

Practice Questions and Solutions for Virtual Coaching Classes

Paper 8A: Financial Management

Topic: Financing Decisions – Capital Structure

Question-1

A company expects a net income of Rs. 80,000. It has 8% Debentures of Rs. 2,00,000. The equity capitalization rate of the company is 10%. Calculate the value of the firm and overall capitalization rate according to the Net Income Approach. Ignore the Income Tax.

If the debenture debt is increased to Rs. 3,00,000, what shall be the value of the firm and overall capitalization rate?

Solution:

$$S = \text{Rs. } 64,000 \text{ (} 80,000 - 16,000 \text{)}/10\% = \text{Rs. } 6,40,000$$

$$V = S + D = \text{Rs. } 6,40,000 + \text{Rs. } 2,00,000 = \text{Rs. } 8,40,000$$

$$K_o = \text{EBIT}/V = \text{Rs. } 80,000/\text{Rs. } 8,40,000 = 9.52\%$$

If the debenture debt is increased to Rs. 3,00,000, then:

$$V = \text{Rs. } 5,60,000 + \text{Rs. } 3,00,000 = \text{Rs. } 8,60,000$$

$$K_o = \text{Rs. } 80,000/\text{Rs. } 8,60,000 = 9.30\%$$

Question-2

A company expects a net operating income of Rs.1,00,000. It has 6% Debentures of Rs. 5,00,000. The overall capitalization is 10%. Calculate the value of the firm and cost of equity according to the Net Operating Income Approach.

Also, show changes when Debt is increased to Rs. 7,50,000.

Solution:

$$V = \text{EBIT}/K_o = \text{Rs. } 1,00,000/10\% = \text{Rs. } 10,00,000$$

$$\text{Equity} = V - D = \text{Rs. } 10,00,000 - \text{Rs. } 5,00,000 = \text{Rs. } 5,00,000$$

$$\begin{aligned} K_e &= (\text{EBIT} - \text{Interest})/\text{Equity} \\ &= (\text{Rs. } 1,00,000 - \text{Rs. } 30,000)/\text{Rs. } 5,00,000 = 14\% \end{aligned}$$

When Debt is increased to Rs. 7,50,000, then:

$$K_e = (\text{Rs. } 1,00,000 - \text{Rs. } 45,000)/\text{Rs. } 2,50,000 = 22\%$$

Question-3

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

You are required to COMPUTE:

- (i) Current value of the firm
- (ii) Overall cost of capital.

Solution:

- (i) **Calculation of total value of the firm**

	₹
EBIT	1,00,000
Less: Interest (@10% on ` 5,00,000)	50,000
Earnings available for equity holders	50,000
Equity capitalization rate i.e. K_e	15%

$$\text{Value of equity holders} = \frac{\text{Earnings available for equity holders}}{\text{Value of equity (S)}}$$

$$= \frac{50,000}{0.15} = ₹ 3,33,333$$

$$\text{Value of Debt (given) D} \quad \quad \quad 5,00,000$$

$$\text{Total value of the firm } V = D + S (5,00,000 + 3,33,333) \quad \quad \quad 8,33,333$$

- (ii) Overall cost of capital = $K_o = K_e \left(\frac{S}{V}\right) + K_d \left(\frac{D}{V}\right)$ or $\frac{\text{EBIT}}{V}$

$$= 0.15 \left(\frac{3,33,333}{8,33,333}\right) + 0.10 \left(\frac{5,00,000}{8,33,333}\right)$$

$$= \frac{1}{8,33,333} [50,000 + 50,000]$$

$$= 12.00\%$$

Question-4

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
K_e	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.

Solution:

1. Valuation of firms

Particulars	Levered Firm (₹)	Unlevered Firm (₹)
EBIT	30,000	30,000
Less: interest	10,000	Nil
Earnings available to Equity Shareholder/ K_e	20,000	30,000
	20%	12.5%
Value of Equity	1,00,000	2,40,000
Debt	1,00,000	Nil
Value of Firm	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 (240000x15%)	<u>36,000</u>
Lend money (36000 x50%)	18,000
Buy shares in Levered company (36000 x50%)	<u>18,000</u>
Total	<u>36,000</u>

3. Change in Return

Income from shares in Levered company	₹
(18000 x 20%)	3,600
Interest on money lent (18000 x 10%)	<u>1,800</u>
Total Income after switch over	5,400
Income from Unlevered firm (36000 x 12.5%)	<u>4,500</u>
Incremental Income due to arbitrage	<u>900</u>

Question-5

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?

Solution:

	Company	
	M Ltd.	N Ltd.
EBIT (NOI)	₹ 20,000	₹ 20,000
Debt (D)	₹ 1,00,000	---
K_e	11.50%	10%
K_d	7%	---

$$\text{Value of equity (S)} = \frac{\text{NOI} - \text{Interest}}{\text{Cost of equity}}$$

$$S_M = \frac{20,000 - 7,000}{11.50\%} = ₹ 1,13,043$$

$$S_N = \frac{20,000}{10\%} = ₹ 2,00,000$$

$$VM = 1,13,043 + 1,00,000 \{V = S + D\} = ₹ 2,13,043$$

$$VN = ₹ 2,00,000$$

Arbitrage Process:

If you have 10% shares of M Ltd., your value of investment in equity shares is 10% of ₹1,13,043 i.e. ₹ 11,304.30 and return will be 10% of (₹20,000 – ₹7,000) = ₹ 1,300.

Alternate Strategy will be:

Sell your 10% share of levered firm for ₹ 11,304.30 and borrow 10% of levered firms debt i.e. 10% of ₹ 1,00,000 and invest the money i.e. 10% in unlevered firms stock:

Total resources /Money we have = ₹11,304.30 + ₹10,000 = ₹21,304.3 and you invest 10% of ₹2,00,000 = ₹ 20,000

Surplus cash available with you is = ₹21,304.3 – ₹20,000 = ₹ 1,304.3

Your return = 10% EBIT of unlevered firm – Interest to be paid on borrowed funds

i.e. = 10% of ₹ 20,000 – 7% of ₹ 10,000 = ₹2,000 – ₹700 = ₹ 1,300

i.e. your return is same i.e. ₹ 1,300 which you are getting from N Ltd. before investing in M Ltd. but still you have ₹ 1,304.3 excess money available with you. Hence, you are better off by doing arbitrage.

In the above example you have not invested entire amount received from “sale of shares of levered company plus amount borrowed”. You maintained same level of earning and reduced investment. Alternatively, you could have invested entire amount in unlevered company. In that case your annual earnings would have increased. An example for the same is as follows:

Question-6

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

Capital employed = ₹ 2,00,000, EBIT = ₹ 30,000, Tax = 30 %, K_e of unlevered firm = 12.5%

Sources	Levered Company (₹)	Unlevered Company (₹)
Debt (@10%)	1,00,000	Nil

Calculate value of Levered and unlevered firm.

Solution:

Particulars	Levered Firm (Rs.)	Unlevered Firm (Rs.)
EBIT	30,000	30,000
Less: interest	10,000	Nil
EBT	20,000	30,000
Less: Tax @ 30%	6,000	9,000
Earnings available to Equity Shareholders	14,000	21,000
K_e	-	12.5%
Equity value	-	1,68,000
Debt value	-	-
Total Value	-	1,68,000

3,000 (tax shield)

Value of unlevered firm = value of unlevered firm + Tax benefit

$$= 1,68,000 + 3,000 = 1,71,000$$

Question-7

Stopgo Ltd, an all equity financed company, is considering the repurchase of ₹ 200 lakhs equity and to replace it with 15% debentures of the same amount. Current market Value of the company is ₹ 1140 lakhs and its cost of capital is 20%. Its Earnings before Interest and Taxes (EBIT) are expected to remain constant in future. Its entire earnings are distributed as dividend. Applicable tax rate is 30 per cent.

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) Hypothesis:

- (i) The market value of the company
- (ii) Its cost of capital, and
- (iii) Its cost of equity

Solution:**Working Note**

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

$$\frac{\text{Net income (NI) for equity holders}}{0.20} = ₹ 1,140 \text{ lakhs}$$

Therefore, Net Income to equity-holders = ₹ 228 lakhs

EBIT = ₹ 228 lakhs / 0.7 = ₹ 325.70 lakhs

	All Equity (₹ In lakhs)	Debt of Equity (₹ In lakhs)
EBIT	325.70	325.70
Interest on ₹200 lakhs @ 15%	--	30.00
EBT	325.70	295.70
Tax @ 30 %	97.70	88.70
Income available to equity holders	228	207

- (i) Market value of levered firm = Value of unlevered firm + Tax Advantage
 = ₹ 1,140 lakhs + (₹200 lakhs x 0.3)
 = ₹ 1,200 lakhs

The impact is that the market value of the company has increased by ₹ 60 lakhs (₹ 1,200 lakhs – ₹ 1,140 lakhs)

Calculation of Cost of Equity

$$\begin{aligned} K_e &= (\text{Net Income to equity holders} / \text{Equity Value}) \times 100 \\ &= (207 \text{ lakhs} / 1200 \text{ lakhs} - 200 \text{ lakhs}) \times 100 \\ &= (207 / 1000) \times 100 \\ &= 20.7 \% \end{aligned}$$

- (ii) Cost of Capital

Components	Amount (₹ In lakhs)	Cost of Capital %	Weight	WACC %
Equity	1000	20.7	83.33	17.25
Debt	200	(15% X 0.7) = 10.5	16.67	1.75
	1200			19.00

The impact is that the WACC has fallen by 1% (20% - 19%) due to the benefit of tax relief on debt interest payment.

(iii) Cost of Equity is 20.7% [As calculated in point (i)]

The impact is that cost of equity has risen by 0.7% i.e. 20.7% - 20% due to the presence of financial risk.

Further, Cost of Capital and Cost of equity can also be calculated with the help of formulas as below, though there will be no change in final answers.

$$\text{Cost of Capital } (K_o) = K_{eu}(1-tL)$$

Where,

K_{eu} = Cost of equity in an unlevered company

t = Tax rate

$$L = \frac{\text{Debt}}{\text{Debt} + \text{Equity}}$$

$$K_o = 0.2 \times \left(1 - \frac{\text{₹ 200 lakh}}{\text{₹ 1,200 lakh}} \times 0.3 \right)$$

So, Cost of capital = 0.19 or 19%

$$\text{Cost of Equity } (K_e) = K_{eu} + (K_{eu} - K_d) \frac{\text{Debt}(1-t)}{\text{Equity}}$$

Where,

K_{eu} = Cost of equity in an unlevered company

K_d = Cost of debt

t = Tax rate

$$K_e = 0.20 + \left((0.20 - 0.15) \times \frac{\text{₹ 200 lakh} \times 0.7}{\text{₹ 1,000 lakh}} \right)$$

$$K_e = 0.20 + 0.007 = 0.207 \text{ or } 20.7\%$$

So, Cost of Equity = 20.70%

Question-8

J Ltd. is considering three financing plans. The-key information is as follows:

- (a) Total investment to be raised ₹ 4,00,000.
 (b) Plans showing the Financing Proportion:

Plans	Equity	Debt	Preference Shares
X	100%	-	-
Y	50%	50%	-

Z	50%	-	50%
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- (c) Cost of Debt 10%
 Cost of preference shares 10%
- (d) Tax Rate 50%
- (e) Equity shares of the face value of ₹10 each will be issued at a premium of ₹ 10 per share.
- (f) Expected EBIT is ₹ 1,00,000.

You are required to compute the following for each plan :

- (i) Earnings per share (EPS)
 (ii) Financial break even point
 (iii) Indifference Point between the plans and indicate if any of the plans dominate.

Solution:

(i) Computation of Earnings per Share (EPS)

Plans	X (₹)	Y (₹)	Z (₹)
Earnings before interest & tax (EBIT)	1,00,000	1,00,000	1,00,000
Less: Interest charges (10% of ₹ 2,00,000)	--	(20,000)	--
Earnings before tax (EBT)	1,00,000	80,000	1,00,000
Less: Tax @ 50%	(50,000)	(40,000)	(50,000)
Earnings after tax (EAT)	50,000	40,000	50,000
Less: Preference share dividend (10% of ₹2,00,000)	--	--	(20,000)
Earnings available for equity shareholders (A)	50,000	40,000	30,000
No. of equity shares (B) Plan X = ₹ 4,00,000 / ₹ 20 Plan Y = ₹ 2,00,000 / ₹ 20 Plan Z = ₹ 2,00,000 / ₹ 20	20,000	10,000	10,000
E.P.S (A ÷ B)	2.5	4	3

(ii) Computation of Financial Break-even Points

Financial Break-even point = Interest + Preference dividend / (1 - tax rate)

Proposal 'X' = 0

Proposal 'Y' = ₹ 20,000 (Interest charges)

Proposal 'Z' = Earnings required for payment of preference share dividend
 = ₹ 20,000 ÷ (1 - 0.5 Tax Rate) = ₹ 40,000

(iii) Computation of Indifference Point between the plans

Combination of Proposals

(a) Indifference point where EBIT of proposal "X" and proposal 'Y' is equal

$$\frac{(EBIT)(1-0.5)}{20,000 \text{ shares}} = \frac{(EBIT - ₹ 20,000)(1-0.5)}{10,000 \text{ shares}}$$

$$0.5 \text{ EBIT} = \text{EBIT} - ₹ 20,000$$

$$\text{EBIT} = ₹ 40,000$$

(b) Indifference point where EBIT of proposal 'X' and proposal 'Z' is equal:

$$\frac{(EBIT)(1-0.5)}{20,000 \text{ shares}} = \frac{\text{EBIT}(1-0.5) - ₹ 20,000}{10,000 \text{ shares}}$$

$$0.5 \text{ EBIT} = \text{EBIT} - ₹ 40,000$$

$$0.5 \text{ EBIT} = ₹ 40,000$$

$$\text{EBIT} = \frac{₹ 40,000}{0.5} = ₹ 80,000$$

(c) Indifference point where EBIT of proposal 'Y' and proposal 'Z' are equal

$$\frac{(EBIT - ₹ 20,000)(1-0.5)}{10,000 \text{ shares}} = \frac{\text{EBIT}(1-0.5) - ₹ 20,000}{10,000 \text{ shares}}$$

$$0.5 \text{ EBIT} - ₹ 10,000 = 0.5 \text{ EBIT} - ₹ 20,000$$

There is no indifference point between proposal 'Y' and proposal 'Z'

Analysis: It can be seen that financial proposal 'Y' dominates proposal 'Z', since the financial break-even-point of the former is only ₹ 20,000 but in case of latter, it is ₹ 40,000. EPS of plan 'Y' is also higher.

Question-9

The following data are presented in respect of Quality Automation Ltd.:

	Amount (₹)
Profit before interest and tax	52,00,000
Less : Interest on debentures @ 12%	<u>12,00,000</u>
Profit before tax	40,00,000
Less : Income tax @ 50%	<u>20,00,000</u>
Profit After tax	20,00,000

No. of equity shares (of ₹ 10 each)	8,00,000
EPS	2.5
P/E Ratio	10
Market price per share	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 K_e 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:

- (i) the additional funds are raised as a loan.
- (ii) the amount is raised by issuing equity shares.

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

Solution:

In this question EBIT after proposed extension is not given. Therefore, we can assume that existing return on capital employed will be maintained.

Working notes:

$$1. \text{ Return on Capital Employed} = \frac{\text{EBIT}}{\text{Capital Employed}} = \frac{₹ 52,00,000}{₹ 3,00,00,000} = 17.33\%$$

Capital Employed = Debt + Equity

$$= 1,00,00,000 + (80,00,000 + 1,20,00,000) = ₹ 3,00,00,000$$

$$2. \text{ Proposed EBIT} = \text{Proposed Capital Employed} \times \text{Return on capital employed}$$

$$= (3,00,00,000 + 40,00,000) \times 17.33\% = ₹ 58,92,200$$

(if you take return on capital employed in full digits then accurate EBIT will be 58,93,333)

$$3. \text{ Debt Equity ratio} = \frac{\text{Debt}}{\text{Debt Equity}}$$

Option1: Loan option

$$\text{Debt} = 1,00,00,000 + 40,00,000 = ₹ 1,40,00,000$$

$$\text{Equity} = ₹ 2,00,00,000$$

$$\text{Debt Equity ratio} = \frac{1.4 \text{ cr.}}{1.4 \text{ cr.} + 2 \text{ cr.}} = 41.18\%$$

Debt equity ratio has crossed the limit of 35% hence PE ratio in this case will be 8 times and additional borrowing will be at the rate of 14%

Option2: Equity option

Debt = 1,00,00,000

Equity = 2,00,00,000 + 40,00,000 = ₹ 2,40,00,000

Debt Equity ratio = $\frac{1 \text{ cr.}}{1 \text{ cr.} + 2.4 \text{ cr.}} = 29.41\%$

Debt equity ratio has not crossed the limit of 35% hence PE ratio in this case will remain at 10 times.

4. Number of equity shares to be issued in case of equity option @ ₹25 per share = ₹40,00,000 / ₹25 = 1,60,000

Calculation of EPS and MPS under two financial options Particulars	Financial Options	
	Option I 14% additional loan of 40,00,000(₹)	Option II 8,00,000 equity share @ ₹10 i.e 1,60,000 equity shares @25(₹)
Profit before interest and Tax (PBIT)	58,92,200	58,92,200
Less: Interest on old debentures @12%	<u>12,00,000</u>	<u>12,00,000</u>
Less: Interest on additional loan(new) @ 14% on ₹ 40,00,000	5,60,000	Nil
Profit before tax	41,32,200	46,92,000
Less: Taxes @ 50%	20,66,100	23,46,100
Earnings for equity shareholders (EAT/Profit after tax)	20,66,100	23,46,100
Number of Equity Shares	8,00,000	9,60,000
Earnings per Share (EPS)	2.58	2.44
Price/ Earnings ratio	8	10
Probable per share (MPS)	20.66	24.44

Decision: Though loan option has higher EPS but equity option has higher MPS therefore company should raise additional fund through equity option.