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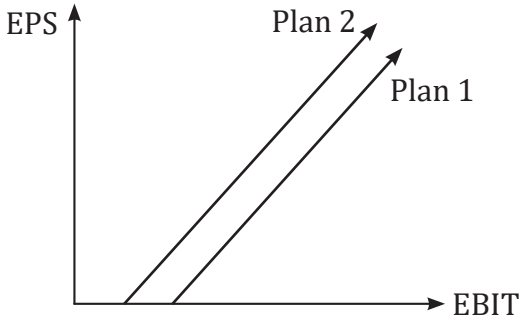
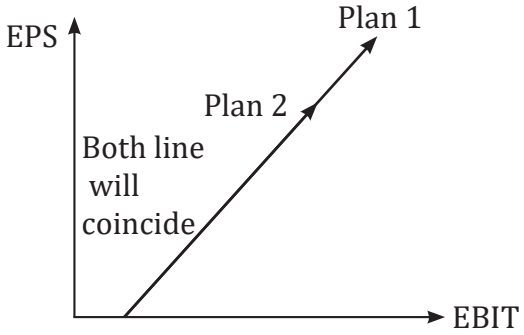
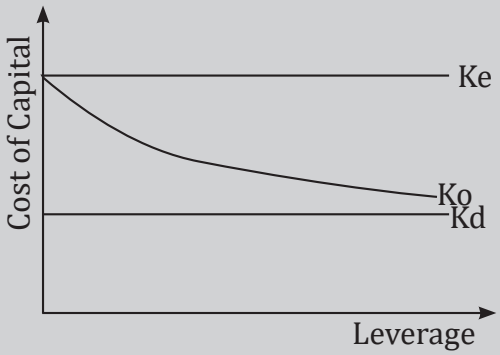
CHAPTER

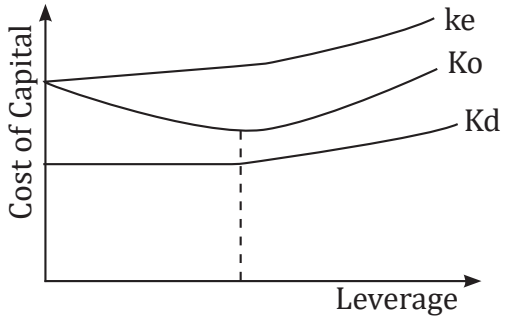
Capital Structure

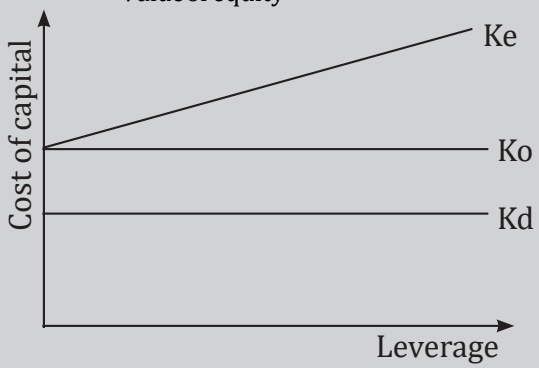
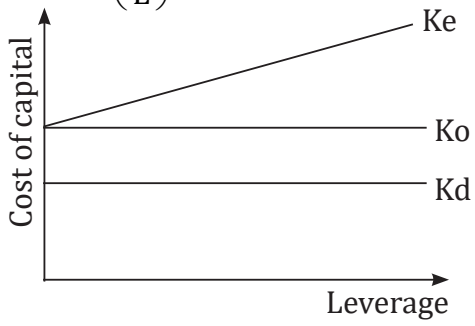
THEORY

Meaning of Capital Structure	Capital structure refers to the mix of a firm's capitalization 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.
Major Factors in Capital Structure Planning	(*a*) Risk (*b*) Cost of capital (*c*) Control (*d*) Purpose of financing (*e*) Flexibility (*f*) Requirement of investors (*g*) Financial leverage or trading on equity (*h*) Growth and stability of sales
Capital Structure vs Financial Structure	❑ Capital structure refers to the combination of debt and equity which a company uses to finance its long-term operations. ❑ Financial Structure is the entire left-hand side of the balance sheet which represents all the long-term and short-term sources of capital. ❑ Thus, capital structure is only a part of financial structure.
Optimum Capital Structure	❑ It deals with the issue of right mix of debt and equity in the long-term capital structure of a firm. ❑ The mix should be designed so as to ensure maximization of wealth which is in line with objective of financial management. ❑ In other words, mix should be designed in such a manner which can provide the highest earnings per share (EPS) over the firm's expected range of earnings before interest and tax (EBIT).
	❑ 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: $\frac{(EBIT - I_1)(1-t)}{E_1} = \frac{(EBIT - I_2)(1-t)}{E_2}$

EBIT-EPS analysis tool or Indifference point analysis	❑ If amount of equity share capital is same under two financial plans, then one of the following two situations will arise: **(*a*) No indifference point –** It will arise when after tax cost of the source other than equity shares is not same under both plans.  **(*b*) Many indifference point –** It will arise when after tax cost of the source other than equity share is same under both plans. 
Trading on equity	❑ It is the process of using securities with fixed financial burden (e.g. loan, preference shares, bonds etc.) to produce gain for the owners (equity shareholders). ❑ It is known as trading on equity because equity shareholders are the only one interested in the business income and lenders are willing to advance funds on the strength of the equity supplied by the owners. ❑ Trading on equity occurs if the firm takes debt to acquire assets on which it can earn return greater than the interest on cost of debt. In this case, the leverage is favourable for the firm.
General assumptions of all approaches	(*a*) There are only two sources of funds: (i) Equity; and (ii) Debt having fixed interest (*b*) Total assets of the firm are given and there would be no change in the decisions of the firm. (*c*) There are no retained earnings i.e. dividend payout ratio is 100%. (*d*) The operating profit, i.e. EBIT of the firm is given and is not expected to grow. (*e*) Business risk of the firm is given and it does not get affected by the financing mix.

Net Income (NI) Approach	**Specific assumptions of NI Approach:** (*a*) The debt capitalization rate (Kd) is less than the equity capitalization rate (Ke). (*b*) The use of debt component doesn't change the risk perception of investors. As a result, both debt capitalization rate (Kd) and equity capitalization rate (Ke) remains constant. (*c*) There are no personal or corporate taxation. **Approach:** ❑ According to this approach, capital structure decision is relevant to the value of the firm. ❑ With the increase in debt of the firm, the WACC would decline because of use of relatively less expensive debt and in turn, the value of firm will increase and vice-versa. ❑ The optimum capital structure will be at a point where WACC is minimum and value of firm is maximum. $\text{Value of Equity } (V_E) = \frac{\text{EBIT} - \text{Interest}}{\text{Cost of Equity}}$ $\text{Value of Firm } (V_F) = \text{Value of Equity } (V_E) + \text{Value of Debt } (V_D)$ $\text{Overall cost of capital } (K_0) = \frac{\text{EBIT}}{\text{Value of firm}}$ 
Traditional Approach	**Specific Assumptions of Traditional Approach:** (*a*) There are no personal or corporate taxes. (*b*) The increase in proportion of debt in capital structure leads to change in risk perception of the shareholders. (*c*) The debt capitalization rate (Kd) is less than the equity capitalization rate (Ke). **Approach:** ❑ It is also known as intermediate approach as it takes a midway between NI approach and the NOI approach. ❑ According to this approach, with the increase in debt upto a certain reasonable limit, the overall cost of capital (WACC) will start declining because of use of relatively cheaper debt funds.

	❑ If the debt is increased beyond the reasonable limit, both the cost of equity (ke) and cost of debt (kd) will start rising due to excess level of financial risk. ❑ As a result, WACC of the firm starts rising. ❑ The optimum capital structure will be at a point where WACC is minimum and value of firm is maximum. Value of Equity $(V_E) = \frac{\text{EBIT} - \text{Interest}}{\text{Cost of Equity}}$ Value of Firm (V_F) = Value of Equity (V_E) + Value of Debt (V_D) Overall cost of capital $(K_O) = \frac{\text{EBIT}}{\text{Value of firm}}$ 
Net Operating Income (NOI) Approach	**Specific assumptions of NOI approach:** (*a*) There are no corporate or personal taxes. (*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 (Ko) remains constant for all degrees of debt equity mix. **Approach:** ❑ According to this approach, WACC of the firm or value of firm is independent of its capital structure. ❑ With the increase in the debt component in the capital structure, the financial risk of equity shareholders increases. ❑ To compensate the increased risk the shareholders would expect a higher rate of return on their investments. ❑ Thus, the benefit of using relatively cheaper debt funds is offset by the loss arising out of the increase in cost of equity. ❑ As a result, the overall cost (value of firm) remains constant irrespective of capital structure. Value of Firm $(V_F) = \frac{\text{EBIT}}{\text{Overall cost of capital}}$ Value of Equity (V_E) = Value of Firm (V_F) - Value of Debt (V_D)

	Cost of Equity $(K_E) = \frac{\text{EBIT - Interest}}{\text{Value of equity}}$ 
Modigilani and Miller (MM) Approach	**Specific assumptions of MM Approach:** (*a*) Capital markets are perfect and investors are assumed to be rational. (*b*) There are no personal or corporate taxes. (*c*) Firms can be categorized into "equivalent return" classes. All firms within a class have the same degree of business risk. (*d*) All investors have the same expectations from a firm's net operating income (EBIT) which are necessary to evaluate the value of a firm. **The three basic propositions of the approach are:** 1. The total market value of the firm and its cost of capital are independent of its capital structure. The total market value of a firm is given by capitalizing the expected stream of operating earnings at a discount rate appropriate for its risk class. 2. The cost of equity (Ke) is equal to capitalization rate of pure equity stream plus a premium for financial risk. The financial risk increases with more debt content in the capital structure. As a result, Ke increases in a manner to offset exactly the use of less expensive source of funds. 3. The cut-off rate for investment purposes is completely independent of the way in which an investment is financed. This proposition along-with the first implies a complete separation of the investment and financing decisions of the firm. Value of levered firm (V_L) = Value of unlevered firm (V_U) $= \frac{\text{EBIT}}{\text{Overall Cost of Capital}}$ $K_{eL} = K_{eU} + (K_{eU} - k_d) \times \left(\frac{D}{E}\right)$ 

<table>
<tr><td>MM Approach with corporate taxes</td><td>

MM recognized that the value of the firm will increase and the cost of capital will decrease with the use of debt on account of deductibility of interest charges for tax purpose.
Thus, the optimum capital structure can be achieved by maximizing the debt mix in the equity of the firm.

Value of unlevered firm $(V_U) = \frac{EBIT(1-t)}{\text{Overall cost of capital}}$
Value of levered firm (V_L) = Value of unlevered firm (V_U) + (Debt)(tax rate)
$K_{eL} = K_{eU} + (K_{eU} - k_d) \times (1 - t) \times \left(\frac{D}{E}\right)$
</td></tr>
<tr><td>Weakness of MM hypothesis</td><td>
(a) Since, the interest on debt is tax deductible, a levered firm is in position to take the advantage of trading on equity. Hence, the total market value of a levered firm is likely to exceed that of unlevered firm.
(b) Other hidden costs associated with leverage, such as bankruptcy and agency costs have not been considered.
(c) Investors may not substitute personal leverage for corporate leverage since they don't have the same risk characteristic.
(d) The assumption that an individual will be able to borrow at the same rate at which corporations are able to issue debentures at any point of time is not realistic.
(e) Institutional restrictions may not permit institutional investors to engage in home made leverage.
</td></tr>
<tr><td>Arbitrage process</td><td>

Arbitrage is the process of purchasing a security in a market where the price is low and selling it in a market where the price is higher.
Activities under Arbitrage Process:

<table>
<tr><th>When Levered Firm is overvalued</th><th>When Unlevered Firm is overvalued</th></tr>
<tr><td>1) Investor sells his present equity holdings of levered firm.</td><td>1) Investor sells his present equity holdings of unlevered firm.</td></tr>
<tr><td>2) Investor borrows proportionate to his share of debt of levered firm (because personal leverage is perfect substitute of corporate leverage).</td><td>2) Investor purchases securities of the levered firm equal to his percentage equity holdings in the unlevered firm.</td></tr>
<tr><td>3) Investor purchases securities of the unlevered firm equal to his percentage equity holdings in the levered firm.</td><td>3) Investor will also invest proportionately in the debt instruments.</td></tr>
<tr><td>4) After one year, investor will receive dividend and will pay interest on personal debt taken.</td><td>4) After one year, investor will receive dividend and interest from his investment.</td></tr>
</table>
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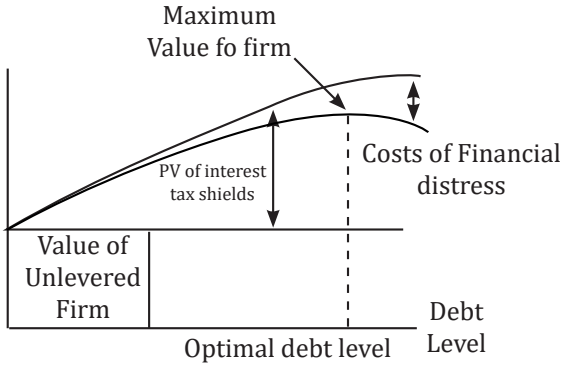
</table>

	5) Thus, investor will earn higher rate of return in unlevered firm as compared to continuing in levered firm. | 5) Thus, investor will earn higher rate of return in levered firm as compared to continuing in unlevered firm. ❑ According to MM, this arbitrage process will come to an end when the values of both companies become identical.
The Trade-off Theory	❑ This theory helps to find the optimum level of debt by balancing the cost and benefits. ❑ Benefits of using debt is tax saving on interest ❑ Cost of using debt involves financial distress and agency cost ❑ In case if company is not able to meet the payment obligations to the debt holder than it may become insolvent which leads to various cost such as legal cost, admin. Cost , bankruptcy cost etc. ❑ Also, there might be dispute between shareholders, management & debt-holders which gives rise to agency cost. ❑ The marginal benefit of further increase in debt declines as debt increases. ❑ Thus, firm tries to trade-off the cost with benefit to optimize or maximize the overall value. 
Pecking Order Theory	❑ This theory states that capital structure decision is affected by manager's choice. ❑ Thee is no well-defined equity-debt mix. ❑ There are two sources i.e. internal & external ❑ Debt is the most cheaper source ❑ Internal equity is cheaper than external equity because it doesn't involve transaction or issue cost etc. ❑ As per this theory, manager may raise funds from various sources in following order: ❍ First choice is to use internal finance ❍ In absence or shortage of internal finance then use secured debt, unsecured debt etc. ❍ Manager may issue new equity shares as last option.

Over Capitalization	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	(*a*) Raising more money through issue of equity shares or debentures than company can employ profitably. (*b*) Borrowing huge amount at higher rate than rate at which company can earn. (*c*) Excessive payment for the acquisition of fictitious assets such as goodwill etc. (*d*) Wrong estimation to earnings and capitalization.
Consequences of over capitalization	(*a*) Considerable reduction in the rate of dividend and interest payments. (*b*) Reduction in the market price of shares (*c*) Resorting to window dressing (*d*) Some companies may opt for reorganization
Remedies of over capitalization	(*a*) Companies should go for thorough reorganization (*b*) Buyback of shares (*c*) Reduction in claims of debenture-holders and creditors (*d*) Value of share may also be reduced.
Under Capitalization	❑ It is a state, when company's actual capitalization is lower than its proper capitalization as warranted by its earning capacity. ❑ This situation normally happens with companies which have insufficient capital but large secret reserves in the form of considerable appreciation in the values of fixed assets not brought into the books.
Consequences of under capitalization	(*a*) The dividend rate will be higher in comparison to similarly situated companies. (*b*) Market value of shares will be higher than value of shares of other similar companies. (*c*) Real value of shares will be higher than their book values.
Remedies of under capitalization	(*a*) The shares of the company should be split up. (*b*) Issue of bonus shares. (*c*) By revising upward the par value of share in exchange of the existing shares.
Over capitalization vs under capitalization	❑ Over capitalization is more dangerous to the company, society and shareholders than under capitalization. ❑ Situation of under capitalization can be handled easily as compared to over capitalization.

PRACTICAL QUESTIONS

1. SK Ltd. has equity share capital of ₹5,00,000 (face value ₹100). To meet the expenditure of an expansion programme, the company wishes to raise ₹3,00,000 and is having following four alternative sources to raise the funds:

Plan *A*: To have full money from the equity shares

Plan *B*: To have ₹1 lakh from equity and ₹2 lakhs from borrowing from the financial institutions @ 10% p.a.

Plan *C*: Full money from borrowing @ 10% per annum

Plan *D*: ₹1 lakh in equity and ₹2 lakh from preference shares @ 8% per annum dividend.

The company is having present earnings (EBIT) of ₹1,50,000. The corporate taxes 50%. Suggest a suitable plan of the above four plans to raise the required funds.

[**Sol.** EPS - ₹15; ₹18.33; ₹21; ₹17.33]

2. SK Ltd. requires ₹25,00,000 for a new plant. This plant is expected to yield earnings before interest and taxes of ₹5,00,000. While deciding about the financial plan, the company considers the objective of maximizing earnings per share.

It has three alternatives to finance the project – by raising debt of ₹2,50,000 or ₹10,00,000 or ₹15,00,000 and the balance in each case by issuing equity shares. The company's share is currently selling at ₹150, but is expected to decline to ₹125 in case the funds are borrowed in excess of ₹10,00,000. The funds can be borrowed at the rate of 10% up to ₹2,50,000, at 15% over ₹2,50,000 and up to ₹10,00,000 and at 20% over ₹10,00,000. The tax rate applicable to the company is 50 percent. Analyse which form of financing should the company choose? **[SM]**

[**Sol.** EPS - ₹15.83; ₹18.125; ₹16.406]

3. SK Ltd., a profit making company, has a paid-up capital of ₹100 lakhs consisting of 10 lakhs ordinary shares of ₹10 each. Currently, it is earning an annual pre-tax profit of ₹60 lakhs. The company's shares are listed and are quoted in the range of ₹50 to ₹80. The management wants to diversify production and has approved a project which will cost ₹50 lakhs and which is expected to yield a pre-tax income of ₹40 lakhs per annum. To raise this additional capital, the following options are under consideration of the management:

(*a*) To issue equity share capital for the entire additional amount. It is expected that the new shares (face value of ₹10) can be sold at a premium of ₹15.

(*b*) To issue 16% non-convertible debentures of ₹100 each for the entire amount.

(*c*) To issue equity capital for ₹25 lakhs (face value of ₹10 each) and 16% non-convertible debentures for the balance amount. In this case, the company can issue shares at a premium of ₹40 each.

Calculate the additional capital that can be raised, keeping in mind that the management wants to maximise the earnings per share to maintain its goodwill. The company is paying income tax at 50% **[SM]**

[**Sol.** EPS - ₹4.17; ₹4.60; ₹4.57]

4. The following data are presented in respect of SK Ltd.: **[SM]**

Particulars	Amount (₹)
Profit before interest and tax	52,00,000
Less: Interest on debentures @12%	12,00,000
Profit before tax	40,00,000
Less: Income tax @ 50%	20,00,000
Profit after tax	20,00,000
No. of equity shares (of ₹10 each)	8,00,000
EPS	2.5
MPS	25

The company is planning to start a new project requiring a total capital outlay of ₹40,00,000. You are informed that a debt equity ratio (D/D + E) higher than 35% push the Ke up to 12.5% means reduce PE ratio to 8 and rises the interest rate on additional amount borrowed at 14%. Find out the probable price of share if:

(*a*) The additional funds are raised as a loan.

(*b*) The amount is raised by issuing equity shares.

(Note: Retained earnings of the company is ₹1.2 crores).

[**Sol.** (*a*) ₹20.66; ₹24.44]

5. The financial advisor of SK Ltd. is confronted with following two alternative financing plans for raising ₹10 lakhs that is needed for plant expansion and modernization.

Alternative I – Issue 80% of funds with 14% Debenture (Face value ₹100) at par and redeem at a premium of 10% after 10 years and balance by issuing equity shares at 33(1/3)% premium.

Alternative II – Raise 10% of funds required by issuing 8% irredeemable debentures (face value ₹100) at par and the remaining by issuing equity shares at current market price of ₹125.

Currently, the firm has an Earnings per share (*EPS*) of ₹21.

The modernization and expansion programme is expected to increase the firm's Earnings before Interest and Taxation (EBIT) by ₹2,00,000 annually.

The firm's condensed Balance Sheet for the current year is as given below:

Balance Sheet as on 31.3.2022

Liabilities	(₹)	Assets	(₹)
Current Liabilities	5,00,000	Current Assets	16,00,000
10% Long term loan	15,50,000	Plant & Equipment (Net)	34,00,000
Reserve & Surplus	10,00,000		
Equity share capital (FV: ₹100 each)	20,00,000		
	50,00,000		50,00,000

However, the finance advisor is concerned about the effect that issuing of debt might have on the firm. The average debt ratio for firms in industry is 35%. He believes if this ratio is exceeded, the PE ratio of the company will be 7 because of the potentially greater risk.

If the firm increases its equity capital by more than 10%, he expects the PE ratio of the company will increase to 8.5 irrespective of the debt ratio.

Assume tax rate of 25%. Assume target dividend pay-out under each alternative to be 60% for the next year and growth rate to be 10% for the purpose of calculating cost of equity.

Suggest with reasons which alternative is better on the basis of each of the below given criteria:

(*a*) Earnings per share (*EPS*) & Market Price per share (*MPS*)

(*b*) Financial Leverage

(*c*) Weighted Average Cost of Capital & Marginal Cost of Capital (using Book Value Weights)

[Sol. (*a*) *EPS* – ₹22.60; ₹20.74; *MPS* - ₹158.20; ₹176.29; (*b*) 1.40; 1.21; (*c*) WACC – 9.12%; 7.66%; MACC – 10.65%; 7.58%]

6. SK Limited requires funds amounting to ₹80 lakhs for its new project. To raise the funds, the company has following alternatives:

(*i*) To issue equity shares of ₹100 each (at par) amounting to ₹60 lakhs and borrow the balance amount at the interest of 12% p.a.; or

(*ii*) To issue equity shares of ₹100 each (at par) and 12% debentures in equal proportion.

The income tax rate is 30%. Identify the point of indifference between the available two modes of financing and state which option will be beneficial in different situations. **[SM]**

[Sol. ₹9,60,000]

7. SK Ltd. is considering three financing plans. The key information is as follows:

(*a*) Total investment to be raised ₹2,00,000 **[SM, Similar Nov 2020]**

(*b*) Plans of financing portion

Plans	Equity	Debt	Preference
A	100%	–	–
B	50%	50%	–
C	50%	–	50%

(*c*) Cost of debt 8%

(*d*) Cost of preference shares 8%

(*e*) Tax rate 50%

(*f*) Equity share of the face value of ₹10 each will be issued at a premium of ₹10 per share

(*e*) Expected EBIT is ₹80,000.

You are required to determine for each plan:

(i) Earning per share (*EPS*)

(ii) The financial break-even point

(iii) Indicate if any of the plans dominate and compute EBIT range among the plans for indifference.

[**Sol.** (i) ₹4; ₹7.20; ₹6.40; (ii) Nil; ₹8,000; ₹16,000; (iii) Plan B]

8. SK Ltd.'s EBIT is ₹5,00,000. The company has 10%, ₹20 lakh debentures. The equity capitalization rate i.e. ke is 16%.

You are required to calculate:

(i) Market value of equity and value of firm

(ii) Overall cost of capital

(iii) If company decides to redeem ₹3,00,000 equity with 10% debt, compute value of equity and overall cost of capital. **[SM]**

[**Sol.** (i) ₹38,75,000; (ii) 12.90%; (iii) ₹16,87,500; 12.54%]

9. SK Ltd., is expecting an EBIT of ₹3,00,000. The company presently raised its entire fund requirement of ₹20 lakhs by issue of equity with equity capitalization rate of 16%. The firm is now contemplating to redeem a part of capital by introducing debt financing. The firm has two options to raise debt to the extent of 30% or 50% of total funds. It is expected that for debt financing upto 30% the rate of interest will be 10% and equity capitalization rate is expected to increase to 17%. However, if firm opts for 50% debt then interest rate will be 12% and equity capitalization rate will be 20%. You are required to compute value of firm and its overall cost of capital under different options if the traditional approach is held valid.

[**Sol.** Ko = 16%; 14.91%; 15.79%]

10. SK Ltd. is expecting an Earnings before interest & tax of ₹4,00,000 and is an all equity company.

(a) Using the NOI approach and an overall cost of capital of 10%, compute the total value, the stock market value of the firm, and the cost of equity.

(b) Determine the answers to (a) if the company decide to retire ₹1 million of common stock it with 9% long term debt. Also compute the return of Mr. S if he owns 5% of the shares of SK Ltd.

[**Sol.** (*a*) ₹40,00,000; ₹40,00,000; 10%; (*b*) ₹40,00,000; ₹30,00,000; 10.33%; ₹15,500]

11. Alpha Ltd. and Beta Ltd. are identical except for capital structures. Alpha Ltd. has 50 percent debt and 50 percent equity, whereas Beta Ltd. has 20 percent debt and 80 percent equity. (All percentages are in market-value terms). The borrowing rate for both companies is 8 percent in a no-tax world, and capital markets are assumed to be perfect. **[SM, Similar Jan 2021]**

(*a*) (*i*) If you own 2 percent of the shares of Alpha Ltd., determine your return if the company has net operating income of ₹3,60,000 and the overall capitalization rate of the company, Ko is 18 percent?

(ii) Calculate the implied required rate of return on equity.

(*b*) Beta Ltd. has the same net operating income as Alpha Ltd.

(i) Determine the implied required return of Beta Ltd.?

(ii) Analyse why does it differ from that of Alpha Ltd.?

[**Sol.** (*a*) (i) ₹5,600; (ii) 28%; (*b*) (*i*) 20.50%]

12. SK Ltd. has a total capitalization of ₹10,00,000. The financial manager of the firm wants to take a decision regarding the capital structure. After a study of the capital market, he gathers the following data: **[SM, Similar RTP May 2021]**

Amount of Debt	Interest Rate	Equity Capitalization Rate
₹	%	(at given level of debt) %
0	–	10.0
1,00,000	4.0	10.5
2,00,000	4.0	11.0
3,00,000	4.5	11.6
4,00,000	5.0	12.4
5,00,000	5.5	13.5
6,00,000	6.0	16.0

(*a*) What amount of debt should be employed by the firm if the traditional approach is held valid (and that the firm always maintains its capital structure at book values)?

(*b*) If the Modigliani-Millar approach is followed, what should be the equity capitalization rate?

[Sol. (*a*) 10%; 9.85%; 9.60%; 9.47%; 9.44%; 9.50%; 10%; (*b*) 10%; 10.67%; 11.50%; 12.36%; 13.33%; 14.50%; 16%]

13. There are two company N Ltd. and M Ltd., having same earnings before interest and taxes i.e. EBIT of ₹20,000. M Ltd. is a levered company having a debt of ₹1,00,000 @7% rate of interest. The cost of equity of N Ltd. is 10% and of M Ltd. is 11.50%. Compute how arbitrage process will be carried on?

[**Sol.** ₹130.40]

14. There are two companies U Ltd. and Ltd., having same NOI of ₹20,000 except that L Ltd. is a levered company having a debt of ₹1,00,000 @7% and cost of equity of U Ltd. and L Ltd. are 10% and 18% respectively. Compute how arbitrage process will work.

[**Sol.** ₹323]

15. Companies Chunnu and Munnu are identical in every respect except that the former does not use debt in its capital structure, while the latter employs ₹6,00,000 of 15% debt. Assuming that (a) all the MM assumptions are met, (b) the corporate tax rate is 50%, (c) the EBIT is ₹2,00,000, and (d) the equity capitalization of the unlevered company is 20%, what will be the value of the firms, Chunnu and Munnu? Also determine the weighted average cost of capital for both the firms.

[**Sol.** Chunnu = ₹5,00,000; 20%; Munnu = ₹8,00,000; 12.50%]

16. The following data relates to two companies belonging to the same risk class:

Particulars	A Ltd.	B Ltd.
Expected Net Operating Income	₹18,00,000	₹18,00,000
12% Debt	₹54,00,000	-
Equity capitalization rate	-	18

Required:

(*a*) Determine the total market value, equity capitalization rate and weighted average cost of capital for each company assuming no taxes as per M.M. approach.

(*b*) Determine the total market value, equity capitalization rate and weighted average cost of capital for each company assuming 40% taxes as per MM Approach.

[SM, Similar July 2021, Nov 2018]

[Sol. (*a*) Vf = ₹1,00,00,000; Ko = 18%; (*b*) Vb = ₹60,00,000; Va = ₹81,60,000; Ko-*B* = 18%; Ko-*A* = 13.23%]

17. SK Ltd., an all equity financed company is considering the repurchase of ₹275 lakhs equity shares and to replace it with 15% debentures of the same amount. Current market value of the company is ₹1,750 lakhs with its cost of capital of 20%. The company's Earnings before Interest and Taxes (EBIT) are expected to remain constant in future years. The company also has a policy of distributing its entire earnings as dividend.

Assuming the corporate tax rate as 30%, you are required to calculate the impact on the following on account of the change in the capital structure as per Modigliani and Miller (MM) Approach:

(*a*) Market value of the company (*b*) Overall cost of capital

(*c*) Cost of Equity **[SM, Similar May 2018]**

[**Sol.** (*a*) MV increase by ₹82,50,000; (*b*) Ko decrease by 0.90%; (*c*) Ke increase by 0.62%]

18. Company P and Q are identical in all respects including risk factors except for debt/equity, company P having issued 10% debentures of ₹18 lakhs while company Q is unlevered. Both the companies earn 20% before interest and taxes on their total assets of ₹30 lakhs.

Assuming a tax rate of 50% and capitalization rate of 15% from an all-equity company.

Required:

CALCULATE the value of companies P and Q using (a) Net Income Approach and (b) net Operating Income Approach. **[RPT May 2018]**

[**Sol.** (*a*) ₹32,00,000; ₹20,00,000; (*b*) ₹20,00,000; ₹29,00,000]

PRACTICE QUESTIONS

19. Suppose that a firm has an all equity capital structure consisting of 1,00,000 ordinary shares of ₹10 per share. The firm wants to raise ₹2,50,000 to finance its investments and is considering three alternative methods of financing – (*i*) to issue 25,000 ordinary shares at ₹10 each, (*ii*) to borrow ₹1,50,000 at 8 percent rate of interest, (*iii*) to issue 2,500 preference shares of ₹100 each at an 8 percent rate of dividend. If the firm's earnings before interest and taxes after additional investment are ₹3,12,500 and the tax rate is 50 percent, find the earnings per share under the three financing alternatives.

[**Sol.** EPS - ₹1.25; ₹1.46; ₹1.36]

20. *Y* Limited requires ₹50,00,000 for a new plant. This Plant is expected to yield earnings before interest and taxes of ₹10,00,000. While deciding about the financial plan, the company considers the objective of maximizing earnings per share. It has two alternatives to finance the project – by raising debt of ₹5,00,000 or ₹20,00,000 and the balance in each case by issuing equity shares. The company's share is currently selling at ₹300 but is expected to decline to ₹250 in case the funds are borrowed in excess of ₹20,00,000. The funds can be borrowed at the rate of 12% upto ₹5,00,000, at 10% over ₹5,00,000. The tax rate applicable to the company is 25%. Which form of financing should company choose? **[Nov 2018]**

[**Sol.** ₹47; ₹59.25]

21. *RM* Steels Limited requires ₹10,00,000 for construction of a new plant. It is considering three financial plans: **[May 2019]**

(*i*) The company may issue 1,00,000 ordinary shares at ₹10 per share;

(*ii*) The company may issue 50,000 ordinary shares at ₹10 per share and 5,000 debentures of ₹100 denominations bearing at 8% rate of interest; and

(*iii*) The company may issue 50,000 ordinary shares at ₹10 per share and 5,000 preference shares at ₹100 per share bearing a 8% rate of dividend.

If RM Steels Limited's earnings before interest and taxes are ₹20,000; ₹40,000; ₹80,000; ₹1,20,000 and ₹2,00,000, you are required to compute the earnings per share under each of the three financial plans? Which alternative would you recommend for RM Steels and why? Tax rate is 50%.

[**Sol.** Plan (i) - ₹0.10; ₹0.20; ₹0.40; ₹0.60; ₹1; Plan (ii) - ₹(0.20); Nil; ₹0.40; ₹0.80; ₹1.60; Plan (iii) - ₹(0.60); ₹(0.40); Nil; ₹0.40; ₹1.20]

22. Earnings before interest and tax of a company are ₹4,50,000. Currently the company has 80,000 Equity shares of ₹10 each, retained earnings of ₹12,00,000. It pays annual interest of ₹1,20,000 on 12% Debentures. The company proposes to take up an expansion scheme for which it needs additional fund of ₹6,00,000. It is anticipated that after expansion, the company will be able to achieve the same return on investment as at present. It can raise fund either through debts at rate of 12% p.a. or by issuing Equity shares at par. Tax rate is 40%.

Required to compute the earning per share if:

(*i*) The additional funds were raised through debts.

(*ii*) The additional funds were raised by issue of Equity shares.

Advise whether the company should go for expansion plan and which sources of finance should be preferred. **[Dec 2021]**

[**Sol.** *EPS* - ₹2.610; ₹1.800]

23. The particulars relating to Raj Ltd. for the year ended 31st March, 2022 are given as follows:

Output (units at normal capacity)	1,00,000
Selling price per unit	₹40
Variable cost per unit	₹20
Fixed cost	₹10,00,000

The capital structure of a company as on 31st March, 2022 is as follows:

Particulars	Amount in ₹
Equity share capital (1,00,000 shares of ₹10 each)	10,00,000
Reserve and surplus	5,00,000
Current liabilities	5,00,000
Total:	20,00,000

Raj Ltd. has decided to undertake an expansion project to use the market potential that will involve ₹20 lakhs. The company expects an increase in output by 50%. Fixed cost will be increase by ₹5,00,000 and variable cost per unit will be decreased by 15%. The additional output can be sold at existing selling price without any adverse impact on the market. **[May 2022]**

The following alternative schemes for financing the proposed expansion program are planned:

(Amount in ₹)

Alternative	Debt	Equity Shares
1	5,00,000	Balance
2	10,00,000	Balance
3	14,00,000	Balance

Current market price per share is ₹200.

Slab wise interest rate for fund borrowed is as follows:

Fund Limit	Applicable interest rate
Up-to ₹5,00,000	10%
Over ₹5,00,000 and up-to ₹10,00,000	15%
Over ₹10,00,000	20%

Find out which of the above-mentioned alternatives would you recommend for Raj Ltd. with reference to the *EPS*, assuming a corporate tax rate is 40%?

[Sol. ₹10.60; ₹10.43; 9.87]

24. The following information pertains to CIZA Ltd.: **[May 2023]**

Capital Structure:	₹
Capital Structure:	
Equity share capital (₹10 each)	8,00,000
Retained earnings	20,00,000
9% Preference share capital (₹100 each)	12,00,000
12% Long-term loan	10,00,000
Interest coverage ratio	8
Income tax rate	30%
Price – earnings ratio	25

The company is proposed to take up an expansion plan, which requires an additional investment of 34,50,000. Due to this proposed expansion, earnings before interest and taxes of the company will increase by 6,15,000 per annum. The additional fund can be raised in following manner:

- By issue of equity shares at present market price, or
- By borrowing 16% Long-term loans from bank.

You are informed that Debt-equity ratio (Debt/ Shareholders' fund) in the range of 50% to 80% will bring down the price-earnings ratio to 22 whereas; Debt-equity ratio over 80% will bring down the price-earnings ratio to 18.

Required:

Advise which option is most suitable to raise additional capital so that the Market Price per Share (*MPS*) is maximized.

[Sol. MPS – ₹221; ₹117.90]

25. CALCULATE the level of earnings before interest and tax (*EBIT*) at which the *EPS* indifference point between the following financing alternatives will occur. **[RTP May 2020]**

(*i*) Equity share capital of ₹60,00,000 and 12% debentures of ₹40,00,000.

(*ii*) Equity share capital of ₹40,00,000, 14% preference share capital of ₹20,00,000 and 12% debentures of ₹40,00,000.

Assume the corporate tax rate is 35% and par value of equity share is ₹100 in each case.

[Sol. ₹17,72,308]

26. SK Ltd. is setting up a project with a capital outlay of ₹60,00,000. It has two alternatives in financing the project cost.

Alternative – *I*: 100% equity finance by issuing equity shares of ₹10 each.

Alternative -*II*; Debt-equity ratio 2:1 (issuing equity shares of ₹10 each)

The rate of interest payable on the debt is 18% p.a. The corporate tax rate is 40%. Calculate the indifference point between the two alternative methods of financing.

[**Sol.** ₹10,80,000]

27. *SK* Ltd. is considering a new project which requires a capital investment of ₹9 crores. Interest on term loan is 12% and corporate tax rate is 30%. Calculate the point of indifference for the project considering the Debt Equity ratio insisted by the financing agencies being 2:1.

[**Sol.** ₹1,08,00,000]

28. Sun Ltd. is considering two financing plans: Details of which are as under: **[May 2018]**

(i) Fund's requirement – ₹100 lakhs

(ii) Financial Plan

Plan	Equity	Debt
I	100%	-
II	25%	75%

(iii) Cost of debt – 12% p.a.

(iv) Tax rate – 30%

(v) Equity share of ₹10 each, issued at a premium of ₹15 per share

(vi) Expected earnings before interest and taxes (EBIT) ₹40 lakhs

You are required to compute:

(*a*) *EPS* in each of the two plans

(*b*) The financial break-even point

(*c*) Indifference point between Plan I and Plan II

[**Sol.** (*a*) ₹7; ₹21.70; (*b*) ₹0; ₹9,00,000; (*c*) ₹12,00,000]

29. Current Capital Structure of XYZ Ltd is as follows:

Equity share capital of 7 lakh shares of face value ₹20 each

Reserves of ₹10,00,000

9% bonds of ₹3,00,00,000

11% preference capital; 3,00,000 shares of face value ₹50 each

Additional funds required for XYZ Ltd are ₹5,00,00,000.

XYZ Ltd is evaluating the following alternatives: **[RTP May 2023]**

(I) Proposed alternative I: Raise the funds via 25% equity capital and 75% debt at 10%. PE Ratio in such scenario would be 12.

(II) Proposed alternative II: Raise the funds via 50% equity capital and rest from 12% Preference capital. PE Ratio in such scenario would be 11.

Any new equity capital would be issued at a face value of ₹20 each. Any new preferential capital would be issued at a face value of ₹20 each. Tax rate is 34%.

Determine the indifference point under both the alternatives.

[**Sol.** Indifference point = ₹72,63,636.36]

30. SK Ltd. is considering two alternative financing plans as follows:

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

Particulars	Plan – A (₹)	Plan – B (₹)
12% Debentures	4,00,000	–
	12,00,000	12,00,000

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

[**Sol.** 8.40%]

31. SK Limited presently has ₹36,00,000 in debt outstanding bearing an interest rate of 10 percent. It wishes to finance a ₹40,00,000 expansion programme and is considering three alternatives; additional debt at 12 percent interest, preference shares with an 11 percent dividend, and the issue of equity shares at ₹16 per share. The company presently has 8,00,000 shares outstanding and is in a 40 percent tax bracket.

(*a*) If earning before interest and taxes are presently ₹15,00,000. Determine earnings per share for the three alternatives, assuming no immediate increase in profitability.

(*b*) Analyse which alternatives do you prefer. Compute how much would EBIT need to increase before the next alternative would be best.

[**Sol.** (*a*) ₹0.495; ₹0.305; ₹0.651; (*b*) ₹23,76,000]

32. SK Ltd. has EBIT of ₹1,00,000. The company make use of debt and equity capital. The firm has 10% debentures of ₹5,00,000 and the firm's equity capitalization rate is 15%.

You are required to calculate:

(*a*) Current value of the firm

(*b*) Overall cost of capital

(*c*) Find value of firm and overall cost of capital if firm increases debt by ₹2,00,000

[**Sol.** (*a*) ₹8,33,333; (*b*) 12%; (*c*) ₹9,00,000; 11.11%]

33. Following data is available in respect of two companies having same business risk:

Capital employed = ₹2,00,000; EBIT = ₹30,000 Ke = 12.5%

Sources	Levered Company (₹)	Unlevered Company (₹)
Debt (@10%)	1,00,000	NIL
Equity	1,00,000	2,00,000

Investor is holding 15% shares in levered company. Calculate increase in annual earnings of investor if he switches his holding from levered to unlevered company.

[**Sol.** ₹375]

34. Following data is available in respect of two companies having same business risk:

Capital employed = ₹2,00,000; EBIT = ₹30,000

Sources	Levered Company (₹)	Unlevered Company (₹)
Debt (@10%)	1,00,000	NIL
Equity	1,00,000	2,00,000
Ke	20%	12.5%

Investor is holding 15% shares in Unlevered company. Calculate increase in annual earnings of investor. If he switches his holding from Unlevered to Levered company.

[Sol. ₹900]

35. Determine the optimal capital structure of a company from the following information:

Options	Cost of Debt (Kd) in %	Cost of Equity (Ke) in %	Percentage of Debt on total value (Debt + Equity)
1	11.0	13.0	0.0
2	11.0	13.0	0.1
3	11.6	14.0	0.2
4	12.0	15.0	0.3
5	13.0	16.0	0.4
6	15.0	18.0	0.5
7	18.0	20.0	0.6

[**Sol.** 13%; 12.80%; 13.52%; 14.10%; 14.80%; 16.50%; 18.80%]

36. SK Ltd.'s operating income (*EBIT*) is ₹5,00,000. The firm's cost of debt is 10% and currently the firm employs ₹15,00,000 of debt. The overall cost of capital of the firm is 15%. You are required to calculate:

(*a*) Total value of the firm (*b*) Cost of Equity

[**Sol.** (*a*) ₹33,33,333; (*b*) 19.09%

37. SK Ltd. has a net operating income of ₹21,60,000 and the total capitalization of ₹120 lakhs. The company is evaluating the options to introduce debt financing in the capital structure and the following information is available at various levels of debt value.

Debt Value (₹)	Interest rate (%)	Equity Capitalization rate (%)
0	NA	12.00
10,00,000	7.00	12.50
20,00,000	7.00	13.00
30,00,000	7.50	13.50
40,00,000	7.50	14.00
50,00,000	8.00	15.00
60,00,000	8.50	16.00
70,00,000	9.00	17.00
80,00,000	10.00	20.00

You are required to compute the equity capitalization rate if MM approach is followed. Assume that the firm operates in zero tax regime and calculations to be based on book values.

[**Sol.** 18%; 19%; 20.20%; 21.50%; 23.25%; 25.14%; 27.50%; 30.60%; 34%]

38. One-third of the total market value of SK Ltd. consists of loan stock, which has a cost of 10 percent. Another company MK Ltd., is identical in every respect to SK Ltd., except that its capital structure is all-equity, and its cost of equity is 16 percent. According to Modigliani and Miller, if we ignored taxation and tax relief on debt capital, compute the cost of equity of SK Ltd.

[**Sol.** 19%]

39. The following are the costs and value for the firms A and B according to the traditional approach.

Particulars	Firm A	Firm B
Total value of firm, V (in ₹)	50,000	60,000
Market value of debt, D (in ₹)	0	30,000
Market value of equity, E (in ₹)	50,000	30,000
Expected net operating income (in ₹)	5,000	5,000
Cost of debt (in ₹)	0	1,800
Net income (in ₹)	5,000	3,200
Cost of equity, Ke = NI/E	10.00%	10.70%

(*a*) Compute the Equilibrium value for the firm A and B in accordance with the MM approach. Assume that (*i*) taxes do not exist and (*ii*) the equilibrium value of Ke is 9.09%.

(*b*) Compute value of equity and cost of equity for both the firms. **[Nov 2022]**

[**Sol.** (*a*) ₹55,005.50; ₹55,005.50; (*b*) ₹55,005.50; 9.09%; ₹25,005.50; 12.80%]

40. Rounak 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 COMPUTE:

(*a*) Market value of the company **[RTP Nov 2018]**

(*b*) Cost of equity

(*c*) Weighted average cost of capital (using market weights) and comment on it.

[**Sol.** (*a*) ₹26,50,000; (*b*) 21.98%; (*c*) 19.80%]

41. The following particulars relating to SK Ltd. for the year ended 31st March 2022 is given:

Output	1,00,000 units at normal capacity
Selling price per unit	₹40
Variable cost per unit	₹20
Fixed cost	₹10,00,000

The capital structure of the company as on 31st March, 2022 is as follows:

Particulars	₹
Equity share capital (1,00,000 shares of ₹10 each)	10,00,000
Reserve and Surplus	5,00,000
7% debentures	10,00,000
Current liabilities	5,00,000
Total	**30,00,000**

SK Ltd. has decided to undertake an expansion project to use the market potential, that will involve ₹10 lakhs. The company expects an increase in output by 50%. Fixed cost will be increase by ₹5,00,000 and variable cost per unit will be decreased by 10%. The additional output can be sold at the existing selling price without any adverse impact on the market.

The following alternatives schemes for financing the proposed expansion programme are planned:

(i) Entirely by equity shares of ₹10 each at par.

(ii) ₹5 lakh by issue of equity shares of ₹10 each and the balance by issue of 6% debentures of ₹100 each at par.

(iii) Entirely by 6% debentures of ₹100 each at par.

Find out which of the above-mentioned alternatives would you recommend for SK Ltd. with reference to the risk and return involved, assuming a corporate tax of 40%.

[**Sol.** EPS - ₹5.19; ₹6.80; ₹10.20; DCL – 1.91; 1.94; 1.98]

42. Kalyanam Ltd. has an operating profit of ₹34,50,000 and has employed Debt which gives total Interest Charge of ₹7,50,000. The firm has an existing cost of equity and cost of debt as 16% and 8% respectively. The firm has a new proposal before it, which requires funds of ₹75 lakhs and is expected to bring an additional profit of ₹14,25,000. To finance the proposal, the firm is expecting to issue an additional debt at 8% and will not be issuing any new equity shares in the market. Assume no tax culture.

You are required to calculate the Weighted Average Cost of capital (WACC) of Kalyanam Ltd:

(*a*) Before the new proposal (*b*) After the new proposal

[**Sol.** (*a*) 13.15%; (*b*) 14.45%]

SOLUTIONS

19. **EPS under alternative financing plans:**

Particulars	Equity Financing (₹)	Debt Financing (₹)	Preference Financing (₹)
EBIT	3,12,500	3,12,500	3,12,500
Less: Interest	0	20,000	0
PBT	3,12,500	2,92,500	3,12,500
Less: Taxes	1,56,250	1,46,250	1,56,250
PAT	1,56,250	1,46,250	1,56,250
Less: Preference dividend	0	0	20,000
Earnings available to ordinary shareholders	1,56,250	1,46,250	136,250
Shares outstanding	1,25,000	1,00,000	1,00,000
EPS	1.25	1.46	1.36

20.

Particulars	Option A	Option B
Fund from Equity	45,00,000	30,00,000
Fund from Debt	5,00,000	20,00,000

Particulars	Option A	Option B
EBIT	10,00,000	10,00,000
Less: Interest	60,000 [5,00,000×12%]	2,10,000 [(5,00,000×12%) + (15,00,000×10%)]
EBT	9,40,000	7,90,000
Less: Tax @ 25%	2,35,000	1,97,500
EAT/EAE (A)	7,05,000	5,92,500
No. of Equity Shares (B)	15,000 [45,00,000÷300]	10,000 [30,00,000÷300]
EPS (A ÷ B)	**47**	**59.25**

Financing Option B i.e. raising debt of ₹20,00,000 and equity of ₹30,00,000 is the option which maximizes the earning per share.

21. **Computation of EPS under (i) Plan**

Particulars	₹	₹	₹	₹	₹
EBIT	20,000	40,000	80,000	1,20,000	2,00,000
Less: Interest	–	–	–	–	–
EBT	20,000	40,000	80,000	1,20,000	2,00,000
Less: Tax @ 50%	10,000	20,000	40,000	60,000	1,00,000
EAT	10,000	20,000	40,000	60,000	1,00,000
Less: Pref. Dividend	–	–	–	–	–
EAE	10,000	20,000	40,000	60,000	1,00,000
No. of Equity Shares	1,00,000	1,00,000	1,00,000	1,00,000	1,00,000
EPS	0.10	0.20	0.40	0.60	1

Computation of EPS under (ii) Plan

Particulars	₹	₹	₹	₹	₹
EBIT	20,000	40,000	80,000	1,20,000	2,00,000
Less: Interest	40,000	40,000	40,000	40,000	40,000
EBT	(20,000)	–	40,000	80,000	1,60,000
Less: Tax @ 50%	10,000*	–	20,000	40,000	80,000
EAT	(10,000)	–	20,000	40,000	80,000
Less: Pref. Dividend	–	–	–	–	–
EAE	(10,000)	–	20,000	40,000	80,000
No. of Equity Shares	50,000	50,000	50,000	50,000	50,000
EPS	(0.20)	–	0.40	0.80	1.60

*Assuming tax saving due to this loss

Computation of EPS under (iii) Plan

Particulars	₹	₹	₹	₹	₹
EBIT	20,000	40,000	80,000	1,20,000	2,00,000
Less: Interest	–	–	–	–	–
EBT	20,000	40,000	80,000	1,20,000	2,00,000
Less: Tax @ 50%	10,000	20,000	40,000	60,000	1,00,000
EAT	10,000	20,000	40,000	60,000	1,00,000
Less: Pref. Dividend	40,000*	40,000	40,000	40,000	40,000
EAE	(30,000)	(20,000)	–	20,000	60,000
No. of Equity Shares	50,000	50,000	50,000	50,000	50,000
EPS	(0.60)	(0.40)	–	0.40	1.20

*Assuming cumulative preference shares so dividend has to be paid to them.

From the above *EPS* calculation tables under the three financial plans we can see that when EBIT is ₹80,000 or more, Plan (ii) i.e. Debt-equity mix is preferable over the other plans as the *EPS* is more under it.

On the other hand, EBIT of less than ₹80,000 or less, Plan (i) i.e. equity financing is preferable over the other plans as the *EPS* is more under it.

The final choice of plan will depend on the performance of the company and other macro-economic conditions.

22. Existing capital employed = Equity + Retained Earnings + Debentures

= (80,000 ×10) + 12,00,000 + (1,20,000 ÷ 12%) = ₹30,00,000

Capital employed after expansion = 30,00,000 + 6,00,000 = ₹36,00,000

$$\text{New EBIT} = \frac{\text{Existing EBIT}}{\text{Existing Capital}} \times \text{New Capital} = \frac{4,50,000}{30,00,000} \times 36,00,000 = ₹5,40,000$$

Statement of EPS

Particulars	Existing	Additional fund as debt	Additional fund as equity
EBIT	4,50,000	5,40,000	5,40,000
Less: Interest			
– Existing Debt	1,20,000	1,20,000	1,20,000
– New Debt	–	72,000	–
EBT	3,30,000	3,48,000	4,20,000
Less: Tax @ 40%	1,32,000	1,39,200	1,68,000
EAT/EAE (A)	1,98,000	2,08,800	2,52,000
No. of Equity shares (B)	80,000	80,000	1,40,000
EPS (A ÷ B)	2.475	2.610	1.800

EPS is higher when the additional funds are raised through debt, thus it is the recommended option for the company.

23. **Calculation of EBIT**

Particulars	Existing	Proposed
Sale units	1,00,000	1,50,000
Contribution per unit	40 – 20 = 20	40 – (20×85%) = 23
Total contribution	20,00,000	34,50,000
Less: Fixed cost	10,00,000	15,00,000
EBIT	10,00,000	19,50,000

Statement of EPS

Particulars	Existing	Alternative – 1	Alternative – 2	Alternative – 3
EBIT	10,00,000	19,50,000	19,50,000	19,50,000
Less: Interest	–	50,000 (5,00,000 × 10%)	1,25,000 [(5lakh×10%) + (5lakh×15%)]	[(5lakh×10%) + (5lakh×15%) + (4lakh×20%)]
EBT	10,00,000	19,00,000	18,25,000	16,95,000
Less: Tax @ 40%	4,00,000	7,60,000	7,30,000	6,78,000
EAT / EAE (A)	6,00,000	11,40,000	10,95,000	10,17,000
No. of Equity Shares				
Existing	1,00,000	1,00,000	1,00,000	1,00,000
New	–	15,00,00 ÷ 200 = 7,500	10,00,00 ÷ 200 = 5,000	6,00,000 ÷ 200 = 3,000
Total Equity Shares (B)		1,07,500	1,05,000	1,03,000
EPS (A ÷ B)	6.00	10.60	10.43	9.87

Since, Alternative – 1 has highest *EPS*, thus it is recommended to raise funds in combination of debt of ₹5,00,000 and balance ₹15,00,000 from equity.

24. Working notes:

(*a*) Interest coverage ratio = 8

$$\frac{\text{EBIT}}{\text{Interest}} = 8$$

EBIT = 8 × 1,20,000 = ₹9,60,000

(*b*) Proposed EBIT = 9,60,000 + 6,15,000 = 15,75,000

(*c*) **Option – 1**

Debt = ₹10,00,000

Shareholder's fund = 8,00,000 + 20,00,000 + 12,00,000 + 34,50,000 = ₹74,50,000

$$\text{Debt equity ratio} = \frac{\text{Debt}}{\text{Shareholder's fund}} = \frac{10,00,000}{74,50,000} = 0.1342 = 13.42\%$$

PE Ratio in this case will be 25 times.

(*d*) **Option – 2**

Debt = 10,00,000 + 34,50,000 = ₹44,50,000

Shareholder's fund = 8,00,000 + 20,00,000 + 12,00,000 = ₹40,00,000

Debt equity ratio = $\frac{\text{Debt}}{\text{Shareholder's fund}} = \frac{44,50,000}{40,00,000} = 1.1125 = 111.25\%$

PE Ratio in this case will remain at 18 times

New number of equity shares to be issued = $\frac{34,50,000}{150} = 23,000$

(*e*) Calculation of Existing EPS and *MPS*

Particulars	₹
Current EBIT	9,60,000
(-) Interest	1,20,000
EBT	8,40,000
(-) Tax	2,52,000
EAT	5,88,000
(-) Preference dividend (12,00,000 × 9%)	1,08,000
Net earnings for equity	4,80,000
Number of equity shares	80,000
EPS	6
PE Ratio	25
MPS	150

Calculation of EPS and MPS under two financial options

Particulars	Option – 1	Option – 2
	Equity shares issued	16% long term debt
EBIT	15,75,000	15,75,000
(-) Interest on 12% debentures	1,20,000	1,20,000
(-) Interest on 16% debt	–	5,52,000
EBT	14,55,000	9,03,000
(-) Taxes @ 30%	4,36,500	2,70,900
EAT	10,18,500	6,32,100
(-) Preference dividend	1,08,000	1,08,000
Net earnings for equity	9,10,500	5,24,100
Number of equity shares	1,03,000	80,000
EPS	8.84	6.55
PE Ratio	25	18
MPS	221	117.90

Equity option has higher market price per share therefore company should raise additional fund through equity option.

25. Indifference level between two given plans is given as below:

EPS of (i) = EPS of (ii)

$$=\frac{[\text{EBIT}-(40,00,000\times 12\%)](1-0.35)}{60,000}=\frac{\left[\text{EBIT}-\left(40,00,000\times 12\%\right)\right](1-0.35)-\left(20,00,000\times 14\%\right)}{40,000}$$

$$\frac{0.65(EBIT)-3,12,000}{3}=\frac{0.65(\text{EBIT})-5,92,000}{2}$$

1.30(EBIT) – 6,24,000 = 1.95(EBIT) – 17,76,000

EBIT = ₹17,72,308

26. Alternative-I By issue of 6,00,000 equity shares of ₹10 each amounting to ₹60 lakhs. No financial charges are involved.

Alternative-II By raising the funds in the following way:

debt = ₹40 Lakhs Equity = ₹20 Lakhs (2, 00, 000 equity shares of ₹10 each) Interest Payable on

$$\text{debt} = 40,00,000\times\frac{18}{100}=₹7,20,000$$

The indifference point between the two alternatives is calculated by:

$$\frac{(\text{EBIT}-\text{I}_1)(1-\text{T})}{\text{E}_1}=\frac{(\text{EBIT}-\text{I}_2)(1-\text{T})}{\text{E}_2}$$

$$\frac{(\text{EBIT}-0)(1-0.40)}{6,00,000}=\frac{(\text{EBIT}-7,20,000)(1-0.40)}{2,00,000}$$

$$\frac{(\text{EBIT})(0.60)}{6,00,000}=\frac{(\text{EBIT}-7,20,000)(0.60)}{2,00,000}$$

$$\frac{\text{EBIT}(0.60)}{3}=\frac{0.60(\text{EBIT}-7,20,000)}{1}$$

EBIT = 3(EBIT) – 21,60,000

$$\text{EBIT}=\frac{21,60,000}{2}=10,80,000$$

Therefore, at EBIT of ₹10,80,000 earnings per share for the two alternatives is equal.

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

(i) By issuing equity shares only worth ₹9 crore or

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

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

Point of Indifference between the above two alternatives

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

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

Or 0.7 EBIT = 2 1EBIT – ₹1, 51, 20, 000

EBIT = ₹1, 08, 00, 000

EBIT at point of Indifference will be ₹1.08 crore.

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

28. (*a*) Computation of EPS

Particulars	Plan I	Plan II
EBIT	40,00,000	40,00,000
Less: Interest	–	9,00,000 (75,00,000×12%)
EBT	40,00,000	31,00,000
Less: Tax @ 30%	12,00,000	9,30,000
EAT/EAE (A)	28,00,000	21,70,000
No. of Equity Shares (B)	4,00,000 [100,00,000÷25]	1,00,000 [25,00,000÷25]
***EPS* (A ÷ B)**	7	21.70

(*b*) Computation of Financial Break-even Point

$$\text{Plan I} = \text{Interest} + \frac{\text{Preference Dividend}}{(1-t)} = 0 + 0 = ₹0$$

$$\text{Plan II} = \text{Interest} + \frac{\text{Preference Dividend}}{(1-t)} = 9,00,000 + 0 = ₹9,00,000$$

(*c*) Computation of Indifference Point

$$\frac{(\text{EBIT} - \text{Int})(1-\text{t}) - \text{PD}}{\text{No. of shares}} = \frac{(\text{EBIT} - \text{Int})(1-\text{t}) - \text{PD}}{\text{No. of shares}}$$

$$\frac{(\text{EBIT} - 0)(1-0.30) - 0}{4,00,000} = \frac{(\text{EBIT} - 9,00,000)(1-0.30) - 0}{1,00,000}$$

$$\frac{(0.70)\text{EBIT}}{4} = \frac{(0.70)\text{EBIT} - 6,30,000}{1}$$

(0.70)EBIT = (2.80)EBIT – 25,20,000

(0.21)EBIT = 25,20,000

EBIT = ₹12,00,000

29. Proposed Capital Structure

Capital	Proposal I	Proposal II
Equity	1,25,00,000 (5,00,00,000 × 25%)	2,50,00,000 (5,00,00,000 × 50%)

Capital	Proposal I	Proposal II
Debt @10%	3,75,00,000 (5,00,00,000 × 75%)	–
12% Preference shares	–	2,50,00,000 (5,00,00,000 × 50%)

Total Capital Structure (including new proposal)

Capital	Proposal I	Proposal II
Equity	(7,00,000×20) + 1,25,00,000 = 2,65,00,000	(7,00,000 × 20) + 2,50,00,000 = 3,90,00,000
Reserves	10,00,000	10,00,000
9% Bonds	3,00,00,000	3,00,00,000
10% Debt	3,75,00,000	–
11% Preference Shares	1,50,00,000	–
12% Preference Shares	–	2,50,00,000
Total	**11,00,00,000**	**11,00,00,000**

Let Indifference point be ₹y.

$$EPS \text{ of Proposal I} = \frac{[y - \{(3,00,00,000 \times 9\%) + (3,75,00,000 \times 10\%)\}(1 - 0.34) - (1,50,00,000 \times 11\%)}{[7,00,000 + (1,25,00,000 \div 20)]}$$

$$= \frac{(y - 64,50,000)(0.66) - 16,50,000}{13,25,000}$$

$$EPS \text{ of Proposal II} = \frac{[y - (3,00,00,000 \times 9\%)](1 - 0.34) - (2,50,00,000 \times 12\%)}{[7,00,000 + (2,50,00,000 \div 20]}$$

$$= \frac{(y - 27,00,000)(0.66) - 46,50,000}{19,50,000}$$

For calculation of indifference point,

$$\frac{(y - 64,50,000)(0.66) - 16,50,000}{13,25,000} = \frac{(y - 27,00,000)(0.66) - 46,50,000}{19,50,000}$$

$$\frac{0.66(y) - 42,57,000 - 16,50,000}{1,325} = \frac{(y)(0.66) - 17,82,000 - 46,50,000}{1,950}$$

$$\frac{0.66(y) - 59,07,000}{1,325} = \frac{(y)(0.66) - 64,32,000}{1,950}$$

(1,287)y – 11,51,86,50,000 = (874.50)y – 8,52,24,00,000

(412.50)y = 2,99,62,50,000

y = ₹72,63,636.36

30. Computation of Rate of Preference Dividend

$$\frac{(\text{EBIT} - \text{Interest})(1 - t)}{\text{No. of Equity Shares}(N_1)} = \frac{\text{EBIT}(1 - t)(-) \text{ Preference Dividend}}{\text{No. of Equity Shares}(N_2)}$$

$$\frac{(₹4,80,000 - ₹48,000) \times (1 - 0.30)}{80,000 \text{ shares}} = \frac{₹4,80,000(1 - 0.30) - \text{Preference Dividend}}{80,000 \text{ shares}}$$

$$\frac{₹3,02,400}{80,000 \text{ shares}} = \frac{₹3,36,000 - \text{Preference Dividend}}{80,000 \text{ shares}}$$

₹3, 02, 400 = EBIT ₹3, 36, 000 – Preference Dividend

Preference Dividend = ₹3, 36, 000 – ₹3, 02, 400 = ₹ 33, 600

$$\text{Rate of Dividend} = \frac{\text{Preference Dividend}}{\text{Preference share capital}} \times 100 = \frac{₹33,600}{4,00,000} \times 100 = 8.4\%$$

31. (*a*) Calculation of EPS

Particulars	Alternatives		
	Alternative-I: Take additional Debt	Alternative-II: Issue 11% Preference Shares	Alternative-III: Issue further Equity Shares
	(₹)	(₹)	(₹)
EBIT	15, 00, 000	15, 00, 000	15, 00, 000
Interest on Debts:			
– on existing debt @ 10%	(3, 60, 000)	(3, 60, 000)	(3, 60, 000)
– on new debt @12%	(4, 80, 000)	.....	.....
Profit before taxes	6, 60, 000	11, 40, 000	11, 40, 000
Taxes@ 40%	(2, 64, 000)	(4, 56, 000)	(4, 56, 000)
Profit after taxes	3, 96, 000	6, 84, 000	6, 84, 000
Preference shares dividend	.....	(4, 40, 000)	.....
Earnings available to equity Shareholders	3,96,000	2, 44, 000	6, 84, 000
Number of shares	8, 00, 000	8, 00, 000	10, 50, 000
Earnings per share	0.495	0.305	0.651

(*b*) For the present *EBIT* level, equity shares are clearly preferable. *EBIT* would need to increase by ₹2,376 – ₹1, 500 = ₹876 before an indifference point with debt is reached. One would want to be comfortably above this indifference point before a strong case for debt should be made. The lower the probability that actual EBIT will fall below the indifference point, the stronger the case that can be made for debt, all other things remain the same.

Working Note:

Calculation of indifference point between debt and equity shares -

$$\frac{\text{EBIT} - ₹8,40,000}{8,00,000} = \frac{\text{EBIT} - ₹3,60,000}{10,50,000}$$

$$\frac{\text{EBIT} - ₹8,40,000}{80} = \frac{\text{EBIT} - ₹3,60,000}{105}$$

(EBIT – 8,40,000)(105) = (EBIT – 3,60,000)(80)

(105)EBIT – 8,82,00,000 = (80)(EBIT) – 2,88,00,000

(25)(EBIT) = 5,94,00,000

$$EBIT = \frac{5,94,00,000}{25} = ₹23,76,000$$

32. (i) Calculation of total value of the firm

$$\text{Value of equity } (S) = \frac{\text{Earnings available for equity holders}}{K_e} = \frac{(1,00,000 - 50,000)}{0.15} = 3,33,333$$

Value of Debt (D) (given) = ₹5, 00, 000

Total value of the firm (V) = D + S = 5, 00, 000 + 3, 33, 333 = ₹8, 33, 333

(ii) $$\text{Overall cost of capital}(K_o) = K_e\left(\frac{S}{V}\right) + K_d\left(\frac{D}{V}\right) = 0.15\left(\frac{₹3,33,333}{₹8,33,333}\right) + 0.10\left(\frac{₹5,00,000}{₹8,33,333}\right) = 12.00\%$$

$$\text{Or}, K_0 = \frac{EBIT}{V} = \frac{₹1,00,000}{₹8,33,333} = 12.00\%$$

(iii) Value of debt (*D*) = ₹5,00,000 + ₹2,00,000 = ₹7,00,000

$$\text{Value of equity } (S) = \frac{\text{Earnings available for equity holders}}{K_e} = \frac{(1,00,000 - 70,000)}{0.15} = ₹2,00,000$$

Total value of the firm (V) = D + S = 7, 00, 000 + 2, 00, 000= ₹9, 00, 000

$$\text{Overall cost of capital}(K_o) = K_e\left(\frac{S}{V}\right) + K_d\left(\frac{D}{V}\right) = 0.15\left(\frac{₹2,00,000}{₹9,00,000}\right) + 0.10\left(\frac{₹7,00,000}{₹9,00,000}\right)$$

= 11.11%

$$\text{or, } K_0 = \frac{EBIT}{V} = \frac{₹1,00,000}{₹9,00,000} = 11.11\%$$

33. 1. Valuation of firms

Particulars	Levered Firm (₹)	Unlevered Firm (₹)
EBIT	30,000	30,000
Less: Interest on debt (10% × ₹1, 00, 000)	10,000	Nil
Earnings available to Equity shareholders	20,000	30,000
K_e	12.5%	12.5%
Value of Equity (*S*). (Earnings available to Equity shareholders /K_e)	1, 60, 000	2, 40, 00
Debt (D)	1, 00, 00	Nil
Value of Firm (V) = S + D	2, 60, 000	2, 40, 000

Value of Levered company is more than that of unlevered company. Therefore, investor will sell his shares in levered company and buy shares in unlevered company. To maintain the level of risk he will borrow proportionate amount and invest that amount also in shares of unlevered company.

2. Investment & Borrowings

Sell shares in Levered company (₹1,60,000 × 15%)	24,000
Borrow money (₹1,00,000 × 15%)	15, 000
Buy shares in Unlevered company	39, 000

3. Change in Return

Income from shares in Unlevered company (₹39, 000 × 12.5%)	4,875
Less: Interest on loan (₹15, 000 × 10%)	1,500
Net Income from unlevered firm	3,375
Less: Income from Levered firm (₹24000 × 12.5%)	3,000
Incremental Income due to arbitrage	375

34. 1. Valuation of firms

Particulars	Levered Firm (₹)	Unlevered Firm (₹)
EBIT	30,000	30,000
Less: Interest on debt (10% × ₹1,00,000)	10,000	Nil
Earnings available to Equity shareholders	20,000	30,000
K_e	20%	12.5%
Value of Equity (S) (Earnings available to Equity shareholders/Ke)	1,00,000	2,40,000
Debt (D)	1,00,000	Nil
Value of Firm (V) = S + D	2,00,000	2,40,000

Value of Unlevered company is more than that of Levered company therefore investor will sell his shares in Unlevered company and buy shares in Levered company. Market value of Debt and Equity of Levered company are in the ratio of ₹1, 00, 000 : ₹1,00,000 i.e. 1:1. To maintain the level of risk he will lend proportionate amount (50%) and invest balance amount (50%) in shares of Levered company.

2. Investment & Borrowings

Sell shares in Unlevered company (₹2,40,000 × 15%)	36, 000
Lend money (₹36, 000 × 50%)	18,000
Buy shares in Levered company (₹36,000 × 50%)	18, 000
Total	36, 000

3.

Change in Return	₹
Income from shares in Levered company (₹18, 000 × 20%)	3,600
Interest on money lent (₹18, 000 × 10%)	1,800
Total Income after switch over	5,400
Less: Income from Unlevered firm (₹36, 000 × 12.5%)	45, 500
Incremental Income due to arbitrage	900

35. Note that the ratio given in this question is not debt to equity ratio. Rather it is the debt to total value ratio. Therefore, if the ratio is 0.6 , it means that capital employed comprises 60% debt and 40% equity.

$$K_O = \frac{K_d \times D + K_e \times S}{D + S}$$

In this question total of weight is equal to 1 in all cases, hence we need not to divide by it.

$K_0 = 11\% \times 0 + 13\% \times 1 = 13.00\%$

$K_0 = 11\% \times 0.1 + 13\% \times 0.9 = 12.80\%$

$K_0 = 11.6\% \times 0.2 + 14\% \times 0.8 = 13.52\%$

$K_0 = 12\% \times 0.3 + 15\% \times 0.7 = 14.10\%$

$K_0 = 13\% \times 0.4 + 16\% \times 0.6 = 14.80\%$

$K_0 = 15\% \times 0.5 + 18\% \times 0.5 = 16.50\%$

$K_0 = 18\% \times 0.6 + 20\% \times 0.4 = 18.80\%$

Decision: 2nd option is the best because it has lowest WACC.

36. (i) Statement showing total value of the firm

	₹
Net operating income (EBIT)	5, 00, 000
Less: Interest on debentures (10% of ₹15,00,000)	1, 50, 000
Earnings available for equity holders	3, 50, 000
Total cost of capital (K_0) (given)	15%
Value of the firm $(V) = \frac{EBIT}{k_0} = \frac{₹5,00,000}{0.15}$	33, 33, 333

(ii) Calculation of cost of equity

Market value of debt (D) = ₹15,00,000

Market value of equity (S) = $V - D$ = ₹33,33,3333 – ₹15,00,000 = ₹18,33,333

$$K_e = \frac{\text{EBIT} - \text{Interest paid on debt}}{\text{Market value of equity}} = \frac{₹3,50,000}{₹18,33,333} = 19.09\%$$

or

$$K_0 = K_e\left(\frac{S}{V}\right) + K_d\left(\frac{D}{V}\right)$$

$$= K_o\left(\frac{V}{S}\right) - K_d\left(\frac{D}{S}\right) = 0.15\left(\frac{₹33,33,333}{₹18,33,333}\right) - 0.10\left(\frac{₹15,00,000}{₹18,33,333}\right) = 19.09\%$$

37. As per MM approach, cost of the capital (Ko) remains constant, and cost of equity increases linearly with debt.

$$\text{Value of a Firm} = \frac{NOI}{K_0}$$

$$\therefore 1,20,00,000 = \frac{21,60,000}{K_0}$$

$\therefore K_0 = \frac{21,60,000}{1,20,00,000} = 18\%$

Under MM approach, $k_e = k_0 + \frac{D}{E}(k_0 - k_d)$

Statement of equity capitalization under MM approach

Debt Value (₹)	Equity Value (₹)	Debt/ Equity	K_d (%)	K_o (%)	$K_o - k_d$ (%)	$K_e = K_o + (K_o - K_d)\left(\frac{D}{E}\right)$
–	1,20,00,000	0.0000	NA	18.00	18.00	18.00
10,00,000	1,10,00,000	0.0909	7.00	18.00	11.00	19.00
20,00,000	1,00,00,000	0.2000	7.00	18.00	11.00	20.20
30,00,000	90,00,000	0.3333	7.50	18.00	10.50	21.50
40,00,000	80,00,000	0.5000	7.50	18.00	10.50	23.25
50,00,000	70,00,000	0.7143	8.00	18.00	10.00	25.14
60,00,000	60,00,000	1.0000	8.50	18.00	9.50	27.50
70,00,000	50,00,000	1.4000	9.00	18.00	9.00	30.60
80,00,000	40,00,000	2.0000	10.00	18.00	8.00	34.00

38. Here we are assuming that MM Approach 1958: Without tax, where capital structure has no relevance with the value of company and accordingly overall cost of capital of both levered as well as unlevered company is same. Therefore, the two companies should have similar WACCs. Because SK Limited is all-equity financed, its WACC is the same as its cost of equity finance, i.e. 16 per cent. It follows that SK Limited should have WACC equal to 16 per cent also.

Therefore, Cost of equity in SK Ltd. (levered company) will be calculated as follows:

$K_o = \frac{2}{3} \times K_e + \frac{1}{3} \times K_d = 16\%$ (i.e. equal to WACC of SK Ltd.)

Or, $16\% = \frac{2}{3} \times K_e + \frac{1}{3} \times 10\%$ Or, Ke = 19

39. (*a*) As per MM Model, Ko = Keu = 9.09%

Statement of Value of Firms

Particulars	Firm A	Firm B
EBIT (₹)	5,000	5,000
Ko	9.09%	9.09%
Equilibrium value (₹)	$\frac{5,000}{9.09\%} = 55,005.50$	$\frac{5,000}{9.09\%} = 55,005.50$

(*b*) **Statement of value of Equity**

Particulars	Firm A	Firm B
Equilibrium value	55,005.50	55,005.50
(–) Value of debt	–	30,000
Value of equity	55,005.50	25,005.50

Cost of equity of Firm A (unlevered) = 9.09%

Cost of equity of Firm B (levered) = $\frac{\text{Net Income}}{\text{Value of equity}} \times 100 = \frac{3,200}{25,005.50} \times 100 = 12.80\%$

Or

Cost of equity of firm B = Ko + (Ko – Kd) $\left(\frac{\text{Debt}}{\text{Equity}}\right) = 9.09 + (9.09 - 6)\left(\frac{30,000}{25,005.50}\right) = 12.80\%$

Cost of debt (Kd) = $\frac{1,800}{30,000} \times 100 = 6\%$

40. Working Note:

Market value of equity = $\frac{\text{Net Income}(\text{NI}) \text{for Equity Holders}}{\text{Ke}}$

₹25, 00, 000 = $\frac{\text{Net Income}(\text{NI}) \text{for Equity Holders}}{0.21}$

Net Income for Equity Holders = 25,00,000 × 0.21 = ₹5,25,000

EBIT = $\frac{5,25,000}{1-0.30} = ₹7,50,000$

(₹in lakhs)

Particulars	All Equity	Debt and Equity
EBIT	7,50,000	7,50,000
(-) Interest	–	(75,000)
EBT	7,50,000	6,75,000
(-) Tax @ 30%	2,25,000	2,02,500
Income to shareholders	5,25,000	4,72,500

(*a*) Market value of company = Value of equity + Value of debt

= ₹25,00,000 + (5,00,000 × 0.30) = ₹26,50,000

The impact is that the market value of the company has increased by ₹1,50,000.

(*b*) $K_e = \frac{\text{Net income to equity holders}}{\text{Equity value}} = \frac{4,72,500}{26,50,000-5,00,000} = 0.219 = 21.98\%$

(*c*) $K_d = I \times (1 - t) = 15\% \times (1 - 0.30) = 10.5\%$

Weighted Average Cost of Capital (WACC)

Source (1)	Amount (2)	Weights (3)	Cost of capital (4)	Weighted Average Cost (5)= (3)x(4)
Equity	21,50,000	0.81	21.98	17.80
Debt	5,00,000	0.19	10.50	2.00
	26,50,000	1		19.80

Weighted Average Cost of Capital (WACC) = 19.80%

The impact is that WACC has fallen by 1.20% due to benefit of lower cost of capital of debt.

41. Statement showing Profitability of Alternative Schemes for Financing (₹in 00, 000)

Particulars	Existing	Alternative Schemes		
		(i)	(ii)	(iii)
Equity Share capital (existing)	10	10	10	10
New issues	–	10	5	–
Total	**10**	**20**	**15**	**10**
7% debentures	10	10	10	10
6% debentures	–	–	5	10
Total	**20**	**30**	**30**	**30**
Debenture interest (7%)	0.7	0.7	0.7	0.7
Debenture interest (6%)	–	–	0.3	0.6
Total	**0.7**	**0.7**	**1.0**	**1.3**
Output (units in lakh)	1	1.5	1.5	1.5
Contribution per. Unit (₹) (Selling price – Variable Cost)	20	22	22	22
Contribution (₹lakh)	20	33	33	33
Less: Fixed cost	10	15	15	15
EBIT	10	18	18	18
Less: Interest (as calculated above)	0.7	0.7	1.0	1.3
EBT	9.3	17.3	17	16.7
Less: Tax (40%)	3.72	6.92	6.8	6.68
EAT	5.58	10.38	10.20	10.02
Operating Leverage (Contribution /EBIT)	2.00	1.83	1.83	1.83
Financial Leverage (EBIT/EBT)	1.08	1.04	1.06	1.08
Combined Leverage (Contribution/EBT)	2.15	1.91	1.94	1.98
EPS (EAT/No. of shares) (₹)	5.58	5.19	6.80	10.02
Risk	–	Lowest	Lower than option (3)	Highest
Return	–	Lowest	Lower than option (3)	Highest

From the above figures, we can see that the Operating Leverage is same in all alternatives though Financial Leverage differs. Alternative (iii) uses the maximum amount of debt and result into the highest degree of financial leverage, followed by alternative (ii). Accordingly, risk of the company will be maximum in these options. Corresponding to this scheme, however, maximum EPS (i.e., ₹10.02 per share) will be also in option (iii).

So, if SK Ltd. is ready to take a high degree of risk, then alternative (iii) is strongly recommended. In case of opting for less risk, alternative (ii) is the next best option with a reduced EPS of ₹6.80 per share. In case of alternative (i), EPS is even lower than the existing option, hence not recommended.

42. (i) Value of Debt $= \frac{\text{Interest}}{\text{Cost of debt}\left(K_d\right)} = \frac{₹7,50,000}{0.08} = ₹93,75,000$

(ii) Value of equity capital $= \frac{\text{Operating profit - Interest}}{\text{Cost of equity}\left(K_e\right)} = \frac{₹34,50,000 - ₹7,50,000}{0.16}$

$= ₹1, 68, 75, 000$

(iii) New Cost of equity (K_e) after proposal $= \frac{\text{Increased Operating profit – Interest on Increased debt}}{\text{Equity capital}}$

$= \frac{\left(₹34,50,000 + ₹14,25,000\right) - \left(₹7,50,000 + ₹6,00,000\right)}{\text{n}1,68,75,000} = \frac{₹35,25,000}{₹1,68,75,000} = 0.209 \text{ or } 20.9\%$

(*a*) Calculation of Weighted Average Cost of Capital (WACC) before the new proposal

Sources	(₹)	Weight	Cost of Capital	WACC
Equity	1, 68, 75, 000	0.6429	0.160	0.1029
Debt	93, 75, 000	0.3571	0.080	0.0286
Total	**2, 62, 50, 000**	**1**		**0.1315 or 13.15%**

(*b*) Calculation of Weighted Average Cost of Capital (WACC) after the new proposal

Sources	(₹)	Weight	Cost of Capital	WACC
Equity	1,68,75,000	0.5000	0.209	0.1045
Debt	1,68,75,000	0.5000	0.080	0.0400
Total	**3,37,50,000**	**1**		**0.1445 or 14.45%**