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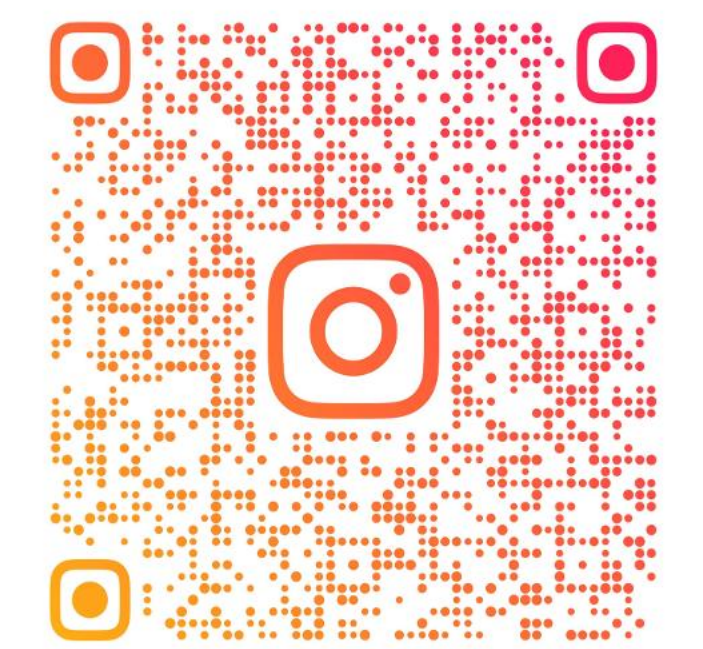


CA ADARSH JOSHI

CA , B.COM

FOUNDER

- 8+ years of teaching experience in CA education
- Subject Expert in:
CA Foundation – Paper 2: Business Laws
CA Intermediate – Paper 2: Corporate and Other Laws
- Has uploaded over 3000+ educational videos for CA Foundation and CA Inter students
- Known for his dynamic, conceptual and “fun-and-learn” teaching style
- Guided thousands of students across India to success in CA exams
- Strong academic background with B.Com (BMCC, Pune) and ACA qualification
- Widely appreciated for his clarity, energy, and practical approach to law subjects
- Through Shikshadwar, offers comprehensive classes, books, tests, and mentorship to CA students



CAADARSHJOSHI



CA DARSHAN JAIN

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CO FOUNDER

- Chartered Accountant by profession & educator by passion
- Teaching Financial Accounting , Financial Management & Strategic Management to CA Students For 12 Years.
- Practicing Chartered Accountant For Past 13 years in The Field of Audit , Direct & Indirect Taxes & Management Consultancy
- Elected as Convenor of The Jalna CA CPE Chapter of WIRC of ICAI For 2 consecutive years 20-21 & 21-22.
- He Has Successfully Completed & Qualified Following Certificate Course Conducted By ICAI
 1. Forensic Accounting & Fraud Detection
 2. Concurrent Audit of Banks
 3. Goods & Service Tax (GST)
 4. Public Finance & Accounting
 5. Drafting & Pleading Before Authorities
 6. Wealth management & Financial Planning
 7. Artificial Intelligence



@CA_DARSHAN_JAIN

CA TUSHAR TAPARIA

CA , LLB

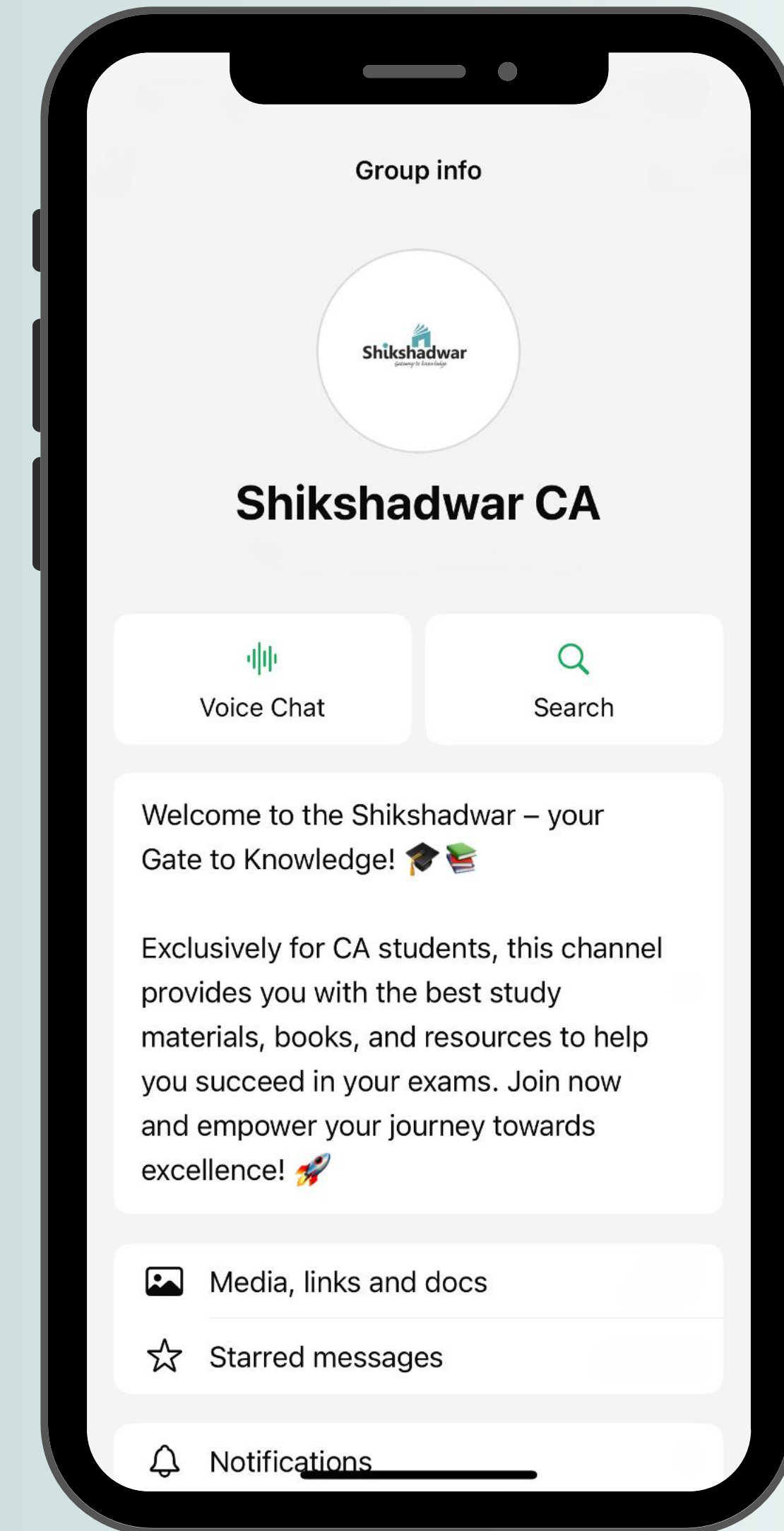
- A multi-faceted professional with a Chartered Accountancy qualification and a Bachelor's degree in Law.
- Brings 7+ years of teaching experience across CA and CS professional courses.
- Specializes in:
 - Taxation at CA Intermediate and CS Executive levels
 - Economics at CA Foundation level
- Known for simplifying complex concepts with crystal-clear explanations and practical insights.
- Expert in delivering Fasttrack batches with proven accelerated learning techniques.
- Frequently invited as a visiting faculty for Taxation at reputed coaching institutes.
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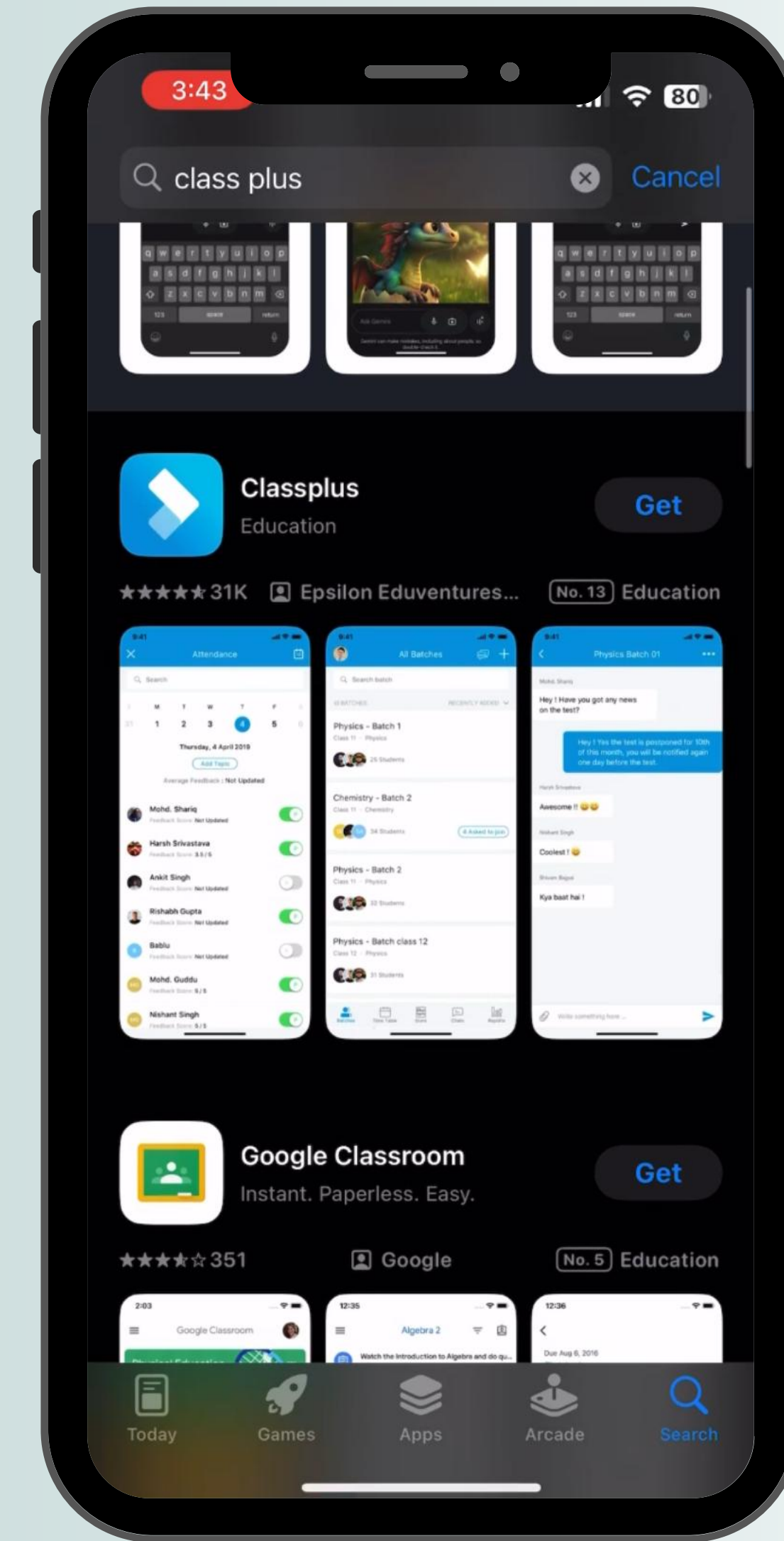
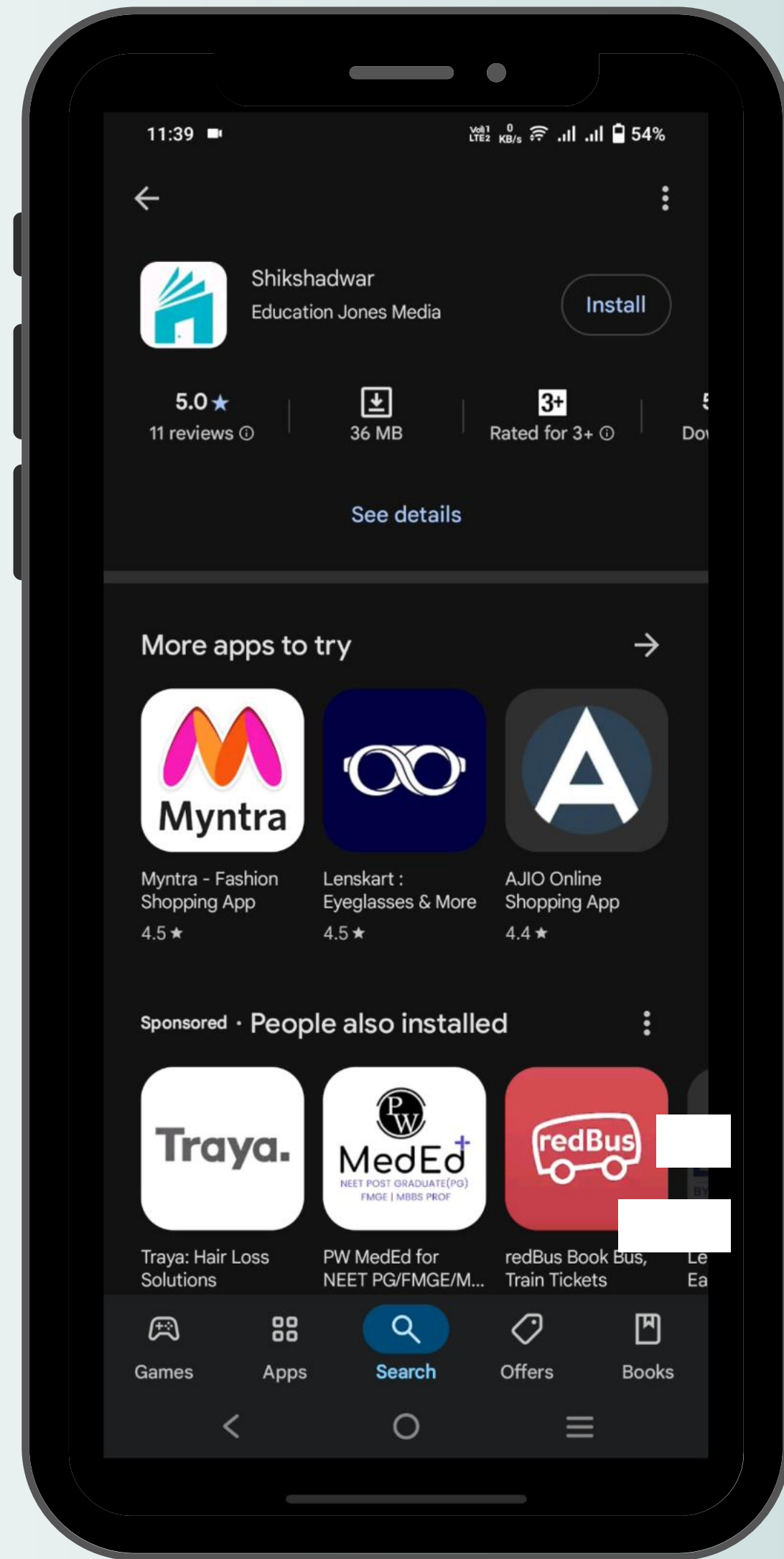
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CA INTERMEDIATE MAY 25

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RRR - Result Oriented Rapid Revision

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Amendments Ki Pathshala

20 -20 Series

CA INTERMEDIATE MAY 25

Marathons Schedule With Links

DATE	TIME	EDUCATOR	SUBJECT	TOPICS	YOUTUBE LINK
17/4/2025	8.00 AM	CA ADARSH JOSHI	LAW	RRR	
18/4/2025	12.00 NOON	CA TUSHAR TAPARIA	GST	RRR	
19/4/2025	8.00 AM	CA CS DARSHAN JAIN	FM	RRR	
20/4/2025	8.00 AM	CA ADARSH JOSHI	LAW	ONE SHOT MCQ MARATHON	
21/4/2025	2.00 PM	CA TUSHAR TAPARIA	GST	GST AMENDMENTS & ITS IMPORTANT QUESTIONS	
23/4/2025	8.00 AM	CA CS DARSHAN JAIN	FM	ONE SHOT MCQ MARATHON	

DATE	TIME	EDUCATOR	SUBJECT	TOPICS	YOUTUBE LINK
24/4/2025	2.00 PM	CA TUSHAR TAPARIA	DT	DT AMENDMENTS & ITS IMPORTANT QUESTIONS	
27/4/2025	8.00 AM	CA CS DARSHAN JAIN	SM	ONE SHOT MCQ MARATHON	
4/5/2025	8.00 AM	CA ADARSH JOSHI	LAW	MOST IMPORTANT QUESTIONS	
6/5/2025	3.00 PM	CA TUSHAR TAPARIA	TAXATION	20-20	
12/5/2025	8.00 AM	CA CS DARSHAN JAIN	FM	20-20	
13/5/2025	8.00 AM	CA CS DARSHAN JAIN	SM	SUPER CHART REVISION	

CAPITAL STRUCTURE

WEIGHTAGE ANALYSIS

SR.NO	NAME OF TOPIC	May 18	Nov 18	May 19	Nov 19	Nov 20	Jan 21	Jul 21	Dec 21	May 22	Nov 22	May 23	Nov 23
1	MEANING , SCOPE AND OBJECTIVES OF FM	4	2		3	4	4	2	2	2	2		4
2	TYPES OF FINANCING	6	8	6	4	4	2	4	4	2	4	6	8
3	LEVERAGE ANALYSIS	5	10	10	10	12	10	10	10	10	10	7	5
4	COST OF CAPITAL		10	5	14	5	10	10	5	10	11	10	10
5	CAPITAL STRUCTURE	10	5	10		10	10	5	10	10	6	10	10
6	CAPITAL BUDGETING	28	10	15	20	5	12	12	2	14	20	10	10
7	RISK ANALYSIS IN CAPITAL BUDGETING	4	7	6	3	12	5	5	14	5	5	5	5

BIRDS EYE VIEW

- Introduction.
- Optimum capital structure
- Features of an appropriate capital structure
- Factors Affecting Capital Structure
- Capital structure theories
- Net income approach
- Net operating income approach
- Traditional approach
- Modigliani-Miller approach
- Trade off Theory
- Pecking Order Theory
- EBIT EPS Analysis
- EPS indifference point
- Financial Break Even Point
- Other important formulas

INTRODUCTION

Capital structure refers to the mix of sources from where the long-term funds required in a business may be raised. In other words, it refers to the proportion of debt, preference capital and equity capital

OPTIMUM CAPITAL STRUCTURE

One of the basic objectives of financial management is to maximize the value or wealth of the firm.

Capital structure is optimum when the firm has a combination of equity and debt so that the wealth of the firm is the maximum. At this level, cost of capital is the minimum and market price per share is maximum. In theory, one can speak of an optimum capital structure; but in practice, appropriate capital structure is a more realistic term than the former.

FEATURES OF APPROPRIATE CAPITAL STRUCTURE

1. **Profitability**- It should minimize the cost of financing and maximize earning per equity share
2. **Flexibility**- the capital structure should be such that company can raise funds whenever needed.
3. **Conservation**- The debt content should not exceed the maximum; which the company can bear.
4. **Solvency**- The capital structure should be such that the firm does not run the risk of becoming insolvent.
5. **Control**- there should be minimum risk of loss or dilution of control of the company

FACTORS AFFECTING CAPITAL STRUCTURE



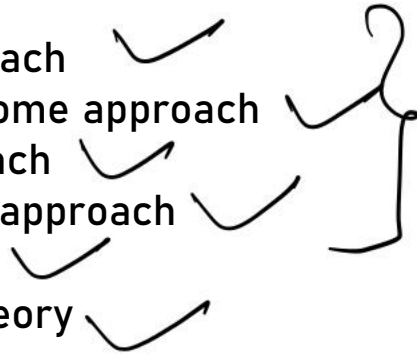
CAPITAL STRUCTURE THEORIES

Capital structure theories seek to explain the relationship between the following variables –

1. Proportions of components of capital (debt, equity etc.)
2. Costs of each component of capital
3. Impact of leverage
4. Overall cost of capital (WACC) and
5. Value of the firm.

The following are the capital structure theories

1. Net income approach
2. Net operating income approach
3. Traditional approach
4. Modigliani-miller approach
5. Trade off Theory
6. Pecking Order Theory



Practical.
Consider.

CAPITAL STRUCTURE THEORIES

* Value of firm depends on Cap Structure

* Value of firm does not depend on capital structure

* WACC depends on Capital Structure

* WACC does not depend on Capital Structure

Capital Structure Relevance Theory (Variable WACC)

Capital Structure Irrelevance Theory (Constant WACC)

Net Income (NI) Approach

Traditional Approach

Modigliani and Miller (MM) APPROACH – 1963: with tax

Net Operating Income (NOI) Approach .

Modigliani and Miller (MM) Approach – 1958: without tax

CAPITAL STRUCTURE THEORIES - ASSUMPTIONS

- There are only two sources of funds viz. debt and equity. (No preference share capital).
- All earnings are distributed to equity shareholders. (No retained earnings)
- Total Assets of the Firm (i.e. Capital Employed) is constant. (No change in Capital Employed). However, Debt- Equity mix can be changed.
- The business risk is assumed to be constant and is not affected by the financing mix decision. (No change in fixed costs or operating risks).
- There are no corporate or personal taxes (No taxation)
- The Firm has Perpetual Life

NET INCOME APPROACH - ASSUMPTION

Apart from the general assumptions, the following additional assumptions are made –

1. K_d = debt capitalization rate and k_e = equity capitalization rate.
2. The cost of debt remains constant at all levels of debt-equity mix. This is because, the use of debt content does not change the risk perception of investors.

NET INCOME APPROACH - THEORY

- ◆ Debt is a cheaper sources of finance than equity due to tax saving effect and investor's risk expectations.
- ◆ Use of cheaper debt funds in total capital structure.
- ◆ Hence, as the degree of financial leverage increase, the WACC will decline with every increase in the debt content in total funds employed.
- ◆ Since value of firm = $EBIT/WACC$, the value of firm will increase for every decline in WACC.
- ◆ Where debt content is reduced, the reverse will happen, i.e. WACC will increase thereby reducing the value of the firm.
- ◆ Thus, a firm can increase its value and lower the overall cost of capital by increasing the proportion of debt in the capital structure.
- ◆ The value of the firm will be the maximum at a point where WACC is the minimum.

Thus, the theory suggests total or maximum possible debt financing for minimizing the cost of capital



K_d Constant at all debt - equity mix

NET OPERATING INCOME APPROACH - ASSUMPTION

1. The cost of debt (k_d) is always less than cost of equity (k_e)
2. k_d (debt capitalization rate) remains constant at various levels of debt-equity mix.
3. k_e (equity capitalization rate) increases as debt content increases due to higher financial risk and higher expectations of equity investors.
4. The market (investors in debt as well as equity) capitalizes the value of the firm as a whole, without giving importance to the debt-equity mix. Hence overall cost of capital is constant.

NET OPERATING INCOME APPROACH - THEORY

- ◆ Debt may be cheaper than equity. But the risk perception of equity investors increase with the use of additional debt in the capital employed.
- ◆ Increase in financial risk cause the equity capitalization rate to increase
- ◆ Thus, the advantage of using low-cost debt is set off exactly by increase in equity capitalization rate.
- ◆ Therefore, the overall cost of capital remains constant for all degrees 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 market value of the firm is ascertained by capitalizing the net operating income at the overall cost of capital, which is constant. The market value is not affected by debt-equity mix change.

Since WACC is constant at all levels, every debt-equity mix is as good as any other mix. There is no optimum capital structure. Every capital structure is optimal one.

Fayda = meksaam (imrewards)

Content of Debt \uparrow WACC \downarrow

[Because K_d is less than K_c]

[Fayda]

Content of Debt \uparrow Risk of Equity Shareholders \uparrow K_e \uparrow WACC \uparrow

[meksaam]

TRADITIONAL APPROACH - ASSUMPTION

Apart from the general assumptions, the following additional assumptions are made –

1. The cost of debt (k_d) is always less than cost of equity (k_e)
2. k_d and k_e vary with change in debt-equity mix. As debt content increases, financial risk increases, causing increase in the expectations of equity investors and rise in the cost of equity. Also additional loans can be taken only at higher rate interest. So cost of debt also rises beyond a certain level of debt content.
3. Increase in cost of equity is steeper and higher than increase in cost of debt.

TRADITIONAL APPROACH - THEORY

- ◆ Debt is cheaper source of finance than equity due to tax saving effect and investor's risk expectations.
- ◆ Use of cheaper debt fund in total capital structure will reduce the overall or weighted Average cost of capital since debt percentage increases in the total capital structure. This is because the benefits of the cheaper debt may be so large that even in offsetting the effect of increase in cost of equity, the WACC may go down.
- ◆ Hence as the degree of financial leverage increases, the WACC decline with every increase in the debt content in total funds employed.
- ◆ However, if financial leverage increases beyond an acceptable limit, (called the optimal point) the cost of debt and cost of equity start rising. This is because of the high financial risk associated with the firm.
- ◆ The increase in cost of equity owing to increased financial risk and increasing cost of debt makes the overall cost of capital to increase.
- ◆ The firm should have debt and equity in the capital structure. At the optimal capital structure the overall cost of capital will be the minimum and the value of the firm is the maximum.

Thus, as per the traditional Theory, the firm should try to achieve the optimal capital structure by minimizing WACC and maximizing value of Firm.

Traditional Theory (Relevant)

Beyond Optimum Persist.



[Optimum Capital Structure will be at lowest WACC)

CAPITAL STRUCTURE THEORIES - FORMULAS

Value of the Firm = Market value of equity + Market value of debt

OR

Value of the Firm = EBIT/ K_e

Market value of Equity = $\frac{NI/EBT}{K_e}$ (EATCS) No Tax & No PD

NI = EBT = EAES = Since No Taxes & No Preference Shares

OR

Market value of Equity = Market Value Of Firm – Market Value of Debt

$$\text{Market value of Debt} = \frac{\text{Interest}}{K_d}$$

OR

$$\text{Market Value of Debt} = \text{Market Value of Firm} - \text{Market Value of Equity}$$

$$\text{Overall cost of capital}(K_o) = \text{WACC} = \frac{\text{EBIT}}{\text{value of the firm}} \text{ OR WACC Computation Statement (If No Taxes)}$$

OR

$$\text{Overall cost of capital}(K_o) = \text{WACC} = \text{WACC Computation Statement (If Taxes)}$$



OR $\frac{\text{EBIT}(1-t)}{\text{value of firm}}$

ILLUSTRATION 1

Rupa Ltd.'s EBIT is ₹5,00,000. The company has 10%, ₹20 lakh debentures. The equity capitalization rate (K_e) is 16%.

You are required to CALCULATE:

- (i) Market value of equity and value of firm
- (ii) Overall cost of capital

$$\frac{EAEs}{K_e} = \frac{300000}{16\%} = 1875000$$

$$Vof = 1875000 + 200000 = 3875000$$

$$\therefore \frac{EBIT}{Vof} = \frac{500000}{3875000} = 12.90\%$$

$$\text{Value of Equity} = \frac{\text{EAT}}{k_e}$$

$$= \frac{\text{EBIT} - \text{Interest}}{k_e}$$

$$= \frac{500000 - 200000}{16\%}$$

$$= \frac{300000}{16\%} = \underline{\underline{1875000}}$$

$$\text{Value of firm} = \text{Value of Equity} + \text{Value of Debt}$$

$$= 1875000 + 2000000$$

$$= 3875000$$

$$\text{Overall Cost of Capital} = \text{EBIT} / \text{Value of Firm}$$

$$= 500000 / 3875000$$

$$= 0.1290$$

That is 12.90%.

Statement showing Computations of WACC

Sr. NO	Source	Amnt	prop'n	Cost	WACC
A	Equity	1875000	0.48	16%	0.0768
B	Debt	2000000	0.52	10%	0.052
		3875000			0.1288

$$\therefore \text{WACC} = 12.90\% \text{ (approx)}$$

ILLUSTRATION 2

Amita 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:

- (i) Total value of the firm
- (ii) Cost of equity

$$\begin{aligned} & \text{500000} \mid 15\% = 333333 \\ \text{VOTE} & = 333333 - 150000 \\ & = 183333 \\ \frac{\text{EAE S}}{\text{VOTE}} & = \frac{350000}{183333} \\ & = 19.09\% \end{aligned}$$

Name of firm \Rightarrow EBIT / K₀

\Rightarrow 500000 / 15%

\Rightarrow 3333333

$$\text{Value of Equity} = \frac{\hat{EAGS}}{K_e}$$

$$\text{Value of firm} - \text{Value of Debt} = \frac{\hat{EBIT} - \text{Interest}}{K_e}$$

$$3333333 - 1500000 = \frac{500000 - 150000}{K_e}$$

$$1833333 = \frac{350000}{K_e}$$

$$\therefore K_e = 350000 / 1833333 = 0.1909 \text{ that is } 19.09\%$$

ILLUSTRATION 3

Alpha Ltd. and Beta Ltd. are identical except for capital structure. Alpha Ltd. has 50 per cent debt and 50 per cent equity, whereas Beta Ltd. has 20 per cent debt and 80 per cent equity (All percentages are in market-value terms). The borrowing rate for both the companies is 8 per cent in a no-tax world, and capital markets are assumed to be perfect.

- (a) (i) *If you own 2 per cent of the shares of Alpha Ltd., DETERMINE your return if the company has net operating income of ₹ 3,60,000 and the overall capitalisation rate of the company (K_0) is 18 per cent.*
- (ii) *CALCULATE the implied required rate of return on equity of Alpha Ltd.*
- (b) *Beta Ltd. has the same net operating income as Alpha Ltd.*
- (i) *CALCULATE the implied required rate of return on equity of Beta Ltd.*
- (ii) *ANALYSE why does it differ from that of Alpha Ltd.*

Computation of Value of Alpha Ltd & Its Composition

$$\begin{aligned}\text{Value of Alpha Ltd} &= \text{EBIT} / K_0 \\ &= 360000 / 18\% \\ &= 2000000\end{aligned}$$

Composition
2000000
↑

Equity
50%
1000000

Debt
50%
1000000

Statement Showing EAES, Earning of Shareholders Holding 2% and Implied Return on Equity

Sr. No.	Particulars	Amount
A	EBIT	360 crd
B	Interest (1000 crd \times 8%)	80 crd
C	EBT / EAT / EAES (A - B)	280 crd
D	Value of Equity	1000 crd
E	Return on Holding 2% shares (C \times 2%)	5600
F	Implied rate of return ($\frac{5600}{1000} \times 100$)	28%

Computation of Value of Beta Ltd & Its Composition

As ALPHA Ltd & Beta Ltd are identical in nature

$$\begin{aligned}\text{Value of Beta Ltd} &= \text{Value of ALPHA Ltd} \\ &= 20,00,000\end{aligned}$$

Composition

Equity 80% 16,00,000	Debt 20% 4,00,000
----------------------------	-------------------------

Statement Showing EAES and Implied Rate of Return on Equity

Sr. No.	Particulars	Amount
A	EBIT	360 000
B	less: Interest (400 000 × 8%)	32 000
C	EBT / EAT / EAES (A - B)	328 000
D	Value of Equity	1 600 000
E	Implied rate of return (C / D × 100)	20.50%

Implied required rate of return on equity of Beta Ltd. is lower than that of Alpha Ltd. because Beta Ltd. uses less debt in its capital structure. when we use the net operating income approach, the decline in required equity return offsets exactly the disadvantage of not employing so much in the way of "cheaper" debt funds.

ILLUSTRATION 4

Indra Ltd. has an EBIT of ₹ 1,00,000. The company makes use of both the 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 COMPUTE:

- (i) Total value of the firm* 833333
- (ii) Overall cost of capital.* 12%

Value of Firm = value of equity + value of debt

$$= \frac{EATs}{K_e} + 50000$$

$$= \frac{EBIT - \text{interest}}{15\%} + 50000$$

$$= \frac{100000 - 50000}{15\%} + 50000$$

$$= 333333 + 50000$$

= 833333

average cost of
Capital (140)

$$= \frac{\text{EBIT}}{\text{Value of firm}}$$

$$= \frac{100000}{833333}$$

$$= 0.1200$$

that is 12%

or

Sl. NO	Particulars	Am't	Prop'n	Cost	WtACC
A	Equity	333333	0.40	15%	0.06
B	Debt	<u>500000</u>	0.60	10%	<u>0.06</u>
		833333			<u>0.12</u>

\therefore WACC = $K_b = 12\%$.

ILLUSTRATION 5

DETERMINE the optimal capital structure of a company from the following information:

Proportion of Debt + Proportion of Equity, K_d & K_e

Options	Cost of Debt (K_d) in %	Cost of Equity (K_e) 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

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

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

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

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

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

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

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

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

MODIGLIANI & MILLER (MM) APPROACH – WITHOUT TAXES

This Approach is a refinement of the Net Operating Income Approach and provides behavioural justification for the variables. The basic theory is essentially the same, but some additional propositions are made.

- 1. Nature of K_d and K_e :** K_d is always less than K_e . Debt Capitalisation Rate (K_d) remains constant at various levels of Debt-Equity mix. However, Equity Capitalisation Rate K_e increases as debt content increases due to higher financial risk and higher expectations of Equity Investors.
- 2. Perfect Market:** The Capital Markets are perfect. Investors are free to buy and sell securities. They are well informed about the risk and return on all type of securities. There are no Transaction Costs. The Investors behave rationally. They can borrow without restrictions on the same terms as the Firms do.
- 3. Risk Classification:** Firms can be classified into "homogenous risk classes." They belong to this class if their expected earnings have identical risk characteristics (as per the Investors' perceptions).
- 4. Risk-Return Relationship:** Investors expect different returns for different risk categories. The higher the risk, the higher is the return expectation.
- 5. Constant WACC:** Risk and Return are directly related, i.e. the higher the risk, the higher the return. But all Firms in the same category have the same risk and have constant expected return. For every risk category (consisting of a number of Firms), the expected return of all Investors (i.e. Debt and Equity) is the same.

6. Market Capitalisation:

- a) The market (Investors in Debt as well as Equity) capitalises the value of the Firm as a whole, without giving importance to the Debt-Equity mix. Hence Overall Cost of Capital is constant for all degrees of Debt-Equity mix.
- b) The Market Value of the Firm is ascertained by capitalising the Net Operating Income (EBIT) at the Overall Cost of Capital K_o , which is constant. The Market Value of the Firm is not affected by Debt-Equity mix change.

MM APPROACH – PROPOSITIONS

- 1. Constant WACC:** The Total Market Value of a Firm and its Cost of Capital are independent of its Capital Structure. The Total Market Value of the Firm is given by capitalising Net Operating Income at a Discount Rate considered appropriate for its risk class.

$$\text{Market Value of Firm} = \frac{EBIT}{K_0}$$

Two hand-drawn circles. The left circle contains the fraction $\frac{EBIT}{K_0}$. The right circle contains the fraction $\frac{EAT}{V_0E}$.

Value of Levered Firm = Value of Unlevered Firm.

- 2. $K_e = K_0 + \text{Premium for Risk}$:** The Financial Risk increases with more debt content increases in the capital structure. As a result, K_e increases such a manner as to off-set exactly the use of less expensive source of Debt Funds.

Cost of Equity (Levered Firm) = WACC (Unlevered Firm) + Risk Premium.

$$\text{So, } \underline{K_e \text{ (Levered)}} = \underline{K_0 \text{ (Unlevered)}} + \frac{\text{Debt}}{\text{Equity}} (\underline{K_0 \text{ of Unlevered}} - \underline{K_d}) \rightarrow \text{Before TAXES}$$

- 3. Leverage Adjustment:** Financial Leverage has no impact on market values, which remain constant for all Firms in the same risk class. In case such Firms had different market values, investors will buy and sell Shares and set aside the leverage effect Through Arbitrage.

③

Ke of A Ud \rightarrow Ke of B Ud
 Investor A Ud feels risky
 Same risk class due to debt content



Value of A Ud = Value of B Ud

①
②

Value of A Ud & B Ud same
 Ke of A & B same.

CONCEPT OF ARBITRAGE UNDER MM APPROACH

Modigliani and Miller argue that there is no difference in the market values of different Firms in the same risk class. Financial Leverage or Use of Debt in Capital Structure has no impact on Market Values. Their reasoning is as under-

- 1. Same Risk = Same K_o = Same Market Value:** Companies in different industries may have different risks, which will result in their earnings being capitalised at different rates. However, Companies in the same risk category will have the same expected earnings (EBIT). This EBIT will be capitalised at the WACC (for that risk category) and hence Market Values of all Companies in the same risk category (i.e. same WACC) will also be the same.
- 2. Buying and Selling Effect:** In the same risk category, if the Market Values (as represented by Market Price per Share i.e. MPS) of different Companies were to be different, investors in the high MPS Company will sell their holding and buy the Shares of low MPS Company.
- 3. Movement in Share Prices:** The buying and selling spree of Investors will lead to increase in demand of the low MPS Company's Shares, causing its share price to increase. Similarly, due to sale of holdings, the price of high MPS Company's Shares will fall.
- 4. Arbitrage:** This movement in Share Prices will continue till both Companies' Share Prices settle at a constant. This is attributed to the arbitrage effect. Through the above procedure, investors will move from a Leveraged Firm to Unleveraged Firm and vice-versa, through the process of arbitrage. This will cease only when total Market Values of both Firms are the same.
- 5. Constant Market Value and WACC:** Thus, for a Company in a particular risk class, the total Market Value must be same, irrespective of level of Debt in the Company's Capital Structure.

MODIGLIANI & MILLER (MM) APPROACH – CRITICISM

Modigliani and Miller theory is criticized on the following grounds -

1. The assumption of perfect market is not practical. In the real world, various imperfections exist, such as transactions cost for purchase and sale of securities & Presence of Corporate Income Taxes.
2. The argument that arbitrage nullifies the effect of leverage is not valid. Investors do not behave in such a calculated and rational way in switching from leveraged to un-leveraged firm or vice-versa.
3. The theory presumes the availability of free knowledge about the company's operations. In Practice , Investors have Little Knowledge about the company's operations. Their dealing in shares are not based only upon the information on hand, but on other considerations also.

MODIGLIANI & MILLER (MM) APPROACH – WITH TAXES

In 1963, MM model was amended by incorporating tax, they recognised that the value of the firm will increase, or cost of capital will decrease where corporate taxes exist. As a result, there will be some difference in the earnings of equity and debt-holders in levered and unlevered firm and value of levered firm will be greater than the value of unlevered firm by an amount equal to amount of debt multiplied by corporate tax rate.

Value of Levered Firm = Value of Unlevered Firm + Tax benefit

Where ,Tax Benefit = Amount of Debt * Tax Rate

$$K_e (\text{Levered}) = K_o (\text{unlevered}) + \frac{\text{Debt} (1-t)}{\text{Equity}} (K_o \text{ of unlevered} - K_d)$$

$$\text{WACC of levered Firm } (K_o) = K_e (\text{Unlevered Firm}) \times \left[1 - (t * \frac{\text{Debt}}{\text{Debt} + \text{Equity}}) \right]$$

Before Taxes
E/A/E\$ / Value of equity
OR
EBIT(1-t) / Value of Firm
OR
K_e / K_o

M & M Theory
Modigliani & Miller theory - Without Taxes

[Irrelevant theory / Constant WACC]

1. Value of levered firm = Value of unlevered firm
2. WACC of levered firm = WACC of unlevered firm
3. K_e of levered firm $>$ K_c of unlevered firm
$$K_e = K_0 + \frac{\text{Debt}}{\text{Equity}} (K_0 - K_d)$$

Modigliani & Miller - with Taxes

[Relevant theory | Variable WACC]

1] Value of levered firm = Value of unlevered firm + (Debt \times Tax rate)

i.e. Value of levered firm $>$ Value of unlevered firm

2] WACC of levered firm $<$ WACC of unlevered firm

3] K_e of levered firm $>$ K_e of Equity of unlevered firm

$$K_e = K_0 + \frac{\text{Debt} \times (1 - t)}{\text{Equity}} (K_0 - K_d)$$

ILLUSTRATION 6

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

Capital employed = ₹2,00,000, EBIT = ₹30,000 and $K_e = 12.5\%$

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

An investor is holding 15% shares in levered company. CALCULATE the increase in annual earnings of investor if he switches his holding from Levered to Unlevered company.

$$\begin{array}{r}
 30000 \\
 10000 \\
 \hline
 20000 \\
 12.5\%
 \end{array}$$

$$\begin{array}{r}
 16000 \\
 10000 \\
 \hline
 26000
 \end{array}$$

Statement Showing value of Firm

Sr.No	Particulars	Levered	Unlevered
`	EBIT	30000	30000
B	Less -Interest	10000	-
	Levered - (100000*10%)		
C	EAES (A-B)	20000	30000
D	Ke	12.50%	12.50%
E	Value of Equity (C/D)	160000	240000
F	Value of Debt	100000	-
G	Value of Firm	260000	240000

Sr. NO	Particulars	amt
A	Amount received on sale of 15% shares of levered (260000 × 15%)	39000
B	Amount paid for purchase of 15% shares of unlevered (240000 × 15%)	36000
C	Amount saved (A-B)	3000
D	Amount earned on saving (3000 × 12.5%)	375

Sale of levered co. $260000 \times 15\% = 39000$
[Inflow]

Purchase of unlevered $240000 \times 15\% = 36000$
[Outflow]

Amount saved $= 3000$
Invested in market

Return of investment $= 3000 \times 12.5\% = 375$

IF INVESTOR SELLS 15% SHARES OF LEVERED CO AND BUYS SHARES OF UNLEVERED CO. OF EQUIVALENT AMOUNT

Amount Received on sale of 15% Shares - 24000

Borrow Amount @ 10% Equivalent to Levered Co. To maintain The Same Risk
15% of 100000 = 15000

Total Amount Available for Investments = 39000

Amount invested = 39000

Amount Left after Investment = 0

↓
alternate way

Position of Investor In Both the Companies

Sr.No	Particulars	Investor of Levered Co.	Investor of unLevered Co.
A	Value of Investment	24000	39000
		(160000 *15%)	
B	Ke	12.50%	12.50%
C	Earnings of Investor (A*B)	3000.0	4875.0
D	Less - Interest	-	1500
			(15000*10%)
E	Net Earnings	3000.0	3375.0
Investor of N Ltd Is Earning More By Rs. 375			

ILLUSTRATION 7

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%

An investor is holding 15% shares in Unlevered company. CALCULATE the increase in annual earnings of investor if he switches his holding from Unlevered to Levered Company.

Sr. NO	Particulars	Amt
A	Amount received on Sale of shares of Unlevered Co. ($240000 \times 15\%$)	36000
B	Amount paid on Purchase of Shares of Levered Co. ($200000 \times 15\%$)	30000
C	Amount saved (A-B)	6000
D	Amount Invested in Debt (C $\times 50\%$)	3000
E	Amount Invested in Equity (C $\times 50\%$)	3000

F Amount earned on investment
in Debt ($3000 \times 10\%$) 300

G Amount earned on investment
in equity ($3000 \times 20\%$) 600

H Total Earnings (F+G) 900

Statement Showing value Of Firm

Sr.No	Particulars	Levered	Unlevered
A	EBIT	30000	30000
B	Less -Interest	10000	-
	Levered - (100000*10%)		
C	EAES (A-B)	20000	30000
D	Ke	20.00%	12.50%
E	Value of Equity (C/D)	100000	240000
F	Value of Debt	100000	-
G	Value of Firm	200000	240000

Alternate way

IF INVESTOR SELLS 15% SHARES OF UNLEVERED CO AND INVESTS IN LEVERED CO. IN SAME PROPORTION OF DEBT & EQUITY

Amount Received on sale of 15% Shares – 36000

Purchase Debt = 18000

Invest in Shares of Levered Co. = 18000

Position of investor In Both Companies

Sr.No	Particulars	Investor of Levered Co.	Investor of UnLevered Co.
A	Value of Investment in Equity	18000	36000
B	Ke	20.00%	12.50%
C	Earning of Investor (A*B)	3600.0	4500.0
D	Interest Earned	1800	
		(18000*10%)	
E	Net Earnings	5400.0	4500.0

INVESTOR OF LEVERED CO WILL EARN MORE BY 900

QUESTION 8 (5 Marks)

In respect of two companies having same business risk, following information is given:

Capital employed = ₹ 4,00,000; EBIT = ₹ 60,000; $K_e = 12\%$

Sources	Levered Company (₹)	Unlevered Company (₹)
Debt (@10%)	1,50,000	Nil
Equity	1,50,000	3,00,000

Investor is holding 20% shares in levered company. CALCULATE increase in annual earnings of investor if he switches his holding from Levered to Unlevered company.

$$\begin{array}{r} \text{₹ } 5000 \times 12\% \\ \hline \text{₹ } 600 \end{array}$$

$$\begin{array}{r} \text{₹ } 25000 \\ \times 20\% \\ \hline \text{₹ } 10500 \end{array}$$

$$\begin{array}{r} \text{₹ } 50000 \\ \times 20\% \\ \hline \text{₹ } 10000 \end{array}$$

Statement Showing value of Firm

Sr.No	Particulars	Levered	Unlevered
`	EBIT	60000	60000
B	Less -Interest	15000	-
	Levered - (150000*10%)		
C	EAES (A-B)	45000	60000
D	Ke	12.00%	12.00%
E	Value of Equity (C/D)	375000	500000
F	Value of Debt	150000	-
G	Value of Firm	525000	500000

IF INVESTOR SELLS 20% SHARES OF LEVERED CO AND BUYS SHARES OF UNLEVERED CO. OF EQUIVALENT AMOUNT

Amount Received on sale of 20% Shares - 75000

Borrow Amount @ 15% Equivalent to Levered Co. To maintain The Same Risk
20% of 150000 = 30000

Total Amount Available for Investments = 105000

Amount invested = 105000

Amount Left after Investment = 0

↓
Alternate way

Position of Investor In Both the Companies

Sr.No	Particulars	Investor of Levered Co.	Investor of unLevered Co.
A	Value of Investment	75000	105000
		(375000*20%)	
B	Ke	12.00%	12.00%
C	Earnings of Investor (A*B)	9000.00	12600.00
D	Less - Interest	-	3000
			(30000*10%)
E	Net Earnings	9000.0	9600
Investor of Unlevered Co Is Earning More By Rs. 600			

ILLUSTRATION 9 (MTP MAY 2022 SERIES 1) 5 MARKS

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

Capital employed = ₹ 4,00,000, EBIT = ₹ 60,000 and $K_e = 12.5\%$

Sources	Levered Company (₹)	Unlevered Company (₹)
Debt (@10%)	2,00,000	Nil
Equity	2,00,000	4,00,000

An investor is holding 15% shares in levered company. CALCULATE the increase in annual earnings of investor if he switches his holding from Levered to Unlevered company.

$$\begin{aligned} & \text{₹ } 2,00,000 \\ & \times 15\% = \text{₹ } 30,000 \end{aligned}$$

$$\begin{aligned} & \text{₹ } 60,000 \\ & \times 12.5\% = \text{₹ } 7,500 \end{aligned}$$
$$\begin{aligned} & \text{₹ } 48,000 \\ & \times 15\% = \text{₹ } 7,200 \end{aligned}$$

ILLUSTRATION 10

Blue 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:

- (i) Market value of the company $1750 + (275 \times 30\%) = 1832.50$
- (ii) Overall Cost of capital ① $\frac{EBIT(1-t)}{V_0}$ ② WACC statement ③ formula.
- (iii) Cost of equity 2 ways

(i) MARKET VALUE OF FIRM

Before Repurchase The Status of a Company is Unlevered Company However After Repurchase There is Introduction of Debt in capital Structure making It Levered Co.

$$\begin{aligned}\text{Value of Firm} &= \text{Value of Unlevered Firm} + \text{Tax Benefits} \\ &= 1750 + (275 * 30\%) \\ &= 1750 + 82.50 \\ &= 1832.50 \text{ Lakhs}\end{aligned}$$

The market Value is increased By 82.50 lakhs

(ii) ASCERTAINMENT OF COST OF EQUITY

$$\text{Value of Equity} = \text{EAES}/K_e$$

$$\text{Value of Firm} - \text{Value of Debt} = \text{EAES (WN 1)}/K_e$$

$$1832.50 - 275 = 321.12/K_e$$

$$1557.50 = 321.12/K_e$$

$$K_e = 20.62 \%$$

The Cost of Equity is Increased by 0.62%

$$K_e = \frac{\text{EAES}}{\text{V of E}}$$

$$\begin{aligned} K_e &= \frac{\text{EAES (WN 1)}}{(1832.50 - 275)} \\ &= \frac{321.12}{1557.50} \\ &= \underline{\underline{20.62\%}} \end{aligned}$$

(ii) ASCERTAINMENT OF COST OF EQUITY

$$\begin{aligned}\text{Cost of Equity (Levered Firm)} &= K_o (\text{Unlevered Firm}) + \frac{\text{Debt} (1-t)}{\text{Equity}} (K_o \text{ of unlevered Firm} - K_d) \\ &= .20 + 275(1-.30)/1557.50 \times (0.20 - 0.15) \\ &= .20 + 192.50/1557.50 \times .05 \\ &= 20.62\%\end{aligned}$$

$$\begin{aligned}&= 0.20 + \frac{275(1-0.30)}{(1832.50 - 275)} (0.20 - 0.15) \\ &= \underline{\underline{20.62\%}}\end{aligned}$$

(iii) Statement Showing Overall Cost of Capital (WACC)

Sr. No.	Source	Value	Proportion	Cost	WACC
A	EQUITY	1557.50	.85	20.62%	.1753
B	DEBT	275	.15	10.50%	.0158
		1832.50			.1911

WACC - 19.11%

WACC has Fallen By 0.89%

①
$$\frac{500(1-0.30)}{1832.50} = \underline{\underline{19.10\%}}$$

3. Computation of Overall Cost of Capital (WACC)

$$\begin{aligned}\text{WACC of levered Firm (K}_o\text{)} &= \text{K}_e \text{ (Unlevered Firm)} \times \left[1 - \left(t^* \frac{\text{Debt}}{\text{Debt} + \text{Equity}}\right)\right] \\ &= .20 \times [1 - (.30 \times 275 / 1832.500)] \\ &= .20 \times (1 - 0.0450) \\ &= .20 \times .955 \\ &= 19.11\%\end{aligned}$$

$$\begin{aligned}\Rightarrow & K_e \times \left[1 - \left(t^* \times \frac{\text{Debt}}{\text{Debt} + \text{Equity}}\right)\right] \\ \Rightarrow & 0.20 \times \left[1 - \left(0.30 \times \frac{275}{1832.50}\right)\right] \\ \Rightarrow & 0.20 \times (1 - 0.0450) \\ \Rightarrow & 0.20 \times 0.955 = 19.1\%\end{aligned}$$

WN 1 - Computation of EBIT & EAES After Restructuring

It Has Been Stated in The Question that EBIT of the Company Shall Remain Constant

$$\begin{aligned}\text{EBIT Before Restructuring} &= \text{EAES}/(1-t) \\ &= 1750 * 20\% / (1-t) \\ &= 500 \text{ Lakhs}\end{aligned}$$

$$\frac{350}{(1-0.30)} = \underline{\underline{500}}$$

$$\frac{1750 * 20\%}{1}$$

The Same Shall be EBIT After Restructuring

Sr. No.	Particulars	Amount (In lakhs)
A	EBIT	500
B	Less – Interest (275 Lakhs *15%)	41.25
C	EBT (A-B)	458.75
D	Less – Tax @ 30%	137.63
E	EAES (C-D)	321.12

ILLUSTRATION 11

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

Handwritten notes under the table:
Under ₹ 54,00,000: 10000000
Under 18: 4600000

REQUIRED:

- 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.
- Determine the total market value, Equity capitalization rate and weighted average cost of capital for each company assuming 40% taxes as per M.M. Approach.

MM without Taxes

	A Ud	B Ud
Market Value	10000000	10000000
K_e	25.04% (2)	18%
WACC	18%	18%

MM with Taxes

	A Ud	B Ud
Market Value	$6000000 + 2160000 = 8160000$	6000000
K_e	$691200 / 2760000 = 25.04\%$	18%
WACC	$1080000 / 8160000 = 13.23\%$	18%

If No taxes

Value of Unlevered Firm = Value of Levered Firm

Value of B Ltd = Value of A Ltd

Value of B Ltd = $\text{NOI}/K_o = 1800000/0.18 = 10000000$

Therefore Value of A Ltd = 10000000

Equity Capitalization Rate & WACC For B Ltd is 18%

Statement Showing Equity Capitalization Rate & WACC of A Ltd

Sr. No	Particulars	A Ltd
A	Net Operating Income	1800000
B	Less – Interest	648000
C	EAES (A-B)	1152000
D	Total value of Firm (Calculated Above)	10000000
E	Value of Debt	5400000
F	Value of Equity (D-E)	4600000
G	Equity Capitalization Rate (C/F*100)	25.04%
H	WACC (WN 1)	18.00%

Statement Showing WACC

Sr.No	Source	Amount	Proportion	Cost	WACC
A	Equity	4600000	0.46	0.2504	0.115
B	Debt	5400000	0.54	0.12	0.065
		10000000	1		0.18

That is 18%

↓
Alternate way of computing WACC

Alternate way of computing Ke

$$\begin{aligned}
 K_e &= K_D + \frac{\text{Debt}}{\text{Equity}} (K_D - K_D) \\
 &= 0.18 + \frac{5400000}{4600000} (0.18 - 0.12) \\
 &= 0.18 + 0.0704 = 0.2504 \text{ That is } \underline{25.04\%}
 \end{aligned}$$

If 40% Taxes

Value of Unlevered Firm (B Ltd) = EAES/ K_o = $(1800000 - 40\% \text{ tax}) / 0.18 = 6000000$

Value of Levered Firm = Value of B Ltd + (Debt X Tax Rate) = $6000000 + (5400000 * 40\%)$
 $= 6000000 + 2160000 = 81600000$

Ke & WACC of B Ltd is 18%

Statement Showing Equity Capitalisation Rate & WACC of A Ltd

Sr.No	Particulars	A Ltd
A	Net Operating Income	1800000
B	Less - Interest	648000
C	EBT	1152000
D	Less - Tax @ 40%	460800
E	EAT/EAES	691200
F	Total Value of Firm (As Calculated Above)	8160000
G	Market Value of Debt	5400000
H	Market Value of Equity (F-G)	2760000
I	Ke (E/H*100)	25.04%
J	WACC (WN 2)	13.23%

Statement Showing WACC

Sr.No	Source	Amount	Proportion	Cost	WACC
A	Equity	2760000	0.3382	0.2504	0.0847
B	Debt	5400000	0.6618	0.072	0.0476
		8160000	1		0.1323

That is 13.23%

↓
first method.

2nd method

$$K_0 = \frac{EBIT(1-t) \times 100}{\text{Value of firm}}$$

$$= \frac{1800000(1-0.40) \times 100}{8160000} = \frac{1080000 \times 100}{8160000} = 13.23\%$$

Alternate way of calculating K_c of A Ltd

$$K_c = K_0 + \frac{\text{Debt} (1-t)}{\text{Equity}} (K_0 - K_d)$$

$$= 0.18 + \frac{5400000 (1-0.4)}{2760000} (0.18 - 0.12)$$

$$= 0.18 + \frac{3240000}{2760000} \times 0.06$$

$$= 0.18 + 0.0704$$

$$= 0.2504 \text{ that is } \underline{25.04\%}$$

An alternate way of calculating WACC of A Ltd.

$$K_0 \text{ of levered firm} = K_e \times \left[1 - (t \times \frac{\text{Debt}}{\text{Equity}}) \right]$$

$$= 0.18 \times \left[1 - (0.40 \times \frac{540000}{816000}) \right]$$

$$= 0.18 \times (1 - 0.2647)$$

$$= 0.18 \times 0.7353$$

$$= 0.1323 \text{ that is } 13.23\%$$

ILLUSTRATION 12

One-third of the total market value of Sanghmani Limited consists of loan stock, which has a cost of 10 per cent. Another company, Samsui Limited, is identical in every respect to Sanghmani Limited, except that its capital structure is all-equity, and its cost of equity is 16 per cent. According to Modigliani and Miller, if we ignored taxation and tax relief on debt capital, COMPUTE the cost of equity of Sanghmani Limited?

$$\begin{aligned}
 K_e &= K_D + \frac{\text{Debt}}{\text{Equity}} (K_D - K_D) \\
 &= 0.16 + \frac{1/3}{2/3} (0.16 - 0.10) \\
 &= 0.16 + 0.33 \times 0.06 = 0.16 + 0.02 = 0.18 = 18\%
 \end{aligned}$$

$$K_e = K_D + \frac{\text{Debt}}{\text{Equity}} (K_D - K_A)$$

$$= 0.16 + \frac{1/3}{2/3} (0.16 - 0.10)$$

$$= 0.16 + \frac{0.33}{0.66} \times 0.06$$

$$= 0.19 \text{ that is } 19\%$$

Alternate way,

As Samsui Ltd & Sanghamani Ltd belongs to same risk & in M&M theory without Taxes
K₀ of unlevered firm = K₀ of levered firm

∴ K₀ of Sanghamani Ltd = 16%.

Statement Showing Overall Cost of Capital (WACC)

Sr. No.	Source	Proportion	Cost	WACC
A	Equity	0.6666	BF 19%	CBP 0.1267
B	Debt	0.3334	10%	0.0333
		1.00		0.16

ILLUSTRATION 13 NOV 22 (SERIES 1) (8 MARKS)

Leo Ltd. has a net operating income of ₹ 21,60,000 and the total capitalisation 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 Capitalisation rate (%)
0	N.A.	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

$$\begin{array}{r} 2160000 \\ \hline 2000000 \\ \hline 18\% \end{array}$$

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.

MM approach
without taxes

$$K_e = K_0 + \frac{\text{Debt}}{\text{Equity}} (K_0 - K_d)$$

≈ 0.184

STATEMENT SHOWING COMPUTATION OF COST OF EQUITY

(METHOD 1)

2160000 / 12000000 = 0.18

Debt	Equity	Debt/Equity	Ko	Kd	Ko-Kd	Ke = Ko + D/E (Ko - Kd)
A	B	C = A/B	D = As Above	E = Given	F = D - E	G = D + C * F
0	12000000	0	.18	-	0.18	0.1800
1000000	11000000	0.09	.18	0.07	0.11	0.1900
2000000	10000000	0.20	.18	0.07	0.11	0.2020
3000000	9000000	0.33	.18	0.075	0.105	0.2150
4000000	8000000	0.50	.18	0.075	0.105	0.2325
5000000	7000000	0.71	.18	0.080	0.01	0.2514
6000000	6000000	1	.18	0.085	0.095	0.2750
7000000	5000000	1.40	.18	0.09	0.09	0.3060
8000000	4000000	2	.18	0.1	0.08	0.3400

STATEMENT SHOWING COMPUTATION OF COST OF EQUITY (METHOD 2) EAES/NOE

Debt	Equity	Kd	EBIT	Interest	EAES	Ke
A	B	C	D	E = A * C	F = C - D	G = F / B
0	12000000	-	2160000	0	2160000	0.1800
1000000	11000000	7%	2160000	70000	2090000	0.1900
2000000	10000000	7%	2160000	140000	2020000	0.2020
3000000	9000000	7.5%	2160000	225000	1935000	0.2150
4000000	8000000	7.5%	2160000	300000	1860000	0.2325
5000000	7000000	8.0%	2160000	400000	1760000	0.2514
6000000	6000000	8.5%	2160000	510000	1650000	0.2750
7000000	5000000	9%	2160000	630000	1530000	0.3060
8000000	4000000	10%	2160000	800000	1360000	0.3400

Statement showing computation of COST OF EQUITY (Method 3)

Debt	Equity	Total	Proportion of Debt	Proportion of Equity	Kd	WACC	Ke
A	B	C= (A+B)	D = A/C	E = B/C	F	G	H = G-(D*F)/E
0	12000000	12000000	0	1	-	0.18	0.1800
1000000	11000000	12000000	0.08	0.92	0.07	0.18	0.1900
2000000	10000000	12000000	0.17	0.83	0.07	0.18	0.2020
3000000	9000000	12000000	0.25	0.75	0.075	0.18	0.2150
4000000	8000000	12000000	0.33	0.67	0.075	0.18	0.2325
5000000	7000000	12000000	0.42	0.58	0.080	0.18	0.2514
6000000	6000000	12000000	0.50	0.50	0.085	0.18	0.2750
7000000	5000000	12000000	0.58	0.42	0.09	0.18	0.3060
8000000	4000000	12000000	0.67	0.33	0.1	0.18	0.3400

ILLUSTRATION 14 (RTP MAY 2021)

Zordon Ltd. has net operating income of ₹ 5,00,000 and total capitalization of ₹ 50,00,000 during the current year. The company is contemplating to introduce debt financing in capital structure and has various options for the same. The following information is available at different levels of debt value:

Debt value (₹)	Interest rate (%)	Equity capitalization rate (%)
0	-	10.00
5,00,000	6.0	10.50
10,00,000	6.0	11.00
15,00,000	6.2	11.30
20,00,000	7.0	12.40
25,00,000	7.5	13.50
30,00,000	8.0	16.00

Assuming no tax and that the firm always maintains books at book values, you are REQUIRED to calculate:

- (i) Amount of debt to be employed by firm as per traditional approach.
- (ii) Equity capitalization rate, if MM approach is followed.

Statement Showing WACC

Debt	Equity	Total	Proportion of Debt	Kd	Proportion of Equity	Ke	WACC
A	B	C= (A+B)	D = A/C	E	F = B/C	G	H = (D*E) + (F*G)
0	5000000	5000000	0	-	1	10%	0.1000
500000	4500000	5000000	0.10	6%	0.9	10.50%	0.1005
1000000	4000000	5000000	0.20	6%	0.8	11%	0.1000
1500000	3500000	5000000	0.30	6.20%	0.7	11.30%	0.0977
2000000	3000000	5000000	0.40	7.00%	0.6	12.40%	0.1024
2500000	2500000	5000000	0.50	7.50%	0.5	13.50%	0.1050
3000000	2000000	5000000	0.60	8.00%	0.4	16%	0.1120

WACC is Minimum if Debt Employed Rs. 1500000 , Hence Amount of Debt to Be Employed Shall be Rs. 1500000

As per MM approach, cost of the capital (K_0) remains constant and cost of equity increases linearly with debt.

$$\text{Value of a firm} = \frac{\text{Net Operating Income (NOI)}}{K_0}$$

$$₹ 50,00,000 = \frac{₹ 5,00,000}{K_0}$$

$$K_0 = \frac{₹ 5,00,000}{₹ 50,00,000} = 10\%$$

STATEMENT SHOWING COMPUTATION OF COST OF EQUITY (METHOD 1)

Debt	Equity	Debt/Equity	Ko	Kd	Ko-Kd	Ke = $Ko + D/E (Ko - Kd)$
A	B	C = A/B	D = As Above	E = Given	F = D-E	G= D+C*F
0	5000000	0	0.10	0	.10	0.1000
500000	4500000	0.11	0.10	0.06	0.04	0.1044
1000000	4000000	0.25	0.10	0.06	0.04	0.1100
1500000	3500000	0.43	0.10	0.062	0.038	0.1163
2000000	3000000	0.67	0.10	0.070	0.03	0.1201
2500000	2500000	1.00	0.10	0.075	0.025	0.1250
3000000	2000000	1.50	0.10	.080	0.02	0.1300

STATEMENT SHOWING COMPUTATION OF COST OF EQUITY (METHOD 2)

Debt	Equity	Kd	EBIT	Interest	EAES	Ke
A	B	C	D	E = A*C	F= C-D	G = F/B
0	5000000	0	500000	0	500000	0.1000
500000	4500000	6%	500000	30000	470000	0.1044
1000000	4000000	6%	500000	60000	440000	0.1100
1500000	3500000	6.20%	500000	93000	407000	0.1163
2000000	3000000	7%	500000	140000	360000	0.1201
2500000	2500000	7.5%	500000	187500	312500	0.1250
3000000	2000000	8%	500000	240000	260000	0.1300

STATEMENT SHOWING COMPUTATION OF COST OF EQUITY (METHOD 3)

Debt	Equity	Total	Proportion of Debt	Proportion of Equity	Kd	WACC	Ke
A	B	C= (A+B)	D = A/C	E = B/C	F	G	H = G-(D*F)/E
0	5000000	5000000	0	1	-	0.10	0.1000
500000	4500000	5000000	0.10	0.9	0.060	0.10	0.1044
1000000	4000000	5000000	0.20	0.8	0.060	0.10	0.1100
1500000	3500000	5000000	0.30	0.7	0.062	0.10	0.1163
2000000	3000000	5000000	0.40	0.6	0.070	0.10	0.1200
2500000	2500000	5000000	0.50	0.5	0.075	0.10	0.1250
3000000	2000000	5000000	0.60	0.4	0.08	0.10	0.1300

QUESTION 15 (5 MARKS)

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

	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, $K_e = NI/V$	10.00%	10.70%

- (i) Compute the Equilibrium value for Firm A and B in accordance with the M-M approach. Assume that (a) taxes do not exist and (b) the equilibrium value of K_e is 9.09%.
- (ii) Compute Value of Equity and Cost of Equity for both the firms.

Statement Showing Value of Firm , Value of Equity & Cost of Equity

SR.NO	PARTICULARS	A	B
A	NET OPERATING INCOME	5000	5000
B	WACC (Ko)	9.09	9.09
C	VALUE OF FIRM	55005.50	55005.50
D	LESS - VALUE OF DEBT	-	30000
E	VALUE OF EQUITY	55005.50	25005.50
F	EAES	5000	3200
			(5000-1800)
G	Ke (F/E*100)	9.09%	12.80%

ILLUSTRATION 16 (PYP JUL 2021) 5 MARKS

The details about two companies R Ltd. and S Ltd. having same operating risk are given below:

Particulars	R Ltd.	S Ltd.
Profit before interest and tax	₹ 10 lakhs	₹ 10 lakhs
Equity share capital ₹ 10 each	₹ 17 lakhs	₹ 50 lakhs
Long term borrowings @ 10%	₹ 33 lakhs	-
Cost of Equity (K_e)	18%	15%

You are required to:

- (1) Calculate the value of equity of both the companies on the basis of M.M. Approach without tax.
- (2) Calculate the Total Value of both the companies on the basis of M.M. Approach without tax.

Statement Showing Value of Equity on the basis of MM without Tax

Sr. No.	Particulars	R Ltd	S Ltd
A	Profit Before Interest & Tax	1000000	1000000
B	Less – Interest	330000	-
		(3300000*10%)	
C	EBT/EAT/EAES (A-B)	670000	1000000
D	Ke	18%	15%
E	Value of Equity (C/D)	3722222	6666667

Statement Showing Total Value of Company on the basis of MM without Tax

Sr. No.	Particulars	R Ltd	S Ltd
A	Value of Equity (As Ascertained Above)	3722222	6666667
B	Value of Debt (Given)	3300000	-
C	Value of Company (A+B)	7022222	6666667

TRADE OFF THEORY

The trade-off theory of capital structure refers to the idea that a company chooses how much debt finance and how much equity finance to use by balancing the costs and benefits. Trade-off theory of capital structure basically entails offsetting the costs of debt against the benefits of debt.

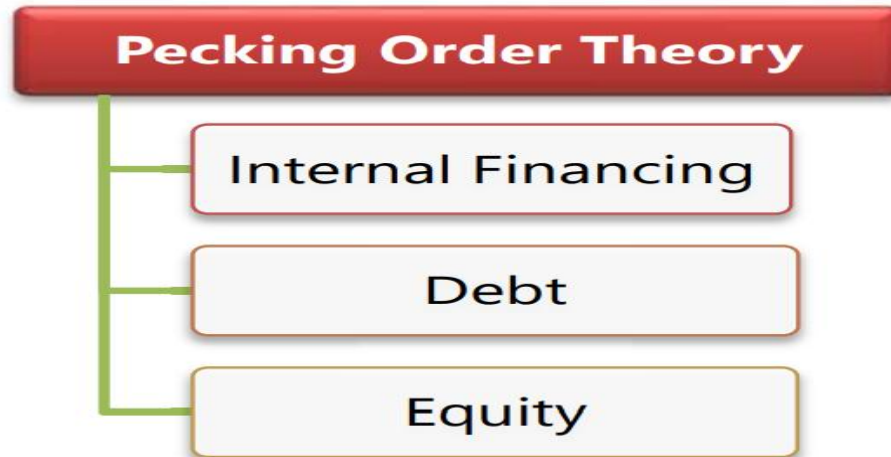
It states that there is an **advantage** to financing with debt, the **tax benefits** of debt and there is a **cost** of financing with debt, the costs of **financial distress** including bankruptcy costs of debt and non-bankruptcy costs (e.g. staff leaving, suppliers demanding disadvantageous payment terms, bondholder/ stockholder infighting, etc).

As the Debt-equity ratio (i.e. leverage) increases, there is a trade-off between the interest tax shield and bankruptcy, causing an optimum capital structure.

PECKING ORDER THEORY

This theory is based on Asymmetric information, which refers to a situation in which different parties have different information. In a firm, managers will have better information than investors. This theory states that firms prefer to issue debt when they are positive about future earnings. Equity is issued when they are doubtful and internal finance is insufficient.

The pecking order theory argues that the capital structure decision is affected by manager's choice of a source of capital that gives higher priority to sources that reveal the least amount of information.



EBIT-EPS-MPS ANALYSIS FOR OPTIMAL CAPITAL STRUCTURE

Choose a capital structure which maximizes market price per share.

Important points

1. Prepare profitability Statement Wherein Start With Same EBIT For All Capital Structure options.
2. Choose a Capital Structure Which Gives Highest MPS , If MPS Not Available take Decision on the Basis of EPS.
3. Assume Slab Rate of Interest.
4. Focus on Calculation of No. Of Shares (it Should include Both Existing + New issue).
5. If EBIT is Not Available Compute EBIT Considering Existing Return on investment or Any Supporting Details Available in Question.

ILLUSTRATION 17

Shahji Steel Limited 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 percent upto ₹ 2,50,000, at 15 percent over ₹ 2,50,000 and upto ₹ 10,00,000 and at 20 percent over ₹ 10,00,000. The tax rate applicable to the company is 50 percent. ANALYSE which form of financing should the company choose?

$$\begin{aligned} \textcircled{1} & 25,00,000 \times 10\% = 2,50,000 \\ \textcircled{2} & 2,50,000 + (7,50,000 \times 15\%) = 1,37,500 \\ \textcircled{3} & 2,50,000 + 1,12,500 + 1,00,000 = 2,37,500 \end{aligned}$$

Financing Options Available With The Company

OPTION 1 = Debt of 250000 + 15000 shares of 150
each amounting RS.
2250000

OPTION 2 = Debt of 100000 + 10000 shares of 150
each amounting RS.
1500000

OPTION 3 = Debt of 150000 + 8000 shares of
125 each amounting
to RS. 1000000

Statement Showing EPS Under all Three Financing Plans

Sr. No.	Particulars	Option 1	Option 2	Option 3
A	EBIT	500000	500000	500000
B	less- Interest [WNI]	25000	137500	237500
C	EBT (A-B)	475000	362500	262500
D	less- Tax @ 50%	237500	181250	131250
E	EAT / EAES	237500	181250	131250
F	No. of Equity shares	15000	10000	8000
G	EPS (E/F)	15.83	18.13	16.41

Conclusion: - As Option 2 gives highest EPS,
it is recommended to avail 2500000 by
way of 1000000 Debt + 1500000 Equity.

WN 1 - Computation of Interest Payable under all 3 options

Option 1

$$250000 \times 10\%$$

25000

Option 2

$$250000 \times 10\%$$

$$750000 \times 15\%$$

25000

112500

137500

Option 3

$$250000 \times 10\%$$

$$750000 \times 15\%$$

$$500000 \times 20\%$$

25000

112500

100000

237500

ILLUSTRATION 18 (MTP MAY 2019 SERIES 1) 10 MARKS

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

- I The company may issue 3,12,500 equity shares at Rs. 10 per share.
 - II The company may issue 1,56,250 equity shares at Rs. 10 per share and 15,625 debentures of Rs. 100 denomination bearing a 8% rate of interest.
 - III The company may issue 1,56,250 equity shares at Rs. 10 per share and 15,625 cumulative preference shares at Rs. 100 per share bearing a 8% rate of dividend.
- (i) 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, DETERMINE earnings per share under each of three financial plans? Assume a corporate income tax rate of 40%.
- (ii) IDENTIFY which alternative would you recommend and why?
- (iii) DETERMINE the EBIT-EPS indifference points by formulae between Financing Plan I and Plan II and Plan I and Plan III.

Plan I: Equity Financing

	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)
EBIT	62,500	1,25,000	2,50,000	3,75,000	6,25,000
Interest	0	0	0	0	0
EBT	62,500	1,25,000	2,50,000	3,75,000	6,25,000
Less: Tax @ 40%	25,000	50,000	1,00,000	1,50,000	2,50,000
PAT	37,500	75,000	1,50,000	2,25,000	3,75,000
No. of equity shares	3,12,500	3,12,500	3,12,500	3,12,500	3,12,500
EPS	0.12	0.24	0.48	0.72	1.20



Plan II: Debt – Equity Mix

	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)
EBIT	62,500	1,25,000	2,50,000	3,75,000	6,25,000
Less: Interest	1,25,000	1,25,000	1,25,000	1,25,000	1,25,000
EBT	(62,500)	0	1,25,000	2,50,000	5,00,000
Less: Tax @ 40%	25,000*	0	50,000	1,00,000	2,00,000
PAT	(37,500)	0	75,000	1,50,000	3,00,000
No. of equity shares	1,56,250	1,56,250	1,56,250	1,56,250	1,56,250
EPS	(Rs. 0.24)	0	0.48	0.96	1.92

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



Plan III: Preference Shares – Equity Mix

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

* In case of cumulative preference shares, the company has to pay cumulative dividend to preference shareholders, when company earns sufficient profits.



(ii) Which Alternative To be Preferred & Why

If EBIT	Plan to be Selected	Reason
62500	I	EPS is Maximum
125000	I	EPS is Maximum
250000	I or II	EPS is Maximum
375000	II	EPS is Maximum
625000	II	EPS is Maximum

Conclusion – if EBIT is Below 250000 it is recommended to Go For Plan I (only Equity) & if EBIT is Above 250000 It is Advised To Go For Plan II (Debt + Equity) . Plan III (Equity + Preference) is Not Advisable At Any level of EBIT & At EBIT of 250000 , Company may Go For Plan I or Plan II As Both Plan Gives Same EPS.

Note

1] In the Absence of Information, it has been assumed that losses has been set off with other Business Profit

2] As per AS-20, The Company needs provide for Dividend for Cumulative Preference shares even in case of insufficient Profit to determine EPS.

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

$$\frac{\text{EBIT}_1 \times (1-t)}{\text{No. of equity shares (N}_1)} = \frac{(\text{EBIT}_2 - \text{Interest}) \times (1-t)}{\text{No. of equity shares (N}_2)}$$
$$\frac{\text{EBIT}(1-0.40)}{3,12,500 \text{ shares}} = \frac{(\text{EBIT} - \text{Rs.}1,25,000) \times (1-0.40)}{1,56,250 \text{ shares}}$$

$$0.6 \text{ EBIT} = 1.2 \text{ EBIT} - \text{Rs.}1,50,000$$

$$\text{EBIT} = \frac{\text{Rs.}1,50,000}{0.6} = \text{Rs.} 2,50,000$$

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



EBIT – EPS Indifference Point: Plan I and Plan III

$$\frac{\text{EBIT}_1 \times (1 - t)}{\text{No. of equity shares (N}_1)} = \frac{\text{EBIT}_3 \times (1 - t) - \text{Pr ef. dividend}}{\text{No. of equity shares (N}_3)}$$

$$\frac{\text{EBIT}_1(1 - 0.40)}{3,12,500 \text{ shares}} = \frac{\text{EBIT}_3(1 - 0.40) - \text{Rs. } 1,25,000}{1,56,250 \text{ shares}}$$

$$0.6 \text{ EBIT} = 1.2 \text{ EBIT} - \text{Rs. } 2,50,000$$

$$\text{EBIT} = \frac{\text{Rs. } 2,50,000}{0.6} = \text{Rs. } 4,16,667$$

Indifference points between Plan I and Plan III is Rs. 4,16,667.



ILLUSTRATION 19

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%	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
PE 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%, pushes the K_e up to 12.5%, means reducing the PE ratio to 8 and rises the interest rate on additional amount borrowed to 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)

$$\begin{array}{r} \text{₹} 2 \\ \hline 120 + 100 + 80 \end{array}$$

Computation of NEW EBIT

EBIT after proposed Expansion is not given in question. Assuming the firm earn same ROI as before, we shall calculate New EBIT

$$\begin{aligned}\therefore \text{ROI} &= \frac{\text{EBIT}}{\text{Capital employed}} \\ &= \frac{\$200000}{\text{equity share Capital} + \text{Debt} + \text{Retained Earnings}} \times 100\end{aligned}$$

$$\begin{aligned}
 &= \frac{\$200,000}{2,000,000 + 1,000,000 + 1,200,000} \times 100 \\
 &= \frac{\$200,000}{3,000,000} \times 100 \\
 &= \underline{17.33\%}
 \end{aligned}$$

Equity Debt Retained Earnings

$$\begin{aligned}
 \therefore \text{New Capital employed} &= \text{Existing Capital} + \text{Proposed Capital} \\
 &= 3,000,000 + 400,000 \\
 &= 3,400,000
 \end{aligned}$$

$$\begin{aligned}\therefore \text{New EBIT} &= 34000000 \times 17.33\% \\ &= \underline{\underline{5892200}}\end{aligned}$$

Financing Options Available With The Company

- OPTION 1 - amount 4000000 by way of loan
- OPTION 2 - amount 4000000 by way of equity

Statement Showing EPS & MPS Under Financing Plans

Sr. No.	Particulars	Option 1	Option 2
A	Debt	14000000	10000000
B	Equity	20000000	24000000
C	Debt + Equity	34000000	34000000
D	Debt / Debt + Equity (A/C x 100)	41.18%	29.41%
E	EBIT	5892200	5892200
F	less - Interest		
	- Existing	1200000	1200000
	- New (4000000 x 14%)	560000	-
	Total	1760000	1200000
G	EBT (E - F)	4132200	4692200
H	less - Tax @ 50%	2066100	2346100

Sr. No.	Particulars	Option 1	Option 2
I	EAT/EAES (G-H)	2066100	2346100
J	No. of Equity shares		
	- Existing	800000	800000
	- New	-	160000
	(4000000/25)		
	Total	800000	960000
K	EPS (I/J)	2.58	2.44
L	PIE Ratio	8	10

M MPS (KXL)

20'64

24'40

Conclusion: As MPS is highest in Option 2,
it is advised to avail 4000000 by
way of issue of equity shares.

ILLUSTRATION 20

The following figures are made available to you

PARTICULARS	Rs.
Net profit for the year	18,00,000
Less: Interest on secured debentures @ 15% (Debentures were issued 3 months after commencement of the year)	1,12,500
Profit before tax	16,87,500
Less: Income tax @ 35%	5,90,625
Profit after tax	10,96,875
No. of equity shares (Rs. 10 each)	1,00,000
Market Quotation of equity share	109.7

Company has accumulated revenue reserves of Rs.12 lakhs. The company is examining a project, calling for an investment obligation of Rs.10 lakhs. This investment is expected to earn the same rate of return as funds already employed.

You are informed that a debt-equity ratio (debt divided by debt plus equity) higher than 60% will cause the price earnings ratio to come down by 25% and the interest rate on additional borrowing will cost company 300 basis points more than on their current borrowing on secured debentures. (100 Basis Points Refers to 1%)

You are required to advise the company on the probable price of the equity share, if

- a) The additional investments were to be raised by way of loans; or
- b) The additional investments were to be raised by way of equity.

Computation of NEW EBIT

EBIT After Proposed Financing is Not Provided in Question. Assuming That The Firm Gets The Same ROI as Before.

Existing EBIT = 1800000

Existing Capital Employed = Debt + Equity + Retained Earnings
= (112500/9*12)/15% + (100000 * 10) + 1200000
= 1000000 + 1000000 + 1200000
= 3200000

ROI Will Be = (Existing EBIT/Existing Capital Employed) X 100
= (1800000/3200000) X 100
= 56.25%

New EBIT = Capital Employed * ROI
= 4200000*56.25%
= 2362500

Financing Options Available With The Company

Option 1 – Avail 10 lakhs by Way of Loan

Option 2 – Avail 10 Lakhs By Way of Equity

Statement Showing EPS & MPS Under Financing Plans

Sr. No.	Particulars	Option 1	Option 2
A	Debt	2000000	1000000
B	Equity	2200000	3200000
C	Debt + Equity (A+B)	4200000	4200000
D	Debt/Debt + Equity (A/C)	47.61%	23.81%
E	EBIT	2362500	2362500
F	Less – Interest		
	Existing	150000	150000
	New	150000	-
	Total	300000	150000
G	EBT (E-F)	2062500	2212500
H	Less – Tax @ 35%	721875	774375

Sr. No.	Particulars	Option 1	Option 2
I	EAT (G-H)	1340625	1438125
J	No. Of Equity Shares		
	- Existing	100000	100000
	- New	-	9116
	Total	100000	109116
K	EPS (I/J)	13.41	13.18
L	PE Ratio (As Existing) (109.70/10.97)	10 Times	10 Times
M	MPS (K*L)	134.10	131.80

INDIFFERENCE POINT ANALYSIS FOR OPTIMAL CAPITAL STRUCTURE

The basic objective of financial management is to design an appropriate capital structure which can provide the highest earnings per share (EPS) over the firm's expected range of earnings before interest and taxes (EBIT).

EPS measures a firm's performance for the investors. The level of EBIT varies from year to year and represents the success of firm's operations. EBIT-EPS analysis is a vital tool for designing the optimal capital structure of a firm.

The objective of this analysis is to find the EBIT level that will equate EPS regardless of the financing plan chosen.

INDIFFERENCE POINT - FORMULAE

EPS of Plan A = EPS of Plan B

$$\frac{(EBIT - I_1)(1 - t) - PD_1}{N_1} = \frac{(EBIT - I_2)(1 - t) - PD_2}{N_2}$$

Terms used

I_1 =interest under plan A

N_1 =No. of shares under plan A

I_2 =interest under plan B

N_2 =No. of shares under plan B

PD_1 =amount of preference dividend under plan A

PD_2 =amount of preference dividend under plan B

T=tax rate (not tax amount)

INDIFFERENCE POINT – IMPORTANT POINTS

- Indifference point is amount of EBIT at which EPS under two financial plans is same.
- Indifference point cannot be calculated if number of equity shares is same under two plans.
- Between debt and equity plan, EPS under debt plan would be more after indifference point.
- Consider existing equity shares plus new shares to be issued in denominator
- Amount of interest and preference dividend should include existing amounts also if it is existing company

INDIFFERENCE POINT – ANALYSIS

SITUATION	OPTION TO BE CHOSEN	REASON
EBIT below indifference point	Option with lower debt & Lower interest Burden.	When rate of earnings and operating profits (EBIT) are low, more interest and debt burden is not advisable
EBIT equal to indifference point	Any alternative can be chosen.	Same EPS due to indifference point
EBIT above indifference point	Option with higher debt & higher Interest Burden.	When EBIT is high, financial leverage works favorably & EPS is maximized

ILLUSTRATION 21 (MTP DEC 2021 SERIES 2) 5 MARKS

ABC Limited is setting up a project with a capital outlay of ₹ 90,00,000. 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 debts is 18% p.a. The corporate tax rate is 30%. CALCULATE the indifference point between the two alternative methods of financing.

The difference point between the two alternatives is calculated by:

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

$$\frac{(EBIT - 0)(1 - 0.30)}{9,00,000} = \frac{(EBIT - 10,80,000)(1 - 0.30)}{3,00,000}$$

$$\frac{(EBIT)(0.70)}{9,00,000} = \frac{(EBIT - 10,80,000)(0.70)}{3,00,000}$$

$$\frac{EBIT(0.70)}{3} = \frac{0.70(EBIT - 10,80,000)}{1}$$

$$EBIT = 3EBIT - 32,40,000$$

$$-2EBIT = -32,40,000$$

$$EBIT = \frac{32,40,000}{2}$$

$$EBIT = ₹ 16,20,000$$

Therefore, at EBIT of ₹ 16,20,000, earnings per share for the two alternatives is equal.



ILLUSTRATION 22 (RTP MAY 2020)

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

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

Or

(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.

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

$$\frac{(\text{EBIT} - 0.12 \times ₹40,00,000)(1 - 0.35)}{60,000 \text{ shares}} = \frac{(\text{EBIT} - 0.12 \times ₹40,00,000)(1 - 0.35) - (0.14 \times ₹20,00,000)}{40,000 \text{ shares}}$$

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

$$\text{Or } 1.30 \text{ EBIT} - ₹6,24,000 = 1.95 \text{ EBIT} - ₹17,76,000$$

$$\text{Or } (1.95 - 1.30) \text{ EBIT} = ₹17,76,000 - ₹6,24,000 = ₹11,52,000$$

$$\text{Or } \text{EBIT} = \frac{₹11,52,000}{0.65}$$

$$\text{Or } \text{EBIT} = ₹17,72,308$$



ILLUSTRATION 23

33600

Xylo Ltd. is considering two alternative financing plans as follows: 8.4%

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

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

EPS of Plan A = EPS of Plan B

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

Let the figures be in lakhs.

$$\frac{(4.80 - 0.48)(1 - 0.30) - 0}{0.80} = \frac{(4.80 - 0)(1 - 0.30) - PD}{0.80}$$

$$3.024 = 3.36 - PD$$

$$\therefore 3.024 - 3.36 = -PD$$

$$0.336 = PD$$

$$\therefore \text{Preference Dividend} = 33600$$

$$\text{Rate of Dividend on Preference} = \frac{\text{Preference Dividend}}{\text{Preference Share Capital}} \times 100$$

$$\begin{array}{r} 11 \\ \hline 33600 \\ \hline 400000 \end{array} \quad 7100$$

$$\begin{array}{r} 11 \\ \hline \hline 8.40\% \\ \hline \hline \end{array}$$

FINANCIAL BREAKEVEN POINT ANALYSIS FOR OPTIMAL CAPITAL STRUCTURE

- Financial Break Even point Indicates the level of EBIT at which EPS would be Zero,
- It also Means The Level of Earnings which is Just Sufficient to meet its Fixed Financial Commitment of Interest & Preference Dividend
- In case of company using 100% equity , FBEP would be zero
- Formula for FBEP = $\text{Interest} + \frac{\text{Pref. Dividend}}{(1-t)}$

P/E RATIO

Formula

$$\text{P/E Ratio} = \frac{\text{market price Per share}}{\text{Earnings per share}}$$

Terms used

Market price is taken from stock exchange.

Important points

- This ratio indicates number of times market price is as compared to EPS of company.
- As debt-equity ratio goes up P/E ratio comes down generally.
- It can Also Be Calculated as $= 100/K_e$, Thus PE Ratio & K_e is Inversely Related. Higher the P/E ratio , Lower is K_e & Vice versa.

IMPORTANT POINTS

- ❑ **If number of shares is not given then decision of capital structure should be taken on basis of Amount of Return on Equity.**
- ❑ **If nothing is given about issue price of Share Assume that it is issued at current market price.**
- ❑ **If nothing is given regarding interest rate-calculations, then assume slab rate system for interest calculations.**
- ❑ **If there is loss in any year then we have two options**
 - a) **Carry forward such loss to future years. (tax paid in year of loss would be zero)**
 - b) **Set off such loss against the income from other sources (there will be tax saving in the year of loss)**
- ❑ **If P/E ratio is not given in the problem then take the decision on the basis of EPS.**
- ❑ **With change in capital structure Return on Equity//EPS/Market price also changes but ROI/ROCE remains same irrespective of capital structure.**
- ❑ **As Per AS 20 , The full amount of the required preference dividends for cumulative preference shares for the period, whether or not the dividends have been provided for needs to be deducted from Profit After tax to Arrive at Earnings Available For Equity Shareholders.**

ILLUSTRATION 24

Ganapati Limited is considering three financing plans. The key information is as follows:

- (a) Total investment to be raised is ₹ 2,00,000.
- (b) Plans of Financing Proportion:

Plans	Equity	Debt	Preference Shares
A	100%	-	-
B	50%	50%	-
C	50%	-	50%

- | | | |
|-----|---|-----|
| (c) | Cost of debt | 8% |
| | Cost of preference shares | 8% |
| (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 ₹ 80,000. | |

You are required to DETERMINE for each plan:

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

Statement Showing EPS Under Plan A , Plan B & Plan C

Sr. No.	Particulars	Plan A	Plan B	Plan C
A	EBIT	80 000	80 000	80 000
B	less - Interest	0	8 000	0
C	EBT (A - B)	80 000	72 000	80 000
D	less - Tax @ 50%	40 000	36 000	40 000
E	EAT (C - D)	40 000	36 000	40 000
F	less - Pref. Dividend	-	-	8 000
G	EAES	40 000	36 000	32 000
H	No. of Eq. Shares	10 000 (200 000 / 20)	5 000 (100 000 / 20)	5 000 (100 000 / 20)
I	EPS	4	7.20	6.40

Computation of FBEP Under Plan A , B & C

Plan A

$$\text{FBEP} = \text{Interest} + \frac{\text{PD}}{(1-t)} = 0 + \frac{0}{(1-t)} = 0$$

Plan B

$$\text{FBEP} = \text{Interest} + \frac{\text{PD}}{(1-t)} = 8000 + \frac{0}{(1-t)} = 8000$$

Plan C

$$\text{FBEP} = \text{Interest} + \frac{\text{PD}}{(1-t)} = 0 + \frac{8000}{(1-0.50)} = 16000$$

Verifications

	Plan A	Plan B	Plan C
EBIT	0	8000	16000
Less - Interest	0	8000	-
EBT	0	0	16000
Less - Tax @ 50%	0	0	8000
EAT	0	0	8000
Less - PD	0	0	8000
EAT ES	0	0	0
No. of eq. shares	10000	5000	5000
EPS	0	0	0

Computation of indifference point between
Plan A & Plan B

EPS of Plan A = EPS of Plan B

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

Let the figures be in thousand

$$\frac{(EBIT - 0)(1 - 0.50) - 0}{10} = \frac{(EBIT - 8)(1 - 0.50)}{5}$$

$$\frac{0.50 EBIT}{10} = \frac{0.50 EBIT - 4}{5}$$

$$2.50 EBIT = 5 EBIT - 40$$

$$- 2.50 EBIT = -40$$

$$\therefore EBIT = 16$$

\therefore Indifference Point between A & B
= 16 000

Computation of Indifference Point between
Plan A & Plan C

$$\text{EPS of Plan A} = \text{EPS of Plan C}$$

$$\text{Indifference Point between Plan A \& C} = \underline{\underline{32000}}$$

Computation of Indifference Point between
Plan B & Plan C

EPS of Plan B = EPS of Plan C

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

Let the figures be in thousand.

$$\frac{(EBIT - 8)(1 - 0.50) - 0}{\cancel{0.50}} = \frac{(EBIT - 0)(1 - 0.50) - 8}{\cancel{0.50}}$$

$$0.50 EBIT - 4 = 0.50 EBIT - 8$$

As it cannot be solved mathematically, it can be concluded that No indifference point may be ascertained for Plan B & C

Comment

On the Basis of EPS it can be commented that Plan B dominates Plan A & Plan C as Plan B is giving highest EPS.

ILLUSTRATION 25

Yoyo Limited presently has ₹ 36,00,000 in debt outstanding bearing an interest rate of 10 per cent. It wishes to finance a ₹ 40,00,000 expansion programme and is considering three alternatives: additional debt at 12 per cent interest, preference shares with an 11 per cent 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 per cent tax bracket.

- (a) If earnings 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 alternative do you prefer. COMPUTE how much would EBIT need to increase before the next alternative would be best.

Statement Showing EPS Under Plan A , Plan B & Plan C

Sr. No.	Particulars	Plan A	Plan B	Plan C
A	EBIT	1500000	1500000	1500000
B	Less – Interest			
	Existing	360000	360000	360000
	New	480000	-	-
	Total	840000	360000	360000
C	EBT (A-B)	660000	1140000	1140000
D	Less – Tax @ 40%	264000	456000	456000
E	EAT (C-D)	396000	684000	684000
F	Less – Preference Dividend	-	440000	-

Sr. No.	Particulars	Plan A	Plan B	Plan C
G	Earnings Available To Equity Shareholders (E-F)	396000	244000	684000
H	No. Of Equity Shares			
	Existing	800000	800000	800000
	New Issue	-	-	250000
	Total	800000	800000	1050000
I	EPS (G/H)	0.50	0.31	0.65

Conclusion - On the Basis of EPS Computation , It Is Recommended to Avail 40,00,000 By Way of issue of 250000 Shares of 16 Each , As it yields Maximum EPS.

The next Best alternative shall be Plan A

Thus, let us find indifference Point between Plan A & Plan C

$$\text{EPS of Plan A} = \text{EPS of Plan C}$$

$$\frac{(\text{EBIT} - \text{Interest})(1-t) - \text{PD}}{\text{No. of Eq. Shares}} = \frac{(\text{EBIT} - \text{Interest})(1-t) - \text{PD}}{\text{No. of Eq. Shares}}$$

Let the figures be in lakhs.

$$\frac{(EBIT - 8.4)(1 - 0.40) \cdot 0}{8} = \frac{(EBIT - 3.6)(1 - 0.40) \cdot 0}{10.50}$$

$$\frac{0.60 EBIT - 5.04}{8} = \frac{0.60 EBIT - 2.16}{10.50}$$

$$6.3 EBIT - 52.92 = 4.8 EBIT - 17.28$$
$$\therefore 6.3 EBIT - 4.8 EBIT = -17.28 + 52.92$$

$$1.5 \text{ EBIT} = 35.64$$

$$\therefore \text{EBIT} = 23.76$$

$$\therefore \text{EBIT} = \text{Indifference Point} = 2376000$$

Thus if the Company wants to enjoy same EPS as of Plan A & Plan C, it needs to increase EBIT by 876000 (2376000 - 1500000)



thank you!