td>11,70,000</td>
</tr>
</tbody>
</table>
Operating Leverage = \( \frac{\text{Contribution}}{\text{EBIT}} = \frac{₹ 20,00,000}{₹ 15,00,000} = 1.3333 \)

Financial Leverage = \( \frac{\text{EBIT}}{\text{EBT}} = \frac{₹ 15,00,000}{₹ 11,70,000} = 1.2821 \)

Combined Leverage = \( \text{OL} \times \text{FL} \) or \( \frac{\text{Contribution}}{\text{EBT}} = 1.3333 \times 1.2821 \) or \( \frac{₹ 20,00,000}{₹ 11,70,000} = 1.7094 \)

**Question 13**

*Delta Ltd.* currently has an equity share capital of ₹ 10,00,000 consisting of 1,00,000 Equity share of ₹ 10 each. The company is going through a major expansion plan requiring to raise funds to the tune of ₹ 6,00,000. To finance the expansion the management has following plans:

- **Plan-I**: Issue 60,000 Equity shares of ₹ 10 each.
- **Plan-II**: Issue 40,000 Equity shares of ₹ 10 each and the balance through long-term borrowing at 12% interest p.a.
- **Plan-III**: Issue 30,000 Equity shares of ₹ 10 each and 3,000, 9% Debentures of ₹ 100 each.
- **Plan-IV**: Issue 30,000 Equity shares of ₹ 10 each and the balance through 6% preference shares.

The EBIT of the company is expected to be ₹ 4,00,000 p.a. assume corporate tax rate of 40%.

**Required:**

(i) Calculate EPS in each of the above plans.

(ii) Ascertain financial leverage in each plan.

**Answer**

<table>
<thead>
<tr>
<th>Sources of Capital</th>
<th>Plan I</th>
<th>Plan II</th>
<th>Plan III</th>
<th>Plan IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present Equity Shares</td>
<td>1,00,000</td>
<td>1,00,000</td>
<td>1,00,000</td>
<td>1,00,000</td>
</tr>
<tr>
<td>New Issue</td>
<td>60,000</td>
<td>40,000</td>
<td>30,000</td>
<td>30,000</td>
</tr>
<tr>
<td>Equity share capital (₹)</td>
<td>16,00,000</td>
<td>14,00,000</td>
<td>13,00,000</td>
<td>13,00,000</td>
</tr>
<tr>
<td>No. of Equity shares</td>
<td>1,60,000</td>
<td>1,40,000</td>
<td>1,30,000</td>
<td>1,30,000</td>
</tr>
<tr>
<td>12% Long term loan (₹)</td>
<td>–</td>
<td>2,00,000</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

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9% Debentures (₹) …… — — 3,00,000 —
6% Preference Shares (₹) …… — — — 3,00,000

Computation of EPS and Financial Leverage

<table>
<thead>
<tr>
<th>Sources of Capital</th>
<th>Plan I</th>
<th>Plan II</th>
<th>Plan III</th>
<th>Plan IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBIT (₹)</td>
<td>4,00,000</td>
<td>4,00,000</td>
<td>4,00,000</td>
<td>4,00,000</td>
</tr>
<tr>
<td>Interest on 12% Loan (₹)</td>
<td>—</td>
<td>24,000</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Interest on 9% debentures (₹)</td>
<td>—</td>
<td>—</td>
<td>27,000</td>
<td>—</td>
</tr>
<tr>
<td>EBT (₹)</td>
<td>4,00,000</td>
<td>3,76,000</td>
<td>3,73,000</td>
<td>4,00,000</td>
</tr>
<tr>
<td>Less : Tax@ 40%</td>
<td>1,60,000</td>
<td>1,50,400</td>
<td>1,49,200</td>
<td>1,60,000</td>
</tr>
<tr>
<td>EAT (₹)</td>
<td>2,40,000</td>
<td>2,25,600</td>
<td>2,23,800</td>
<td>2,40,000</td>
</tr>
<tr>
<td>Less: Preference Dividends (₹)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>18,000</td>
</tr>
<tr>
<td>(a)Net Earnings available for equity shares (₹)</td>
<td>2,40,000</td>
<td>2,25,600</td>
<td>2,23,800</td>
<td>2,22,000</td>
</tr>
<tr>
<td>(b) No. of equity shares</td>
<td>1,60,000</td>
<td>1,40,000</td>
<td>1,30,000</td>
<td>1,30,000</td>
</tr>
<tr>
<td>(c) EPS (a ÷ b) (₹)</td>
<td>1.50</td>
<td>1.61</td>
<td>1.72</td>
<td>1.71</td>
</tr>
<tr>
<td>Financial leverage—</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| \[
| \left( \frac{\text{EBIT}}{\text{EBIT-I}} \right) \text{ or } \left( \frac{\text{EBIT}}{\text{EBT}^*} \right) |
| \]                                      | 1.00       | 1.06       | 1.07       | 1.08       |

* EBT is Earnings before tax but after interest and preference dividend in case of Plan IV.

Comments: Since the EPS and financial leverage both are highest in plan III, the management could accept it.

Question 14

Z Limited is considering the installation of a new project costing ₹80,00,000. Expected annual sales revenue from the project is ₹90,00,000 and its variable costs are 60 percent of sales. Expected annual fixed cost other than interest is ₹10,00,000. Corporate tax rate is 30 percent. The company wants to arrange the funds through issuing 4,00,000 equity shares of ₹10 each and 12 percent debentures of ₹40,00,000.

You are required to:

(i) Calculate the operating, financial and combined leverages and Earnings per Share (EPS).

(ii) Determine the likely level of EBIT, if EPS is ₹4, or ₹2, or Zero.
Answer

(i) Calculation of Leverages and Earnings per Share (EPS)

### Income Statement

<table>
<thead>
<tr>
<th>Particulars</th>
<th>(`)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales Revenue</td>
<td>90,00,000</td>
</tr>
<tr>
<td>Less: Variable Cost @ 60%</td>
<td>54,00,000</td>
</tr>
<tr>
<td>Contribution</td>
<td>36,00,000</td>
</tr>
<tr>
<td>Less: Fixed Cost other than Interest</td>
<td>10,00,000</td>
</tr>
<tr>
<td>Earnings before Interest and Tax (EBIT)</td>
<td>26,00,000</td>
</tr>
<tr>
<td>Less: Interest (12% on ₹ 40,00,000)</td>
<td>4,80,000</td>
</tr>
<tr>
<td>Earnings before tax (EBT)</td>
<td>21,20,000</td>
</tr>
<tr>
<td>Less: Tax @ 30%</td>
<td>6,36,000</td>
</tr>
<tr>
<td>Earnings after tax (EAT)/ Profit after tax (PAT)</td>
<td>14,84,000</td>
</tr>
</tbody>
</table>

1. **Calculation of Operating Leverage (OL)**

   \[
   \text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{36,00,000}{26,00,000} = 1.3846
   \]

2. **Calculation of Financial Leverage (FL)**

   \[
   \text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{26,00,000}{21,20,000} = 1.2264
   \]

3. **Calculation of Combined Leverage (CL)**

   \[
   \text{Combined Leverage} = \text{OL} \times \text{FL} = 1.3846 \times 1.2264 = 1.6981
   \]

   Or,

   \[
   \frac{\text{Contribution}}{\text{EBT}} = \frac{36,00,000}{21,20,000} = 1.6981
   \]

4. **Calculation of Earnings per Share (EPS)**

   \[
   \text{EPS} = \frac{\text{EAT} \div \text{PAT}}{\text{Number of Equity Shares}} = \frac{14,84,000}{4,00,000} = 3.71
   \]

(ii) Calculation of likely levels of EBIT at Different EPS

   \[
   \text{EPS} = \frac{(\text{EBIT} - I)(1 - T)}{\text{Number of Equity Shares}}
   \]

   (1) If EPS is ₹ 4
4.69 Financial Management

\[
4 = \frac{(\text{EBIT} - 4,80,000)(1 - 0.3)}{4,00,000} \quad \text{Or, EBIT} - 4,80,000 = \frac{16,00,000}{0.70}
\]

\[
\text{EBIT} - 4,80,000 = 22,85,714 \quad \text{Or, EBIT} = 27,65,714
\]

(2) If EPS is ₹ 2

\[
2 = \frac{(\text{EBIT} - 4,80,000)(1 - 0.3)}{4,00,000} \quad \text{Or, EBIT} - 4,80,000 = \frac{8,00,000}{0.70}
\]

\[
\text{EBIT} - 4,80,000 = 11,42,857 \quad \text{Or, EBIT} = 16,22,857
\]

(3) If EPS is ₹ Zero

\[
0 = \frac{(\text{EBIT} - 4,80,000)(1 - 0.3)}{4,00,000} \quad \text{Or, EBIT} = 4,80,000
\]

Question 15

The following details of RST Limited for the year ended 31st March, 2015 are given below:

<table>
<thead>
<tr>
<th>Operating leverage</th>
<th>1.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined leverage</td>
<td>2.8</td>
</tr>
<tr>
<td>Fixed Cost (Excluding interest)</td>
<td>₹ 2.04 lakhs</td>
</tr>
<tr>
<td>Sales</td>
<td>₹ 30.00 lakhs</td>
</tr>
<tr>
<td>12% Debentures of ₹ 100 each</td>
<td>₹ 21.25 lakhs</td>
</tr>
<tr>
<td>Equity Share Capital of ₹ 10 each</td>
<td>₹ 17.00 lakhs</td>
</tr>
<tr>
<td>Income tax rate</td>
<td>30 per cent</td>
</tr>
</tbody>
</table>

Required:

(i) Calculate Financial leverage

(ii) Calculate P/V ratio and Earning per Share (EPS)

(iii) If the company belongs to an industry, whose assets turnover is 1.5, does it have a high or low assets turnover?

(iv) At what level of sales the Earning before Tax (EBT) of the company will be equal to zero?

Answer

(i) Financial leverage

Combined Leverage = Operating Leverage (OL) × Financial Leverage (FL)

\[2.8 = 1.4 \times FL \quad \text{Or, FL} = 2\]

Financial Leverage = 2
(ii) **P/V Ratio and EPS**

Operating leverage = \( \frac{\text{Contribution (C)}}{\text{C} - \text{Fixed Cost (FC)}} \times 100 \)

\[
1.4 = \frac{C}{C - 2,04,000} \quad \text{Or, } 1.4 \ (C - 2,04,000) = C
\]

Or, \( 1.4 \ C - 2,85,600 = C \) \[\Rightarrow \quad C = 7,14,000\]

Now, P/V ratio = \( \frac{\text{Contribution (C)}}{\text{Sales (S)}} \times 100 = \frac{7,14,000}{30,00,000} \times 100 = 23.8\%\)

Therefore, P/V Ratio = 23.8\% 

**EPS** = \( \frac{\text{Profit after tax}}{\text{No. of equity shares}} \)

EBT = Sales – V – FC – Interest

= \( $30,00,000 - 22,86,000 - 2,04,000 - 2,55,000 = 2,55,000\)

PAT = EBT – Tax

= \( 2,55,000 - 76,500 = 1,78,500 \)

EPS = \( \frac{1,78,500}{1,70,000} = 1.05 \)

(iii) **Assets turnover**

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

0.784 < 1.5 means lower than industry turnover.

(iv) **EBT zero means 100% reduction in EBT. Since combined leverage is 2.8, sales have to be dropped by 100/2.8 = 35.71%. Hence new sales will be**

\( 30,00,000 \times (100 - 35.71) = 19,28,700. \)

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

**Question 16**

*From the following financial data of Company A and Company B: Prepare their Income Statements.*
### Answer

#### Income Statements of Company A and Company B

<table>
<thead>
<tr>
<th></th>
<th>Company A (₹)</th>
<th>Company B (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sales</strong></td>
<td>91,000</td>
<td>1,05,000</td>
</tr>
<tr>
<td>Less: Variable cost</td>
<td>56,000</td>
<td>63,000</td>
</tr>
<tr>
<td><strong>Contribution</strong></td>
<td>35,000</td>
<td>42,000</td>
</tr>
<tr>
<td>Less: Fixed Cost</td>
<td>20,000</td>
<td>31,500</td>
</tr>
<tr>
<td><strong>Earnings before interest and tax (EBIT)</strong></td>
<td>15,000</td>
<td>10,500</td>
</tr>
<tr>
<td>Less: Interest</td>
<td>12,000</td>
<td>9,000</td>
</tr>
<tr>
<td><strong>Earnings before tax (EBT)</strong></td>
<td>3,000</td>
<td>1,500</td>
</tr>
<tr>
<td>Less: Tax @ 30%</td>
<td>900</td>
<td>450</td>
</tr>
<tr>
<td><strong>Earnings after tax (EAT)</strong></td>
<td>2,100</td>
<td>1,050</td>
</tr>
</tbody>
</table>

#### Working Notes:

**Company A**

(i) **Financial Leverage**

\[
\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBIT} - \text{Interest}}
\]

So,

\[
5 = \frac{\text{EBIT}}{\text{EBIT} - 12,000}
\]

Or,

\[
5 (\text{EBIT} - 12,000) = \text{EBIT}
\]

Or,

\[
4 \text{ EBIT} = 60,000
\]

Or,

\[
\text{EBIT} = ₹15,000
\]

(ii) **Contribution**

\[
\text{Contribution} = \text{EBIT} + \text{Fixed Cost}
\]

\[
= ₹15,000 + ₹20,000 = ₹35,000
\]
(iii) Sales
\[ = \text{Contribution} + \text{Variable cost} \]
\[ = ₹ 35,000 + ₹ 56,000 \]
\[ = ₹ 91,000 \]

**Company B**

(i) Contribution
\[ = 40\% \text{ of Sales (as Variable Cost is 60\% of Sales)} \]
\[ = 40\% \text{ of } 1,05,000 = ₹ 42,000 \]

(ii) Operating Leverage
\[ = \frac{\text{Contribution}}{\text{EBIT}} \]
\[ \text{Or, } \frac{42,000}{\text{EBIT}} = 4 \]
\[ \text{EBIT} = ₹ 10,500 \]

(iii) Fixed Cost
\[ = \text{Contribution} – \text{EBIT} = 42,000 – 10,500 = ₹ 31,500 \]

**Question 17**

Calculate the operating leverage, financial leverage and combined leverage for the following firms and interpret the results:

<table>
<thead>
<tr>
<th></th>
<th>P</th>
<th>Q</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output (units)</td>
<td>2,50,000</td>
<td>1,25,000</td>
<td>7,50,000</td>
</tr>
<tr>
<td>Fixed Cost (₹)</td>
<td>5,00,000</td>
<td>2,50,000</td>
<td>10,00,000</td>
</tr>
<tr>
<td>Unit Variable Cost (₹)</td>
<td>5</td>
<td>2</td>
<td>7.50</td>
</tr>
<tr>
<td>Unit Selling Price (₹)</td>
<td>7.50</td>
<td>7</td>
<td>10.0</td>
</tr>
<tr>
<td>Interest Expense (₹)</td>
<td>75,000</td>
<td>25,000</td>
<td>-</td>
</tr>
</tbody>
</table>

**Answer**

Estimation of Degree of Operating Leverage (DOL), Degree of Financial Leverage (DFL) and Degree of Combined Leverage (DCL)

<table>
<thead>
<tr>
<th></th>
<th>P</th>
<th>Q</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output (in units)</td>
<td>2,50,000</td>
<td>1,25,000</td>
<td>7,50,000</td>
</tr>
<tr>
<td>Selling Price (per unit)</td>
<td>7.50</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Sales Revenues (Output x Selling Price)</td>
<td>18,75,000</td>
<td>8,75,000</td>
<td>75,00,000</td>
</tr>
<tr>
<td>Less: Variable Cost (Output x Variable Cost)</td>
<td>12,50,000</td>
<td>2,50,000</td>
<td>56,25,000</td>
</tr>
<tr>
<td>Contribution Margin</td>
<td>6,25,000</td>
<td>6,25,000</td>
<td>18,75,000</td>
</tr>
<tr>
<td>Less: Fixed Cost</td>
<td>5,00,000</td>
<td>2,50,000</td>
<td>10,00,000</td>
</tr>
<tr>
<td>Earnings before Interest and Tax (EBIT)</td>
<td>1,25,000</td>
<td>3,75,000</td>
<td>8,75,000</td>
</tr>
</tbody>
</table>
### 4.73 Financial Management

<table>
<thead>
<tr>
<th>Less: Interest Expense</th>
<th>75,000</th>
<th>25,000</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings before Tax (EBT)</td>
<td>50,000</td>
<td>3,50,000</td>
<td>8,75,000</td>
</tr>
<tr>
<td>DOL = (\frac{\text{Contribution}}{\text{EBIT}})</td>
<td>5</td>
<td>1.67</td>
<td>2.14</td>
</tr>
<tr>
<td>DFL = (\frac{\text{EBIT}}{\text{EBT}})</td>
<td>2.5</td>
<td>1.07</td>
<td>1.00</td>
</tr>
<tr>
<td>DCL = DOL \times DFL</td>
<td>12.5</td>
<td>1.79</td>
<td>2.14</td>
</tr>
<tr>
<td>Comment</td>
<td>Aggressive Policy</td>
<td>Moderate Policy</td>
<td>Moderate Policy with no financial leverage</td>
</tr>
</tbody>
</table>

**Question 18**

*Calculate the operating leverage, financial leverage and combined leverage for the following firms:*

<table>
<thead>
<tr>
<th>Particulars</th>
<th>N</th>
<th>S</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production (in units)</td>
<td>17,500</td>
<td>6,700</td>
<td>31,800</td>
</tr>
<tr>
<td>Fixed costs (₹)</td>
<td>4,00,000</td>
<td>3,50,000</td>
<td>2,50,000</td>
</tr>
<tr>
<td>Interest on loan (₹)</td>
<td>1,25,000</td>
<td>75,000</td>
<td>Nil</td>
</tr>
<tr>
<td>Selling price per unit (₹)</td>
<td>85</td>
<td>130</td>
<td>37</td>
</tr>
<tr>
<td>Variable cost per unit (₹)</td>
<td>38.00</td>
<td>42.50</td>
<td>12.00</td>
</tr>
</tbody>
</table>

**Answer**

*Computations of Degree of Operating Leverage (DOL), Degree of Financial Leverage (DFL) and Degree of Combined Leverage (DCL)*

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Firm N</th>
<th>Firm S</th>
<th>Firm D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output (Units)</td>
<td>17,500</td>
<td>6,700</td>
<td>31,800</td>
</tr>
<tr>
<td>Sales Revenue (Output x Selling Price per Unit) (₹)</td>
<td>14,87,500</td>
<td>8,71,000</td>
<td>11,76,600</td>
</tr>
<tr>
<td>Variable Cost/Unit</td>
<td>38.00</td>
<td>42.50</td>
<td>12.00</td>
</tr>
<tr>
<td>Less: Total Variable Cost (Output x Variable Cost per Unit) (B)</td>
<td>6,65,000</td>
<td>2,84,750</td>
<td>3,81,600</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>Contribution (C) (A-B)</td>
<td>8,22,500</td>
<td>5,86,250</td>
<td>7,95,000</td>
</tr>
<tr>
<td>Less: Fixed Cost</td>
<td>4,00,000</td>
<td>3,50,000</td>
<td>2,50,000</td>
</tr>
<tr>
<td>Earnings before Interest and Tax (EBIT)</td>
<td>4,22,500</td>
<td>2,36,250</td>
<td>5,45,000</td>
</tr>
<tr>
<td>Less: Interest on Loan</td>
<td>1,25,000</td>
<td>75,000</td>
<td>Nil</td>
</tr>
<tr>
<td>EBIT</td>
<td>2,97,500</td>
<td>1,61,250</td>
<td>5,45,000</td>
</tr>
<tr>
<td>Operating Leverage (OL) = C/EBIT</td>
<td>1.95</td>
<td>2.48</td>
<td>1.46</td>
</tr>
<tr>
<td>Financial Leverage (FL) = EBIT/PBT</td>
<td>1.42</td>
<td>1.47</td>
<td>1.00</td>
</tr>
<tr>
<td>Combined Leverage (CL) = OL x FL</td>
<td>1.95 x 1.42</td>
<td>2.48 x 1.47</td>
<td>1.46 x 1</td>
</tr>
<tr>
<td>OR Contribution/EBT = CL = Contribution/EBT</td>
<td>2.77</td>
<td>3.65</td>
<td>1.46</td>
</tr>
</tbody>
</table>

**Question 19**

The following information related to XL Company Ltd. for the year ended 31st March, 2016 are available to you:

- **Equity share capital of ₹ 10 each**: ₹ 25 lakh
- **11% Bonds of ₹ 1000 each**: ₹ 18.5 lakh
- **Sales**: ₹ 42 lakh
- **Fixed cost (Excluding Interest)**: ₹ 3.48 lakh
- **Financial leverage**: 1.39
- **Profit-Volume Ratio**: 25.55%
- **Income Tax Rate Applicable**: 35%
4.75 Financial Management

You are required to calculate:

(i) Operating Leverage;
(ii) Combined Leverage; and
(iii) Earning per Share.

Answer

Profit Volume Ratio = \frac{\text{Contribution}}{\text{Sales}} \times 100

So, \(25.55 = \frac{\text{Contribution}}{\text{Sales}} \times 100\) \(\text{or, Contribution} = \text{Sales} \times 25.55\)

\(\text{Contribution} = \text{Sales} \times 25.55 = 42,00,000 \times 25.55 = 10,73,100\)

Income Statement

<table>
<thead>
<tr>
<th>Particulars</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>42,00,000</td>
</tr>
<tr>
<td>Variable Cost (Sales - Contribution)</td>
<td>31,26,900</td>
</tr>
<tr>
<td>Contribution</td>
<td>10,73,100</td>
</tr>
<tr>
<td>Fixed Cost</td>
<td>3,48,000</td>
</tr>
<tr>
<td>EBIT</td>
<td>7,25,000</td>
</tr>
<tr>
<td>Interest</td>
<td>2,03,500</td>
</tr>
<tr>
<td>EBT(EBIT – Interest)</td>
<td>5,21,600</td>
</tr>
<tr>
<td>Tax</td>
<td>1,82,500</td>
</tr>
<tr>
<td>Profit after Tax (EBT – Tax)</td>
<td>3,39,040</td>
</tr>
</tbody>
</table>

(i) Operating Leverage = \frac{\text{Contribution}}{\text{EBIT}}

\(\text{or, Contribution} = \text{EBIT} \times \text{Operating Leverage}\)

\(\frac{\text{Contribution}}{\text{EBT}} = \frac{10,73,100}{7,25,000} = 1.48\)

(ii) Combined Leverage = Operating Leverage x Financial Leverage

\(\text{or,} \frac{\text{EBT}}{\text{EBT} \times \text{Operating Leverage}} = \frac{5,21,600}{7,25,000} = 2.06\)
(iii) Earnings per Share (EPS)

\[
EPS = \frac{\text{PAT}}{\text{No. of Share}} = \frac{\text{₹} 3,39,040}{\text{₹} 2,50,000} = 1.3561
\]

\[
\text{EPS} = 1.36
\]

**Question 20**

The capital structure of RST Ltd. is as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity Share of ₹ 10 each</td>
<td>8,00,000</td>
</tr>
<tr>
<td>10% Preference Share of ₹ 100 each</td>
<td>5,00,000</td>
</tr>
<tr>
<td>12% Debentures of ₹ 100 each</td>
<td>7,00,000</td>
</tr>
<tr>
<td></td>
<td>20,00,000</td>
</tr>
</tbody>
</table>

Additional Information:
- Profit after tax (Tax Rate 30%) are ₹ 2,80,000
- Operating Expenses (including Depreciation ₹ 96,800) are 1.5 times of EBIT
- Equity Dividend paid is 15%
- Market price of Equity Share is ₹ 23

Calculate:
(i) Operating and Financial Leverage
(ii) Cover for preference and equity dividend
(iii) The Earning Yield Ratio and Price Earning Ratio
(iv) The Net Fund Flow

**Answer**

**Working Notes:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Profit after Tax</td>
<td>2,80,000</td>
</tr>
<tr>
<td>Tax @ 30%</td>
<td>1,20,000</td>
</tr>
<tr>
<td>EBT</td>
<td>4,00,000</td>
</tr>
<tr>
<td>Interest on Debentures</td>
<td>84,000</td>
</tr>
<tr>
<td>EBIT</td>
<td>4,84,000</td>
</tr>
<tr>
<td>Operating Expenses (1.5 times of EBIT)</td>
<td>7,26,000</td>
</tr>
<tr>
<td>Sales</td>
<td>12,10,000</td>
</tr>
</tbody>
</table>
4.77 Financial Management

(i) Operating Leverage

\[
\text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{\text{₹ } (12,10,000 - 6,29,200)}{\text{₹ } 4,84,000} = \frac{\text{₹ } 5,80,800}{\text{₹ } 4,84,000} = 1.2 \text{ times}
\]

Financial Leverage = \[
\frac{\text{EBIT}}{\text{EBT}} = \frac{\text{₹ } 4,84,000}{\text{₹ } 4,00,000} = 1.21 \text{ times}
\]

(ii) Cover for Preference Dividend

\[
\text{Cover for Preference Dividend} = \frac{\text{PAT}}{\text{Preference Share Dividend}} = \frac{\text{₹ } 2,80,000}{\text{₹ } 50,000} = 5.6 \text{ times}
\]

Cover for Equity Dividend

\[
\text{Cover for Equity Dividend} = \frac{(\text{PAT} - \text{Preference Dividend})}{\text{Equity Share Dividend}} = \frac{\text{₹ } (2,80,000 - 50,000)}{\text{₹ } 1,20,000} = \frac{\text{₹ } 2,30,000}{\text{₹ } 1,20,000} = 1.92 \text{ times}
\]

(iii) Earning Yield Ratio

\[
\text{Earning Yield Ratio} = \frac{\text{EPS}}{\text{Market Price}} \times 100
\]

\[
= \left( \frac{2,30,000}{80,000} \times 100 \right) = \frac{2.875 \times 100}{23} = 2.875 \times 100 = 12.5\%
\]

Price – Earnings Ratio (PE Ratio)

\[
= \frac{\text{Market Price}}{\text{EPS}} = \frac{23}{2.875} = 8 \text{ times}
\]

(iv) Net Funds Flow

\[
= \text{Net PAT} + \text{Depreciation-Total Dividend}
= \text{₹ } 2,80,000 + \text{₹ } 96,800 - \text{₹ } (50,000 + 1,20,000)
\]

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= ₹ 3,76,800 – ₹ 1,70,000
Net Funds Flow = ₹ 2,06,800

Question 21

Following information are related to four firms of the same industry:

<table>
<thead>
<tr>
<th>Firm</th>
<th>Change in Revenue</th>
<th>Change in Operating Income</th>
<th>Change in Earning per Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>27%</td>
<td>25%</td>
<td>30%</td>
</tr>
<tr>
<td>Q</td>
<td>25%</td>
<td>32%</td>
<td>24%</td>
</tr>
<tr>
<td>R</td>
<td>23%</td>
<td>36%</td>
<td>21%</td>
</tr>
<tr>
<td>S</td>
<td>21%</td>
<td>40%</td>
<td>23%</td>
</tr>
</tbody>
</table>

Find out:
(i) degree of operating leverage, and
(ii) degree of combined leverage for all the firms.

Answer

Calculation of Degree of Operating leverage and Degree of Combined leverage

<table>
<thead>
<tr>
<th>Firm</th>
<th>Degree of Operating Leverage (DOL)</th>
<th>Degree of Combined Leverage (DCL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% change in Operating Income % change in Revenue</td>
<td>% change in EPS % change in Revenue</td>
</tr>
<tr>
<td>P</td>
<td>25% 27% = 0.926</td>
<td>30% 27% = 1.111</td>
</tr>
<tr>
<td>Q</td>
<td>32% 25% = 1.280</td>
<td>24% 25% = 0.960</td>
</tr>
<tr>
<td>R</td>
<td>36% 23% = 1.565</td>
<td>21% 23% = 0.913</td>
</tr>
<tr>
<td>S</td>
<td>40% 21% = 1.905</td>
<td>23% 21% = 1.095</td>
</tr>
</tbody>
</table>

Question 22

The capital structure of ABC Ltd. as at 31.3.15 consisted of ordinary share capital of ₹ 5,00,000 (face value ₹ 100 each) and 10% debentures of ₹ 5,00,000 (₹ 100 each). In the year ended with March 15, sales decreased from 60,000 units to 50,000 units. During this year and in the
previous year, the selling price was `12 per unit; variable cost stood at `8 per unit and fixed expenses were at `1,00,000 p.a. The income tax rate was 30%.

You are required to calculate the following:
(i) The percentage of decrease in earnings per share.
(ii) The degree of operating leverage at 60,000 units and 50,000 units.
(iii) The degree of financial leverage at 60,000 units and 50,000 units.

Answer

<table>
<thead>
<tr>
<th>Sales in units</th>
<th>60,000 (₹)</th>
<th>50,000 (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales Value</td>
<td>7,30,000</td>
<td>6,00,000</td>
</tr>
<tr>
<td>Variable Cost</td>
<td>(4,80,000)</td>
<td>(4,00,000)</td>
</tr>
<tr>
<td>Contribution</td>
<td>2,40,000</td>
<td>2,00,000</td>
</tr>
<tr>
<td>Fixed expenses</td>
<td>(1,00,000)</td>
<td>(1,00,000)</td>
</tr>
<tr>
<td>EBIT</td>
<td>1,40,000</td>
<td>1,00,000</td>
</tr>
<tr>
<td>Debenture Interest</td>
<td>(50,000)</td>
<td>(50,000)</td>
</tr>
<tr>
<td>EBT</td>
<td>90,000</td>
<td>50,000</td>
</tr>
<tr>
<td>Tax @ 30%</td>
<td>(27,000)</td>
<td>(15,000)</td>
</tr>
<tr>
<td>Profit after tax (PAT)</td>
<td>63,000</td>
<td>35,000</td>
</tr>
</tbody>
</table>

(i) Earnings per share (EPS) = \( \frac{63,000}{5,000} = ₹12.6 \) \( \frac{35,000}{5,000} = ₹7 \)

Decrease in EPS = 12.6 – 7 = 5.6

% decrease in EPS = \( \frac{5.6}{12.6} \times 100 = 44.44\% \)

(ii) Operating leverage = \( \frac{\text{Contribution}}{\text{EBIT}} \) = \( \frac{₹ 2,40,000}{₹ 1,40,000} = 1.71 \)

(iii) Financial Leverage = \( \frac{\text{EBIT}}{\text{EBT}} \) = \( \frac{₹ 1,40,000}{₹ 90,000} = 1.56 \)
Question 23

From the following details of X Ltd., prepare the Income Statement for the year ended 31st December, 2014:

Financial Leverage 2
Interest ₹2,000
Operating Leverage 3
Variable cost as a percentage of sales 75%
Income tax rate 30%

Answer

Workings:

(i) Financial Leverage = \( \frac{EBIT}{EBIT - Interest} \) \( \implies \) 2 = \( \frac{EBIT}{EBIT - ₹2,000} \)

Or, \( EBIT = ₹4,000 \)

(ii) Operating Leverage = \( \frac{Contribution}{EBIT} \) \( \implies \) 3 = \( \frac{Contribution}{₹4,000} \)

Or, Contribution = ₹12,000

(iii) Sales = \( \frac{Contribution}{P/V Ratio} \) = \( \frac{₹12,000}{25\%} \) = ₹48,000

(iv) Fixed Cost = Contribution – Fixed cost = EBIT = ₹12,000 – Fixed cost = ₹4,000 \( \implies \) Fixed cost = ₹8,000

Income Statement for the year ended 31st December 2014

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Amount (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>48,000</td>
</tr>
<tr>
<td>Less: Variable Cost (75% of ₹48,000)</td>
<td>(36,000)</td>
</tr>
<tr>
<td>Contribution</td>
<td>12,000</td>
</tr>
<tr>
<td>Less: Fixed Cost (Contribution - EBIT)</td>
<td>(8,000)</td>
</tr>
<tr>
<td>Earnings Before Interest and Tax (EBIT)</td>
<td>4,000</td>
</tr>
<tr>
<td>Less: Interest</td>
<td>(2,000)</td>
</tr>
<tr>
<td>Earnings Before Tax (EBT)</td>
<td>2,000</td>
</tr>
<tr>
<td>Less: Income Tax @ 30%</td>
<td>(600)</td>
</tr>
<tr>
<td>Earnings After Tax (EAT or PAT)</td>
<td>1,400</td>
</tr>
</tbody>
</table>
Question 24

A firm has sales of ₹75,00,000 variable cost is 56% and fixed cost is ₹6,00,000. It has a debt of ₹45,00,000 at 9% and equity of ₹55,00,000.

(i) What is the firm’s ROI?

(ii) Does it have favourable financial leverage?

(iii) If the firm belongs to an industry whose capital turnover is 3, does it have a high or low capital turnover?

(iv) What are the operating, financial and combined leverages of the firm?

(v) If the sales is increased by 10% by what percentage EBIT will increase?

(vi) At what level of sales the EBT of the firm will be equal to zero?

(vii) If EBIT increases by 20%, by what percentage EBT will increase?

Answer

Income Statement

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Amount (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>75,00,000</td>
</tr>
<tr>
<td>Less: Variable cost (56% of 75,00,000)</td>
<td>42,00,000</td>
</tr>
<tr>
<td>Contribution</td>
<td>33,00,000</td>
</tr>
<tr>
<td>Less: Fixed costs</td>
<td>6,00,000</td>
</tr>
<tr>
<td>Earnings before interest and tax (EBIT)</td>
<td>27,00,000</td>
</tr>
<tr>
<td>Less: Interest on debt (@ 9% on ₹45 lakhs)</td>
<td>4,05,000</td>
</tr>
<tr>
<td>Earnings before tax (EBT)</td>
<td>22,95,000</td>
</tr>
</tbody>
</table>

(i) ROI = \( \frac{\text{EBIT}}{\text{Capital employed}} \times 100 \) = \( \frac{\text{EBIT}}{\text{Equity + Debt}} \times 100 \)

\[ = \frac{\text{₹ 27,00,000}}{\text{₹ (55,00,000 + 45,00,000)}} \times 100 = 27\% \]

(ROI is calculated on Capital Employed)

(ii) ROI = 27% and Interest on debt is 9%, hence, it has a favourable financial leverage.

(iii) Capital Turnover = \( \frac{\text{Net Sales}}{\text{Capital}} \)
Financing Decisions

Or = \( \frac{\text{Net Sales}}{\text{Capital}} = \frac{\text{₹ 75,00,000}}{\text{₹ 1,00,00,000}} = 0.75 \)

Which is very low as compared to industry average of 3.

(iv) Calculation of Operating, Financial and Combined leverages

(a) Operating Leverage = \( \frac{\text{Contribution}}{\text{EBIT}} = \frac{\text{₹ 33,00,000}}{\text{₹ 27,00,000}} = 1.22 \) (approx)

(b) Financial Leverage = \( \frac{\text{EBIT}}{\text{EBT}} = \frac{\text{₹ 27,00,000}}{\text{₹ 22,95,000}} = 1.18 \) (approx)

(c) Combined Leverage = \( \frac{\text{Contribution}}{\text{EBT}} = \frac{\text{₹ 33,00,000}}{\text{₹ 22,95,000}} = 1.44 \) (approx)

\[ \text{Or} = \text{Operating Leverage} \times \text{Financial Leverage} = 1.22 \times 1.18 = 1.44 \) (approx)

(v) Operating leverage is 1.22. So if sales is increased by 10%.

EBIT will be increased by 1.22 \( \times \) 10 i.e. 12.20% (approx)

(vi) Since the combined Leverage is 1.44, sales have to drop by 100/1.44 i.e. 69.44% to bring EBT to Zero

Accordingly, New Sales = \( \text{₹ 75,00,000} \times (1 - 0.6944) \)

= \( \text{₹ 75,00,000} \times 0.3056 \)

= \( \text{₹ 22,92,000} \) (approx)

Hence at \( \text{₹ 22,92,000} \) sales level EBT of the firm will be equal to Zero.

(vii) Financial leverage is 1.18. So, if EBIT increases by 20% then EBT will increase by 1.18 \( \times \) 20 = 23.6% (approx)