

5. CAPITAL STRUCTURE

CONCEPT WISE ANALYSIS OF PAST EXAM PAPERS OF IPCC

Model No.	M-09	N - 09	M-10 TO N-10	M - 11	N-11 TO M-13	N - 13	M - 14	N - 14	M - 15	N - 15	M - 16	N - 16
1	-	-	-	-	-	-	-	4	-	8	-	8
2	-	-	-	-	-	5	5	-	-	-	-	-
3.1	-	-	-	-	-	-	-	-	-	-	-	-
3.2	-	-	-	-	-	-	-	-	-	-	-	-
3.3	-	-	-	-	-	-	-	-	-	-	-	-
3.4	-	-	-	-	-	-	-	2.5	-	-	-	-
4	-	3	-	-	-	-	-	-	-	-	-	-

PROBLEMS FOR CLASSROOM DISCUSSION

MODEL 1: EBIT - EPS ANALYSIS

Pr.1: A Ltd. has a share capital of Rs.1,00,000 divided into shares of Rs.10 each. It has a major expansion program requiring an investment of another Rs. 50,000. The management is considering the following alternatives for raising this amount:

- a) Issue of 5,000 equity shares of Rs. 10 each.
- b) Issue of 5,000, 12% preference shares of Rs.10 each.
- c) Issue of 10% debentures of Rs. 50,000.

The company's present Earnings Before Interest And Tax (EBIT) are Rs. 40,000 per annum subject to tax @ 50%. You are required to calculate the effect of each of the above financial plan on the Earnings Per Share presuming:

- i) EBIT continues to be the same even after expansion.
- ii) EBIT increases by Rs. 10,000.

(Ans.: (i) EPS for Alternative-1 Rs.1.33, Alternative-2 Rs.1.4, Alternative-3 Rs.1.75, (ii) EPS Alternative-1 Rs.1.67, Alternative-2 Rs.1.9, Alternative-3 Rs.2.25)

Note: _____

Pr.2: A Company earns a profit of Rs. 3,00,000 per annum after meeting its interest liability of Rs. 1,20,000 on 12% debentures. The Tax rate is 50%. The number of Equity Shares of Rs. 10 each are 80,000 and the retained earnings amount to Rs. 12,00,000. The company proposes to take up an expansion scheme for which a sum of Rs. 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. (PM)

Required:

- a) Compute the Earnings Per Share (EPS), if:

- i) The additional funds were raised as debt
 ii) The additional funds were raised by issue of equity shares.

b) Advise the company as to which source of finance is preferable.

(Ans.: (i) EPS for additional funds raised as Debt is Rs.1.925 & Equity is Rs.1.483 (ii) Since EPS is Maximum in case of funds Raised through Debt)

Note: _____

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

- a) To issue equity capital for the entire additional amount. It is expected that the new shares (face value of Rs.10) can be sold at a premium of Rs.15.
 b) To issue 16% non-convertible debentures of Rs. 100 each for the entire amount.
 c) To issue equity capital for Rs.25 lakhs (face value of Rs.10) and 16% non-convertible debentures for the balance amount. In this case, the company can issue shares at a premium of Rs.40 each.

You are required to advise the management as to how the additional capital can be raised, keeping in mind that the management wants to maximize the earnings per share to maintain its goodwill. The company is paying income tax at 50%.

(Solve Problem No. 5 of Assignment Problems as rework)

(Ans.: Existing EPS is Rs.3 & EPS for Option-I is Rs.4.16, Option-II is Rs.4.6, Option-III is Rs.4.57 & Option-II. i.e., issue of 16% debentures is most suitable to maximize the Earnings Per Share)

Note: _____

Pr.4: Paramount Products Ltd. wants to raise Rs. 100 lakhs for a diversification project. Current estimate of earnings before interest and taxes (EBIT) from the new projects is Rs. 22 lakhs per annum. Cost of debt will 15% for amounts up to and including Rs. 40 lakhs, 16% for additional amounts up to and including Rs. 50 lakhs and 18% for additional amounts above Rs. 50 lakhs. The equity shares (face value Rs.10) of the company have a current market value of Rs. 40. This is expected to fall to Rs. 32 if debts exceeding Rs.50 lakhs are raised. The following options are under consideration of the Company:

Option	Equity	Debt
I	50%	50%
II	60%	40%
III	40%	60%

Determine the earning per share (E.P.S.) for each option and state which option the company should exercise. Tax rate applicable to the company is 50%.

(Solve Problem No. 2, 7 of Assignment Problems as rework)

(Ans.: EPS for Option-I is Rs.5.76, Option-II is Rs.5.33, Option-III is Rs.5.04 & Option-I. is most suitable to maximize the Earnings Per Share)

Note: _____

Pr.5: (PRINTED SOLUTION AVAILABLE) The existing capital structure of XYZ Ltd. is as under:

Particulars	Rs.
Equity shares of Rs. 100 each	40,00,000
Retained earnings	10,00,000
9% preference share of Rs. 100 each	25,00,000
7% debentures of Rs. 100 each	25,00,000

The existing rate of return on the company's capital is 12% and the income-tax rate is 50%. The company requires a sum of Rs. 25,00,000 to finance its expansion program for which it is considering the following alternatives: Issue of 20,000 equity shares at a premium of Rs. 25 per share Or Issue of 10% preference shares or Issue of 8% debentures. It is estimated that the PE ratio in the cases of Equity, Preference and Debenture financing would be 20, 17 and 16 respectively. Which of the above alternatives would you recommend?

(Ans.: Market price (EPS X PE ratio) for Option-I is Rs.146, Option-II is Rs.80, Option-III is Rs.135 & Since market price is high in option I, it is beneficial to raise the funds of Rs.25,00,000 by way of fresh equity shares)
(Solve Problem No. 6 of Assignment Problems as rework)

Note: _____

Pr.6: (PRINTED SOLUTION AVAILABLE) AB Limited provides you with the following information:

Particulars	Rs.
Profit	3,00,000
Less: Interest on debentures (0.12)	60,000
Earnings before taxes	2,40,000
Less: Taxes (0.35)	84,000
Earnings after taxes	1,56,000
Number of equity shares (Rs 10 each)	40,000
Earnings per share	3.9
Ruling market price	39
P/E ratio (Price / EPS) (times)	10

The company has undistributed reserves, Rs. 6,00,000. It needs Rs. 2,00,000 for expansion which will earn the same rate as funds already employed.

You are informed that a debt-equity ratio (debt / debt + equity) higher than 35 per cent will push the P/E ratio down to 8 and raise the interest rate on additional amount borrowed to 14%.

You are required to ascertain the probable price of the equity share:

- If the additional funds are raised as debt; and
- If the amount is raised by rising equity shares (at current market price).

(Ans.: Market price for Option-I is Rs.32.76, Option-II is Rs.40.33, & Since market price is high in option II, it is beneficial to raise the funds by way of fresh equity shares)

(Solve Problem No. 3 of Assignment Problems as rework)

Note: _____

Pr.7: (PRINTED SOLUTION AVAILABLE) Alpha Company is contemplating conversion of 500 14% convertible bonds of Rs. 1,000 each. Market price of the bond is Rs. 1,080. Bond indenture provides that one bond will be exchanged for 10 shares. Price earnings ratio before redemption is 20:1 and anticipated price-earning ratio on redemption is 25:1. Number of shares outstanding prior to redemption are 10,000. EBIT amounts to Rs.2,00,000. The company is in the 35% tax bracket. Should the company convert bonds into shares? Give reasons.

(Ans.: Market price (EPS X PE ratio) for Before conversion is Rs.169 & After conversion is Rs.216.75 & Due to conversion the market price will increase from Rs.169 to Rs.216.75. So it is beneficial to convert the bonds into shares)

Note: _____

MODEL 2: INDIFFERENCE POINT/EPS EQUIVALENCY POINT

Pr.8: ABC Ltd. is considering a capital structure of Rs.10,00,000 for which various mutually exclusive set of options are available. Calculate the indifference level of EBIT between the following alternative sets: (PM)

- Equity share capital of Rs.10,00,000 or 15% Debentures of Rs.5,00,000 plus equity share capital of Rs. 5,00,000.
- Equity share capital of Rs.10,00,000, or 13% Pref. shares capital of Rs.5,00,000 plus Equity share capital of Rs.5,00,000.
- Equity share capital of Rs.6,00,000 plus 15% debentures of Rs.4,00,000, or Equity share capital of Rs.4,00,000 plus 13% Pref. shares capital of Rs.2,00,000 plus 15% debenture of Rs. 4,00,000.
- Equity share capital of Rs.8,00,000 plus 13% Pref. shares capital of Rs.2,00,000, or Equity share capital of Rs.4,00,000 plus 13% Pref. share capital of Rs. 2,00,000 plus 15% debentures of Rs.4,00,000.

The issue price of equity shares may be taken at par i.e., Rs. 100 each and the tax rate may be assumed at 50%. Find out indifference point of EBIT for different sets.

(Ans.: a. Rs.1, 50,000, b. Rs. 2, 60,000, c. Rs.2, 16,000 & d. Rs. 1, 72,000)

(Solve Problem No. 10 of Assignment Problems as rework)

Note: _____

Pr.9: (PRINTED SOLUTION AVAILABLE): The following current data are available concerning Theta Limited:

Share issued	10,000
Market price per share	Rs.20
Interest rate	12%
Tax Rate	46%
Expected EBIT	Rs.15,000

The company requires an additional Rs.50,000 for the coming year.

You are required to determine:

- Which financing option (debt or equity issue) will give higher EPS for the expected EBIT?
- What is indifference level of EBIT for the two alternatives?
- What is EPS for that EBIT? (RTP) (Ans: (i) Equity is preferred, (ii)Rs.30,000 (iii)Rs.1.296/-)

Note: _____

Pr.10: (PRINTED SOLUTION AVAILABLE) Excel Limited is considering three financing plans. The key information is as follows: (SM)

- a) Total funds to be raised, Rs.2,00,000.
b) Financing plans

Plans	Equity (%)	Debt (%)	Preference (%)
A	100	—	—
B	50	50	—
C	50	—	50

- c) Cost of debt 8 per cent; cost of preference shares 8 per cent.
d) Tax rate, 35 per cent.
e) Equity shares of the face value of Rs.10 each will be issued at a premium of Rs.10 per share.
f) Expected EBIT Rs.80,000.

Determine for each plan:

- i) Earnings per share (EPS) and financial break-even point.
ii) Indicate if any of the plans dominate and compute the EBIT range among the plans for indifference.

(Ans.: i. EPS for Plan A is Rs. 5.2, Plan B is Rs. 9.36, Plan C is Rs. 8.8 & Financial Break Even Point for Plan A is Rs. 0, Plan B is Rs. 8,000, Plan C is Rs. 12,308, ii. If EBIT is Rs.16,000, then EPS is same under plan A & Plan B, If EBIT is more than Rs.16,000, then plan B is preferable, If EBIT is less than Rs.16,000, then plan A is preferable)

(Solve Problem No. 11 of Assignment Problems as rework)

Note: _____

Pr.11: (PRINTED SOLUTION AVAILABLE) A new project is under consideration in Zip Ltd., which requires a capital investment of Rs. 4.50 crore. 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. (PM)

(Ans.: EBIT = Rs.54 lakhs)

(Solve Problem No. 8, 9 of Assignment Problems as rework)

Note: _____

Pr.12: X Ltd is considering the following two alternatives

	Plan I	Plan II
	Amount (Rs)	Amount (Rs)
Equity Shares of Rs.10 /- each	4,00,000	4,00,000
12 % Debentures	2,00,000	-
Preference Shares of Rs.100/- each	-	2,00,000
	6,00,000	6,00,000

The indifference point between the plans is Rs.2,40,000 .Corporate Tax rate is 30% .Calculate the rate of Dividend of Preference Shares. (PM) (Ans: 8.40%)

Pr.15: (PRINTED SOLUTION AVAILABLE)

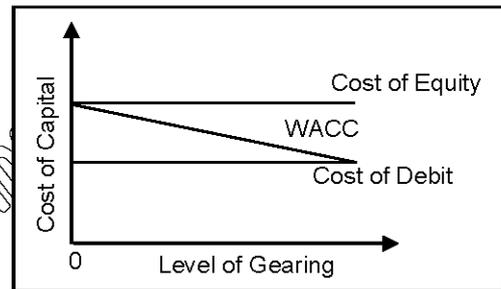
- a) A firm has EBIT of Rs. 40,000. The firm has 10% debentures of Rs. 1,00,000 and its current equity capitalisation rate is 16%. Find out the value of the firm and its overall cost of capital under traditional approach?
- b) The firm is considering increasing its leverage by issuing additional Rs. 50,000 debentures and using the proceeds to retire that amount of equity. If however, as the firm increases the proportion of debt, K_d would rise to 11% and K_e to 17%. State the implications.
- c) The firm issues additional Rs. 1,00,000 debentures instead of Rs. 50,000 (that is having Rs.2,00,000 debentures) and uses the proceeds to retire that amount of equity. Due to increased financial risk, K_d would rise to 12.5% and K_e to 20%. State the implications.

(Ans.: a. Rs.2,87,500 & 13.913%, b. Rs.2,88,235 & 13.88%, c. Rs.2,75,000 & 14.54%)

Note: _____

MODEL 3.2: NET INCOME APPROACH (NI-APPROACH)

This approach has been suggested by Durand. According to this approach a firm can increase its value or lower the overall cost of capital by increasing the proportion of debt in the capital structure. Under this approach, the value of the firm will be maximum at a point where weighted average cost of capital is minimum. Net income approach is based on the following three assumptions:



- a) There are no corporate taxes.
- b) The cost of debt is less than cost of equity or equity capitalisation rate.
- c) The use of debt content does not change the risk perception of investors as a result both the K_d (debt capitalisation rate) and K_e (equity - capitalisation rate) remains constant.

The value of the firm on the basis of Net Income Approach can be ascertained as follows:

$$V = S + D$$

Where, V = Value of the firm
 S = Market value of equity
 D = Market value of debt

$$\text{Market value of equity (S)} = \frac{NI}{K_e}$$

Where, NI = Earnings available for equity shareholders.
 K_e = Equity Capitalisation

The overall cost of capital under this approach is:

$$\text{Overall cost of capital} = \frac{\text{E.B.I.T.}}{\text{Value of the firm}}$$

Pr.16: Rupa Company's EBIT is Rs.5,00,000. The company has 10%, 20 lakh debentures. The equity capitalization rate i.e. K_e is 16%. (SM)

You are required to calculate under NI Approach:

- a) Market value of equity and value of firm b) Overall cost of capital

(Solve Problem No.12 of Assignment Problems as rework)

(Ans.: a. Rs.38,75,000 & 12.9%)

Pr.17: A company's expected net operating income (EBIT) is Rs.50,000. The company has Rs.2,00,000, 10% debentures. The equity capitalisation rate (Ke) of the company is 12.5 %. Find the value of the firm under the NI approach under each of the below alternatives.

- The firm has decided to raise the amount of debenture by Rs.1,00,000 and use the proceeds to retire the equity shares - State the implications?
- The amount of debt has been reduced by Rs. 1,00,000 and a fresh issue of equity shares is made to retire the debentures State the implications?

(Ans.: a. As the proportion of Debt increase has decreased from 11.36% to 10.87% & As a result of M.V of the firm has increased from Rs.4,40,000 to Rs.4,60,000, b. As the proportion of Debt decrease has increased from 11.36% to 11.90% & As a result of M.V of the firm has increased from Rs.4,40,000 to Rs.4,20,000)

Note: _____

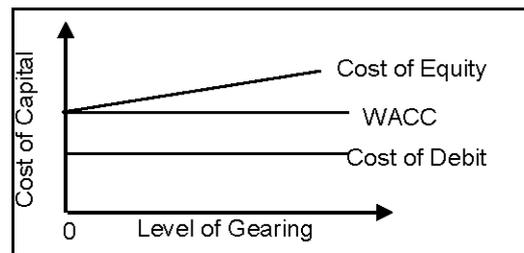
Pr.18: (PRINTED SOLUTION AVAILABLE) KLM Turnkey Ltd., has an operating profit of Rs.40,00,000 and has employed Debt (Total Interest Charge of Rs.10,00,000). The existing Cost of equity and Cost of Debt to the firm are 18% and 12% respectively. The firm has a proposal before it requiring funds of Rs.100 lacs (to be raised by issue of additional debt.) which is expected to bring additional profit of Rs.20,00,000. Find out the existing WACC and new WACC. Assume no Tax. *(Ans.: existing WACC is 16% & new WACC is 15.2%)*

(Solve Problem No. 13 of Assignment Problems as rework)

Note: _____

MODEL 3.3: NET OPERATING INCOME (NOI) APPROACH

This approach has been suggested by Durand. According to this approach, the use of less costly debt funds increases the risk of shareholders. This causes the equity capitalisation rate to increase. Thus, the advantage of debt is set off exactly by increase in equity capitalisation rate. The market value of the firm is ascertained by capitalizing the net operating income at the overall cost of capital which is constant. Therefore there is no optimal capital structure rather every capital structure is as good as any other and so every capital structure is optimal one. The market value of the firm is determined as follows:



$$\text{Market value of the firm (V)} = \frac{\text{Earnings before Interest and tax}}{\text{Overall cost of capital}}$$

The value of equity can be determined by the following equation

$$\begin{aligned} \text{Value of equity (S)} &= V (\text{Market value of firm}) - D (\text{Market value of debt}) \text{ and the cost of equity} \\ &= \frac{\text{Earnings after Interest and before tax}}{\text{Market value of firm (V) - Market value of debt (D)}} \end{aligned}$$

The Net Operating Income Approach is based on the following assumptions:

- The overall cost of capital remains constant for all degree of debt equity mix.
- The market capitalizes the value of firm as a whole. Thus the split between debt and equity is not important.
- The cost of debt is constant.

Pr.19: Z Ltd.'s operating income (before interest and tax) is Rs.9,00,000. The firm's cost of debt is 10 percent and currently firm employs Rs.30,00,000 of debt. The overall cost of capital of firm is 12 percent. Using NOI approach calculate cost of equity. *(Ans.: 13.33%)*

Note: _____

Pr.20: Amitha Ltd's operating income is Rs.5, 00,000. The firm's cost of debt is 10% and currently the firm employs Rs.15, 00,000 of debt. The overall cost of capital of the firm is 15%.

You are required to determine using NOI approach: (SM)

- a) Total value of the firm b) Cost of equity
(Ans.: a. Rs. 33,33,333 & b. 19.09%)

Note: _____

Pr.21: (PRINTED SOLUTION AVAILABLE)

- a) Operating income of Rs.50,000, Cost of debt 10% and outstanding debt Rs.2,00,000. If the overall capitalisation rate (overall cost of capital) is 12.5%. What would be the total value of the firm and the equity capitalisation rate under the NOI approach?
- b) The firm increases the amount of debt from Rs.2,00,000 to Rs.3,00,000 and uses the proceeds of the debt to repurchase equity shares - State the implications?
- c) The firm retires debt by Rs.1,00,000 by issuing fresh equity shares of the same amount - State the implications.

(Ans.: a. Rs. 4,00,000 & 15%, b. Cost of Equity share capital has increased from 15% to 20% & M.V of Equity has decreased from 2,00,000 to 1,00,000 c. Cost of Equity share capital has decreased from 15% to 13.33% & M.V of equity has increased from 2,00,000 to 3,00,000)

Note: _____

Pr.22: (PRINTED SOLUTION AVAILABLE) Alpha Limited and Beta Limited are identical except for capital structures. Alpha has 50 percent debt and 50 percent equity, whereas Beta 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)

- a) (i) If you own 2 percent of the stock of Alpha, what is your return if the company has net operating income of Rs.3,60,000 and the overall capitalisation rate of the company, K_0 is 18 percent? (ii) What is the implied required rate of return on equity?
- b) Beta has the same net operating income as Alpha. (i) What is the implied required equity return of Beta? (ii) Why does it differ from that of Alpha?

(Ans.: a. (i) Rs. 5,600 (ii) 28% b. 20.5% Implied required rate of return on equity is less in the case of Beta. Because it used less debt in the capital structure)

Note: _____

Pr.23: XYZ Ltd. intends to set up a project with capital cost of Rs.50,00,000. It is considering following:

- Alternative 1 = 100% Equity financing
 Alternative 2 = Debt- Equity 1:1
 Alternative 3 = Debt- Equity 3:1

The estimated annual net cash inflow is @ 24% i.e. Rs.12, 00,000 on the project. The rate of interest on debt is 15%. Calculate the weighted average cost of capital for three different alternatives and analyse the capital structure decision.

(Ans.: WACC for Alternative 1 is 24%, Alternative 2 is 24%, Alternative 3 is 24% & Every capital structure is an Optimum capital structure)

Note: _____

Pr.24: (PRINTED SOLUTION AVAILABLE) ZED Limited is presently financed entirely by equity shares. The current market value is Rs.6,00,000. A dividend of Rs.1,20,000 has just been paid. This level of dividend is expected to be paid indefinitely. The company is thinking of investing in a new project involving an outlay of Rs.5,00,000 now and is expected to generate net cash receipts of Rs.1,05,000 per annum indefinitely. The project would be financed by issuing Rs.5,00,000 debentures at the market interest rate of 18%.

Ignoring tax consideration:

- a) Calculate the value of equity shares and the gain made by the shareholders if the cost of equity rises to 21.6%.
- b) Prove that the weighted average cost of capital is not affected by gearing.

(Ans.: a. Market value of equity shares Rs. 6,25,000 & Gain to equity shareholders Rs. 25,000, b. In both cases, it is clear that WACC(20%) is not effected even after gearing)

Note: _____

MODEL 3.4: MODIGLIANI AND MILLER APPROACH

According to this approach change in the debt equity mix does not affect the cost of capital. The total market value of a firm and its cost of capital are independent of its capital structure. The Modigliani & Miller Approach is based on the following assumptions:

1. Investors are free to buy and sell securities.
2. The firms can be classified into 'homogenous risk class'. They belong to this class if their expected earnings is having identical risk characteristics.
3. All investors have the same expectations from a firm's net operating income (EBIT) which are necessary to evaluate the value of a firm.
4. The dividend payment ratio is 100%. i.e. there are no retained earnings.
5. There are no corporate taxes.

Pr.25: The following information is available regarding the Mid-Air Enterprises:

1. Mid-Air currently has no debt, it is an all-equity company;
2. Expected EBIT = Rs.24 lakhs. EBIT is not expected to increase overnight, so Mid-Air is in a no-growth situation;
3. Mid-Air pays out all of its income as dividends;
4. If Mid-Air begins to use debt, it can borrow at the rate $k_d = 8$ percent. This borrowing rate is constant and it is independent of the amount of debt used. Any money raised by selling debt would be used to retire common stock, so Mid-Air assets would remain constant;
5. The risk of Mid-Air's assets, and thus its EBIT, is such that its shareholders require a rate of return $K_e = 12\%$, if no debt is used.

Using MM Model without corporate taxes and assuming a debt of Rs.1 crore, you are required to: (a) Determine the firm's total market value; (b) Determine the firm's value of equity; (c) Determine the firm's leverage cost of equity. (Ans: (a) Rs. 2 Cr, (b) Rs. 1 Cr, (c) 16%)

Note: _____

MODEL 4: ARBITRAGE

The word 'arbitrage' is a technical term referring to a situation where two identical commodities are selling in the same market for different prices, then the market will reach equilibrium by the dealers start buy at the lower price and sell at the higher price, thereby making profit. The arbitrage in MM theory shows that the investors will move quickly to take advantage and will make profit in an equilibrium capital market. If two different firms with same level of business risk but different levels of gearing sold for different values, then shareholders would move from over valued firm to the under valued firm and adjust their level of borrowing through the market to maintain their net investment and risk at the same level. This process of arbitrage would drive the price of the two firms to a common equilibrium total value. Then this would represent an arbitrage opportunity.

Pr.26: The following is the data regarding two companies X and Y belonging to the same risk class:

Particulars	Company X	Company Y
Number of ordinary shares	90,000	1,50,000
Market price per share (Rs.)	1.20	1.00
6% Debentures (Rs.)	60,000	---
Profit before interest (Rs.)	18,000	18,000

All profits after debenture interest are distributed as dividends. Explain how under Modigliani & Miller approach, an investor holding 10% of shares in Company X will be better off in switching his holding to Company Y.

(Ans.: Since there is an increase in earnings of Rs. 108, The investor can switch his holdings from Co. X to Co. Y)

(Solve Problem No. 15 of Assignment Problems as rework)

Note: _____

Pr.27: (PRINTED SOLUTION AVAILABLE) Two companies, X and Y belong to the equivalent risk group. The two companies are identical in every respect except that company Y is levered, while X is unlevered. The outstanding amount of debt of the levered company is Rs. 6,00,000 in 10% Debenture. The other information for the two companies is as follows:

Particulars	X	Y
Net Operating income (EBIT)	Rs.1,50,000	Rs.1,50,000
- Interest	---	60,000
Earnings to equity holders	1,50,000	90,000
Equity capitalization rate, K_e	0.15	0.20
Market value of equity	10,00,000	4,50,000
Market value of debt	---	6,00,000
Total value of firm, V_1	10,00,000	10,50,000
Overall capitalization rate, $K_o = EBIT / V$	15.0%	14.3%
Debt equity ration	0	1.33

An investor owns 5% equity shares of company Y. Show the process and the amount by which he could reduce his outlay through use of the arbitrage process, Is there any limit to the 'process'?

(Ans.: Through the process of arbitrage the investor can reduce his investment to the extent of Rs.2,500)

Note: _____

Pr.28: There are two firms P and Q which are identical except P does not use any debt in its capital structure while Q has Rs.8,00,000, 9% debentures in its capital structure. Both the firms have Earning Before Interest And Tax of Rs.2,60,000 p.a. and the capitalization rate is 10%. Assuming the corporate tax rate of 30%, calculate the value of these firms according to MM Hypothesis. (PM)

(Ans.: P is Rs.18,20,000 & Q is Rs.20,60,000)

(Solve Problem No. 16 of Assignment Problems as rework)

Note: _____

Pr.29: (PRINTED SOLUTION AVAILABLE) Firm A and B are similar except that A is unlevered, while B has Rs.2,00,000 of 5 per cent debentures outstanding. Assume that the tax rate is 40 per cent; NOI is Rs.40,000 and the cost of equity is 10%. (i) Calculate the value of the firm, if the MM assumptions are met. (ii) If the value of the firm B is Rs.3,60,000 then do these values represent equilibrium values. If not, how will equilibrium be set? Explain.

(Ans.: (i) M.V. of Firm A is Rs.2,40,000 & Firm B is Rs.3,20,000 (ii) Market values of these 2 firms will come to equilibrium position through the process of Arbitrage)

Note: _____

Pr.30. (PRINTED SOLUTION AVAILABLE) RES Ltd. is an all equity financed company with a market value of Rs.25,00,000 and cost of equity $K_e = 21\%$. The company wants to buyback equity shares worth Rs.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:

- Market value of RES Ltd
- Cost of Equity (K_e)
- Weighted Average cost of Capital and comment on it. (PM) (Ans: (i)26,50,000,(ii) 22% (iii)19.80%)

Note: _____

Pr.31: Companies A and B belong to the same Business-risk class. Average net operating income before interest of each company is Rs. 100 lakhs. Other related information is given below:

Particulars	Company A	Company B
Market value of equity	400	120
Market value of debentures	-	200
Total market value	400	320

Rate of interest on debentures is 15% p.a. and the same is considered to be certain by all the investors.

- In case the total market values of the two companies are not in equilibrium, explain the process by which equilibrium is restored to according to Modigliani and Miller theory.
- If the cost of equity is 27.78% for Company A in equilibrium, what will it be for Company B?

(Ans.: b.43.75%)

Note: _____

'A' CATEGORY PROBLEMS
1,2,3,6,7,8,9,12,16,19,22,23,25,26,27,29,30,31
(APPLICABLE FOR WEEKEND EXAMS ONLY BUT NOT FOR ANY OTHER EXAMS)

ASSIGNMENT PROBLEMS

EBIT – EPS ANALYSIS:

Pr.1: M/s Mini & Fini Ltd. are analysing the most desirable capital structure. Following are the estimates of the cost of debt and equity capital (after tax) at various levels of debt equity mix.

Debt as a percentage of total Capital employed	Cost of debt (%)	Cost of equity (%)
0	6.0	11.5
10	6.0	12.0
20	6.0	12.0
30	6.5	13.0
40	7.0	15.0
50	7.5	17.0
60	8.0	20.0

You are required to determine the optimal debt-equity mix for the company by calculating composite cost of capital.

(Ans.: The WACC is minimum 20% of debt and 80% equity represents optimum capital structure)

Pr.2: The Modern Chemicals Ltd. requires Rs.25,00,000 for a new plant. This plant is expected to field earnings before interest and taxes of Rs.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 Rs.2,50,000 or Rs.10,00,000 or Rs.15,00,000 and the balance, in each case, by issuing equity shares. The company's share is currently selling at Rs.150, but is expected to decline to Rs.125 in case the funds are borrowed in excess of Rs.10,00,000. The funds can be borrowed at the rate of 10% up to Rs.2,50,000, at 15% over Rs.2,50,000 and up to Rs.10,00,000 and at 20% over Rs.10,00,000. The tax rate applicable to the company is 50%. Which form of financing should the company choose?

(SM) (PM) *(Ans.: EPS for Option I is Rs. 15.83, Option II is Rs. 18.125, Option III is Rs.16.41)*

Pr.3: The Hardware Company Ltd has to make a choice between debt issue and equity issue for its expansion program. Its current position is as follows:

5% Debt	Rs.20,000
Equity capital (Rs.10 per share)	50,000
Surpluses	30,000
Total capitalization	1,00,000
Sales	3,00,000
Total costs	2,69,000
Income before interest and taxes	31,000
Interest	1,000
Earnings before taxes	30,000
Income tax	10,500
Income after taxes	19,500

The expansion program is estimated to cost Rs.50,000. If this is financed through debt, the rate of interest on new debt will be 7 per cent and the price-earnings ratio will be 6. If the expansion program is financed through equity, new shares can be sold netting Rs.25 per share; and the price-earnings ratio will be 7. The expansion will generate additional sales of Rs.1,50,000 with a return of 10 per cent on sales before interest and taxes. If the company is to follow a policy of maximizing the market value of its shares, which form of financing should it choose?

(Ans.: MP for Debt is Rs. 32.37 & Equity is Rs. 29.25)

Pr.4: A company is currently earning an EBIT of Rs. 22 lakhs. Its present borrowings are:

11% Term Loans	40,00,000
Working Capital:	
Borrowing from bank at 16%	30,00,000
Public deposit at 12%	15,00,000

The sales of the company are growing and to support this, the company proposes to obtain an additional bank borrowing of Rs. 25 lakhs. The increase in EBIT is expected to be 20%. Calculate the change in interest coverage rate after the additional borrowings and comment.

(Ans.: The interest coverage ratio has decrease from 2 times to 1.76 times. This is not a favourable situation for money lender / creditor)

Pr.5: M/s Punjab Scooters Ltd. has currently an ordinary share capital of Rs. 40 lakhs, consisting of 40,000 shares of Rs. 100 each. The management is planning to raise another Rs. 40 lakhs to finance a major programme of expansion through one of the four possible financing plans. The options are:

- Further issue of 40,000 equity shares of Rs. 100 each.
- Issue of 20,000 equity shares of Rs. 100 each (Rs. 20 lakhs) and the balance Rs. 20 lakhs through long term borrowings at 9% rate of interest per annum.
- Issue of 10,000 equity shares of Rs. 100 each (Rs. 10 lakhs) and the balance Rs.30 lakhs through long term borrowings at 10% rate of interest per annum.
- Issue of 20,000 equity shares of Rs. 100 each (Rs. 20 lakhs) and 20,000 preference shares of Rs.100 each with 7.5% dividend (Rs.20 lakhs).

You are required to advise the management of the company about the best alternative with earnings per share (EPS) in each alternative. The company's EBIT will be Rs. 15 lakhs and the corporate tax rate is 50%.

(Ans.: EPS for Option A is Rs. 9.375, Option B is Rs. 11, Option C is Rs. 12, Option D is Rs.10)

Pr.6: There are two firms Company A and B having net operating income of Rs.15,00,000 each. Company B is a levered company whereas Company A is all equity company. Debt employed by Company B is of Rs.7,00,000 @ 11%. The tax rate applicable to both the companies is 25%. Calculate earnings available for equity and debt for both the firms. **(SM)**

(Ans.: Total Earnings available to equity holders + Debt holders Company A Rs. 11,25,000 & Company B Rs. 11,44,250)

Pr.7: Touch screen Limited needs Rs.10,00,000 for expansion. The expansion is expected to yield an annual EBIT of Rs.1,60,000. In choosing a financial plan. Touchscreen Limited has an objective of maximizing earnings per share. It is considering the possibility of issuing equity shares and raising debt of Rs.1,00,000 or Rs.4,00,000 or Rs.6,00,000. The current market price per share is Rs.25 and is expected to drop to Rs. 20 if the funds are borrowed in excess of Rs.5,00,000. Funds can be borrowed at the rates indicated below: (a) upto Rs.1,00,000 at 8%; (b) over Rs.1,00,000 up to Rs.5,00,000 at 12%; (c) over Rs.5,00,000 at 18%. **(SM)**

Assume a tax rate of 50 per cent. Determine the EPS for the three financing alternatives.

(Ans.: EPS for Alternative I Rs. 2.11, Alternative II Rs. 2.42, Alternative III Rs. 2.15)

INDIFFERENCE POINT:

Pr.8: A new project under consideration requires a capital outlay of Rs.300 lakhs for which the funds can either be raised by the issue of equity shares of Rs.100 each or by the issue of equity shares of the value of Rs.200 lakhs and by the issue of 15% loan of Rs.100 lakhs. Find out the indifference level of EBIT given the tax rate at 35%.

(Ans.: If EBIT is 45lakhs then EPS will be same under both the options i.e., Rs. 9.75 per share)

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Pr.9: Ganesha Limited is setting up a project with a capital outlay of Rs.60,00,000. It has two alternatives in financing the project cost. (SM)

Alternative (a): 100% equity finance

Alternative (b): Debt-equity ratio 2:1

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

(Ans.: EBIT = Rs. 10,80,000)

Pr.10: A Company needs Rs. 31,25,000 for the construction of new plant. The following three plans are feasible: (PM)

- The company may issue 3,12,500 equity shares at Rs. 10 per share.
- The Company may issue 1,56,250 ordinary equity shares at Rs. 10 per share and 15.625 debentures of Rs. 100 denomination bearing a 8% rate of interest.
- The Company may issue 1,56,250 equity shares at Rs. 10 per share and 15,625 preference shares at Rs. 100 per share bearing a 8% rate of dividend.
 - If the Company's earnings before interest and taxes are Rs. 62,500, Rs. 1,25,000, Rs. 2,50,000, Rs. 3,75,000 and Rs. 6,25,000, what are the earnings per share under each of three financial plans? Assume a Corporate income tax rate of 40%.
 - Which alternative would you recommend and why?
 - Determine the EBIT-EPS indifference points by formulae between Financing Plan I and Plan II and Plan I and Plan III.

(Ans.: i. EPS for Plan A Rs. 0.12, 0.24, 0.48, 0.72, 1.20 & Plan B (Rs. 0.24), 0, 0.48, 0.96, 1.92 & Plan C (Rs. 0.56), (0.32), 0.16, 0.64, 1.60)

Pr.11: 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: (PM)

Proposals	% of Equity	% of Debts	% of Preference shares
P	100	-	-
Q	50	50	-
R	50	-	50

- Cost of debt – 10%, Cost of preference shares – 10%
 - Tax rate – 50%
 - Equity shares of the face value of Rs. 10 each will be issued at a premium of Rs. 10 per share.
 - Total investment to be raised Rs. 40,00,000.
 - Expected earnings before interest and tax Rs. 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.

(Ans.: EPS for P is Rs. 4.5, Q is Rs. 8, R is Rs. 7 & Financial Break-even Point Rs. 4,00,000)

Pr.12: ABC Ltd. has a current level of EBIT of Rs. 17,00,000 which is likely to be unchanged. It has decided to raise Rs. 5,00,000 of additional capital funds and has identified two mutually exclusive alternative financial plans. The relevant information is as follows:

Present Capital Structure : 3,00,000 Equity shares of Rs. 10 each, and 10%, Bonds of Rs.20,00,000

Tax rate : 50%

Current EBIT	:	Rs. 17,00,000
Current EPS	:	Rs. 2.50
Current market price	:	Rs.25 per share
Financial Plan I	:	20,000 equity shares @ Rs.25 per share
Financial Plan II	:	12% debentures of Rs. 5,00,000.

What is the indifference level of EBIT?

(Ans.: EBIT is Rs.11,60,000)

CAPITAL STRUCTURE THEORIES:

Pr.13: Glamour Ltd. earned a profit of Rs.20 lakhs before providing for interest and tax. The company's capital structure is as follows:

- 4,00,000 Equity shares of Rs.10 each and its markets capitalisation rate is 16%.
- 25,000 14% secured redeemable debentures of Rs.150 each.

You are required to calculate the value of the firm under Net Income approach. Also calculate the overall cost of capital of the Firm.

(Ans.: Rs. 1,29,68,750 & 15.42%)

Pr.14: XYZ Limited is expecting an EBIT of Rs.3, 00,000. The company presently raised its entire fund requirement of Rs.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 increases 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. (PM)

(Answer: For 0%, 30% & 50% Debt – Value: 18,75,000; 20,11,176; 19,00,000 and COC: 16%;14.91%; 15.78%)

ARBITRAGE:

When value of levered firm is more than the value of unlevered firm

Pr.15: There are two firms N and M, having same earning before interest and taxes i.e. EBIT of Rs. 20,000. Firm M is levered company having a debt of Rs. 1,00,000 @ 7% rate of interest. The cost of equity of N company is 10% and of M company is 11.50%. (SM)

Find out how arbitrage process will be carried on?

(Ans.: 'M' company, But still you have Rs.1,304.3 excess money available with you. Hence, you are better off by doing arbitrage)

When value of unlevered firm is more than the value of levered firm

Pr.16: There are two firms U and L having same NOI of Rs. 20,000 except that the firm L is a levered firm having a debt of Rs. 1,00,000 @ 7% and cost of equity of U & L are 10% and 18% respectively. Show how arbitrage process will work. (SM)

(Ans.: Total value of the firm Rs. 1,72,222 & Assume you have 10% shares of unlevered firm i.e. investment of 10% of Rs. 2,00,000 = Rs.20,000 and Return @ 10% on Rs. 20,000)

'A' CATEGORY ASSIGNMENT PROBLEMS – 2, 3,5,7,8,10,11,12,13,14,15,16.
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THE END

Verified by : M.P. Raju Sir
Executed by: Sai Ram Sir