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CA ADARSH JOSHI

CA , B.COM

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- 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

CA , CS , LLB , DISA , DIRM , B.COM

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.
- Loved by students for his interactive teaching style, real-life examples, and exam-oriented approach.

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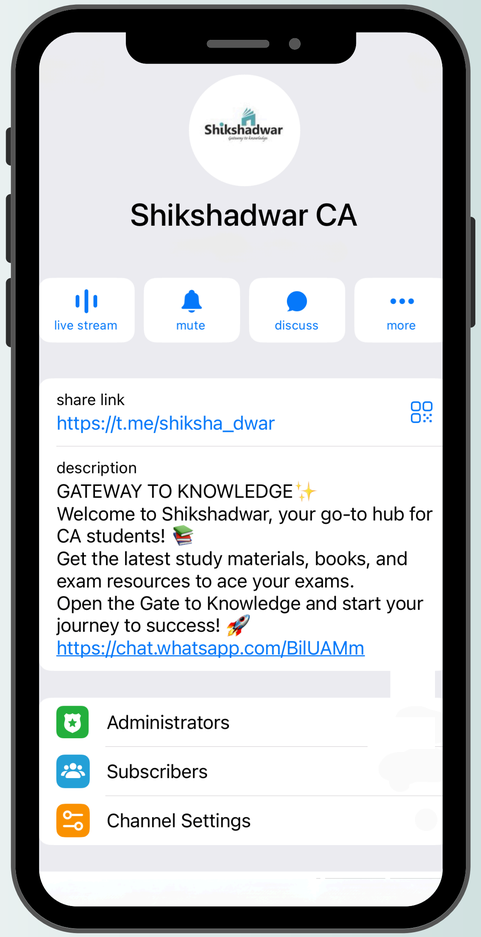

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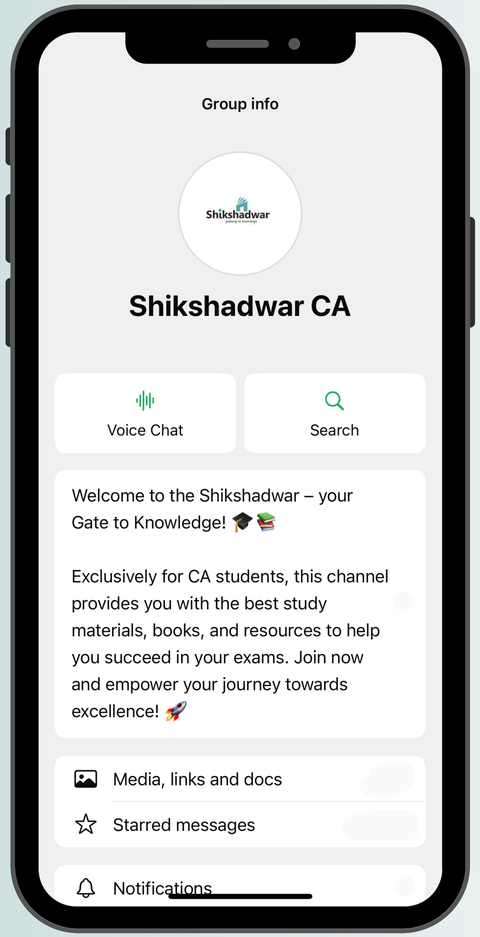

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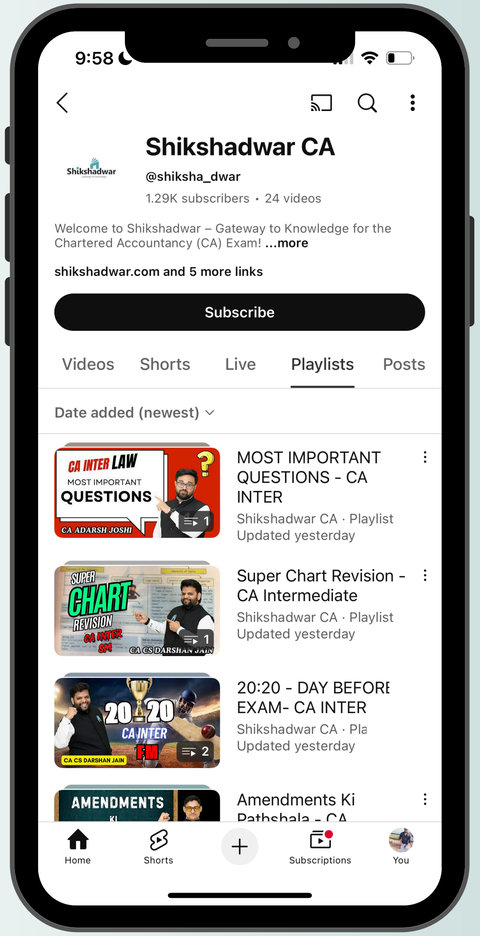

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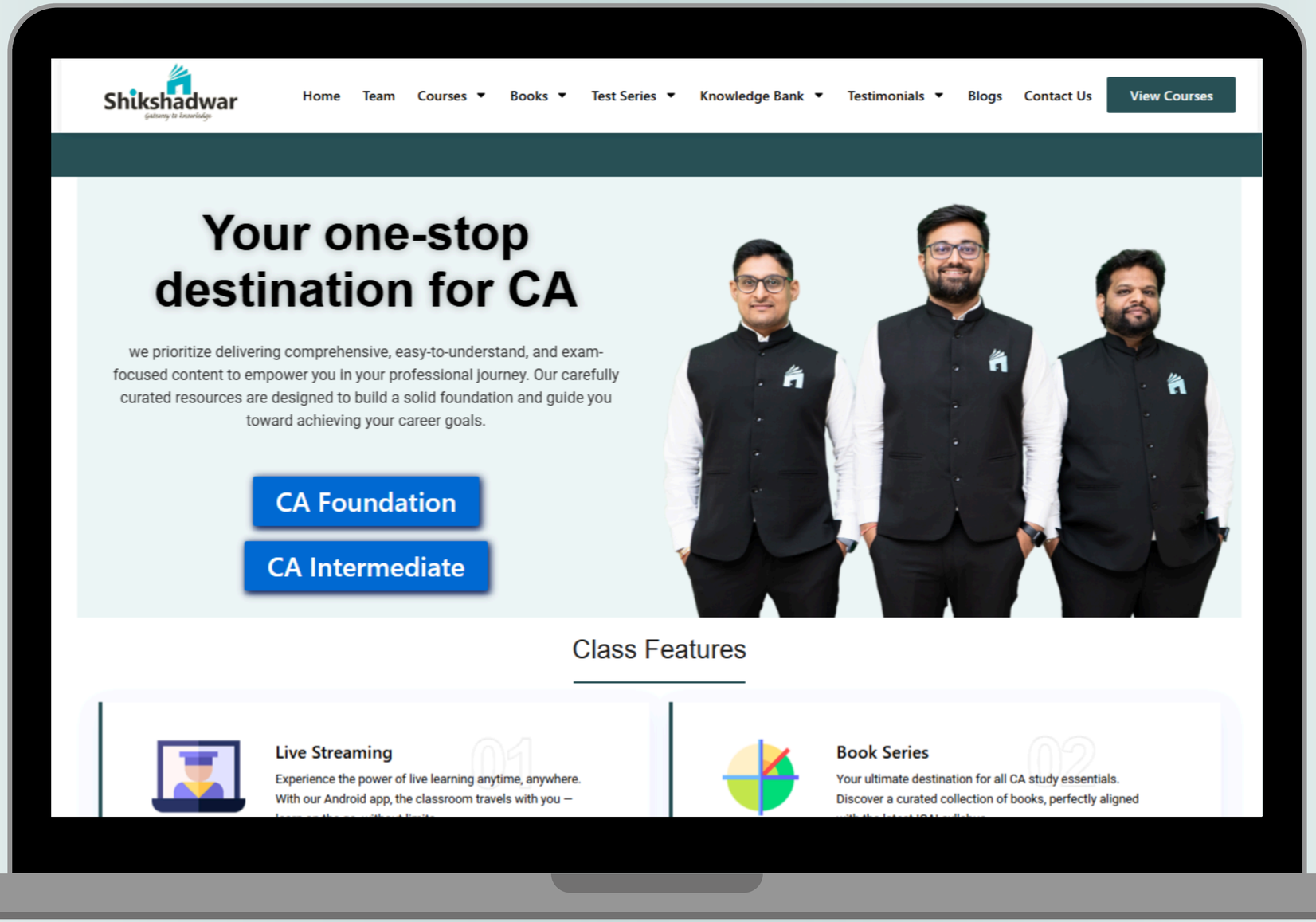

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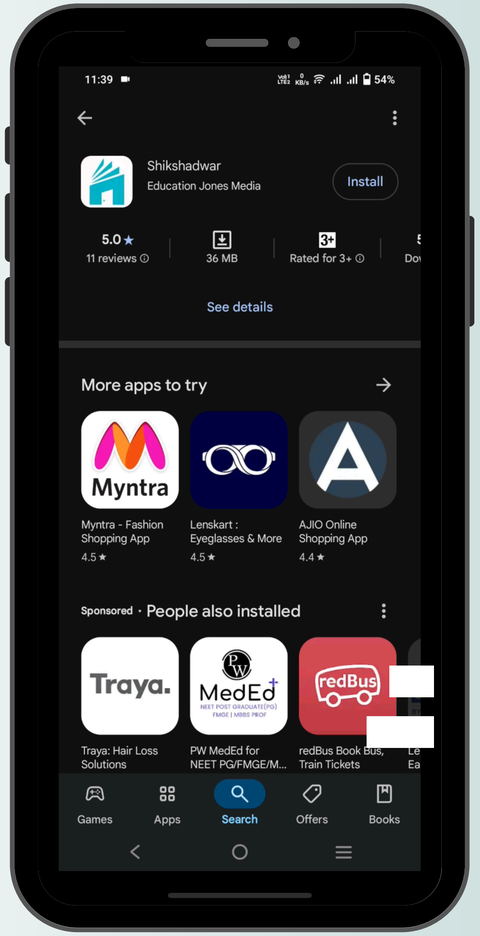

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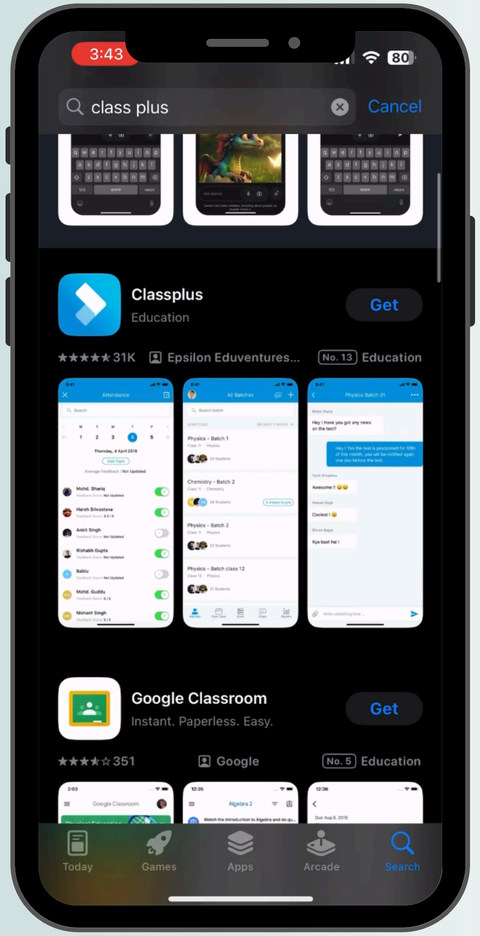

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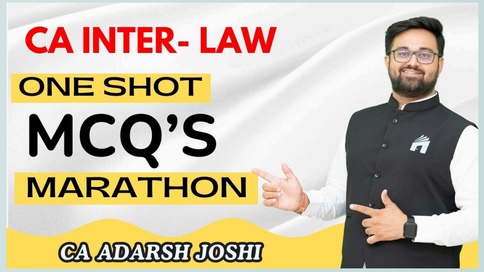
CA INTERMEDIATE MAY 25

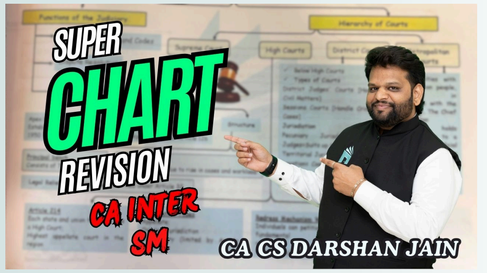
Marathons Live Streams

RRR - Result Oriented Rapid Revision

Most Imp Questions



One Shot MCQ's Marathon



Super Chart Revision

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	WATCH NOW
18/4/2025	12.00 NOON	CA TUSHAR TAPARIA	GST	RRR	WATCH NOW
19/4/2025	8.00 AM	CA CS DARSHAN JAIN	FM	RRR	WATCH NOW
20/4/2025	8.00 AM	CA ADARSH JOSHI	LAW	ONE SHOT MCQ MARATHON	WATCH NOW
21/4/2025	2.00 PM	CA TUSHAR TAPARIA	GST	GST AMENDMENTS & ITS IMPORTANT QUESTIONS	WATCH NOW
23/4/2025	8.00 AM	CA CS DARSHAN JAIN	FM	ONE SHOT MCQ MARATHON	WATCH NOW

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	

LEVERAGE ANALYSIS

PROFITABILITY STATEMENT

Particular	RS
Sales	XXX
Less: Variable cost	XXX
Contribution	XXX
Less: Fixed cost	XXX
Operating Profit or EBIT	XXX
Less: Interest	XXX
Earnings Before Tax (EBT)	XXX
Less: Tax	XXX
Earnings After Tax (EAT)	XXX
Less: Preference Dividend	XXX
Earning available to Equity shareholders (A)	XXX
NO. Of Equity shares (B)	XXX
EPS (A/B)	XXX

PROFITABILITY STATEMENT

TWO LEVEL FORMULA

Formula

$$OL = \frac{\%\ Change\ in\ EBIT}{\%\ change\ in\ sales}$$

Term Used

$$\%\ Change\ in\ EBIT = \frac{Change\ in\ EBIT}{Orignal\ EBIT}$$

$$\%\ Change\ in\ Sales = \frac{Change\ in\ Sale}{Orignal\ Sale}$$

Important Points

- In order to use above formula, we need information about two levels of sales.
- This formula gives degree of operating leverage at base level. i.e. original level considered in the Denominator.
- Degree of operating leverage indicates how much will be the expected change in EBIT for 1% change in sales.

OPERATING LEVERAGE

ONE LEVEL FORMULA

Formula

$$OL = \frac{Contribution}{EBIT}$$

Term Used

EBIT = Earnings Before Interest and Taxes.

Important Points

- This formula required information about one level of sales only.
- If sales increase OL comes down, indicating that business risk has decreased.
- Degree of operating leverage indicates how much will be change in EBIT for 1% change in sales.
- OL is expressed in times & not percentage.
- OL will be there only if there are Fixed Operating Costs in the cost structure of the company.
- If fixed cost is zero. OL will be 1 (No Operating leverage)
- The Above Formula may Also Be used to Find EBIT in Case only OL & Fixed Cost is Given in Question

$$OL = \frac{EBIT + Fixed\ Cost}{EBIT}$$

OPERATING LEVERAGE

RELATIONSHIP BETWEEN OPERATING LEVERAGE & MARGIN OF SAFETY

1. Break Even Point is a Point Where Contribution = Fixed Cost that is No profit & No Loss.

2. Margin of Safety $= \frac{Contribution\text{-}Fixed\ Cost}{Contribution} = \frac{EBIT}{Contribution}$

3. DOL $= \frac{Contribution}{EBIT}$

4. Higher Margin of safety indicates lower business risk & Higher profit and vice versa. MOS is inversely related to OL.

   DOL = 1/MOS.

OPERATING LEVERAGE

TWO LEVEL FORMULA

Formula

$$FL = \frac{\%\ Change\ in\ EPS}{\%\ change\ in\ EBIT}$$

Term Used

$$\%\ Change\ in\ EPS = \frac{Change\ in\ EPS}{Orignal\ EPS}$$

$$\%\ Change\ in\ EBIT = \frac{Change\ in\ EBIT}{Orignal\ EBIT}$$

Important Points

- It gives how much will be change in EPS for 1 % change in EBIT.
- Information at two levels is required to use this formula.
- We get Degree of financial leverage at base level i.e. sales level considered in the denominator. While calculating % change.

FINANCIAL LEVERAGE

ONE LEVEL FORMULA

Formula

$$FL = \frac{EBIT}{EBIT - \frac{(PD)}{(1-t)}}$$

Term Used

PD = preferred Dividend

T = Income Tax Rate (Not Tax Amount)

EBIT = Earnings before Interest and Taxes

EBT = Earning before Tax

Important Points

- This formula can be used at one level of sales.
- If EBIT increases FL decreases indicating the decrease in Financial Risk.
- Financial Leverage is expressed in Times & not in percentage.
- It gives how much will be change in EPS for 1 % change in EBIT.
- The Above Formula may Also Be used to Find EBIT in Case only FL & Interest Cost is Given in Question

$$FL = \frac{EBIT}{EBIT - Interest}$$

FINANCIAL LEVERAGE

TWO FORMULA & ONE FORMULA

Two level formula

$$CL = \frac{\%\ Change\ in\ EPS}{\%\ change\ in\ Sales}$$

One level formula

$$CL = OL \times FL$$

Or

$$CL = \frac{Contribution}{EBIT - \frac{(PD)}{(1-t)}}$$

COMBINED LEVERAGE

$$\text{PV Ratio} = \frac{\text{Total } \textit{Contribution}}{\text{Total } \textit{Sales}} \text{ x } 100$$

$$\text{EPS} = \frac{\text{Earnings available to Equity } \textit{Shareholders}}{\text{Number of Equity } \textit{Shares}}$$

OTHER FORMULAS

$$\text{ROI/ROCE(Before Tax)} = \frac{\textit{EBIT}}{\text{Total Capital } \textit{Employed}}$$

$$\textit{ROE} = \frac{\text{Earnings available to Equity } \textit{Shareholders}}{\text{Amount of } \textit{Equity}}$$

$$\text{Total Asset Turnover } \textit{Ratio} = \frac{\text{Net } \textit{Sales}}{\text{Total } \textit{Assets}}$$

SUMMARY

DOL	DFL	DCL
Show level of business risk.	Show level of financial risk.	Show level of total or combined risk.
It Measures Impact of Fixed operating Cost.	It measures impact of Fixed Financial Charges.	It Measures Impact of Fixed operating Cost & Fixed Financial Charges.
DOL=Contribution/EBIT	DFL=EBIT /EBT Or DFL=EBIT /EBT - $\frac{PD}{(1-t)}$	DCL=Contribution/EBT Or DCL=Contribution/EBT- $\frac{PD}{(1-t)}$ Or DCL = DOL * DFL
Measure % change in **EBIT** which results from a 1 % change in **sales.**	Measure % change in **EPS** which results from a 1 % change in **EBIT**	Measure % change in **EPS** which results from a 1 % change in **sales.**
For example, if DOL is 3 & there is 8% increase in output then EBIT will increase by 24% & if there is a 8% decrease in output EBIT will decrease by 24%.	For example, if DFL is 2 & there is 5% increase in output then EBIT then EPS will increase by 10% & if there is a 5% decrease in EBIT, EPS will decrease by 10%.	For example, if DCL is 6 & there is 8% increase in sales then EPS will increase by 48% & if there is a 8% decrease in sale then EPS will decrease by 48%.
Low DOL is Preferred.	High DFL is Preferable only if ROCE>Rate of Interest.	A Combination of Low DOL & High DFL is Preferable.
It is undefined at B.E.P	It is undefined at Financial B.E.P.	It is undefined at Financial B.E.P.

SUMMARY

ILLUSTRATION

A company had the following Balance Sheet as on 31st March, 2021:

Liabilities	Amount in crores (₹)	Assets	Amount in crores (₹)
Equity Share Capital (50 lakhs shares of ₹ 10 each)	5	Fixed Assets (Net)	12.5
Reserves and Surplus	1	Current Assets	7.5
15% Debentures	10		
Current Liabilities	4		
	20		20

The additional information given is as under:

Fixed cost per annum (excluding interest)	₹ 4 crores
Variable operating cost ratio	65%
Total assets turnover ratio	2.5
Income Tax rate	30%

Required:

CALCULATE the following and comment:

(i) Earnings Per Share

(ii) Operating Leverage

(iii) Financial Leverage

(iv) Combined Leverage

Total Assets	= ₹ 20 crores
Total Asset Turnover Ratio	= 2.5
Hence, Total Sales	= 20 × 2.5 = ₹ 50 crores

Profitability Statement

Sr.No	Particulars	Amount
A	Sales	50.00
B	Less - variable Cost (65%)	32.50
C	Contribution (A-B)	17.50
D	Less - Fixed Cost	4.00
E	EBIT (C-D)	13.50
F	Less - Interest	1.50
G	EBT (E-F)	12.00
H	Less - Tax (30%)	3.60
I	EAT (G-H)	8.40

(i) Earnings per Share

$$\text{EPS} = \frac{₹\ 8.40 \text{ crores}}{\text{Number of Equity Shares}} = \frac{₹\ 8.40 \text{ crores}}{50,00,000} = ₹\ 16.80$$

It indicates the amount, the company earns per share. Investors use this as a guide while valuing the share and making investment decisions. It is also an indicator used in comparing firms within an industry or industry segment.

(ii) Operating Leverage

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{₹\ 17.50 \text{ crores}}{₹\ 13.50 \text{ crores}} = 1.296$$

It indicates the choice of technology and fixed cost in cost structure. It is level specific. When firm operates beyond operating break-even level, then operating leverage is low. It indicates sensitivity of earnings before interest and tax (EBIT) to change in sales at a particular level.

(iii) Financial Leverage

$$\text{Financial Leverage} = \frac{\text{EBIT}}{\text{PBT}} = \frac{₹\ 13.50\ \text{crores}}{₹\ 12.00\ \text{crores}} = 1.125$$

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

(iv) Combined Leverage

$$\text{Combined Leverage} = \frac{\text{Contribution}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{PBT}}$$

Or,

$$= \text{Operating Leverage} \times \text{Financial Leverage}$$

$$= 1.296 \times 1.125 = 1.458$$

The combined leverage studies the choice of fixed cost in cost structure and choice of debt in capital structure. It studies how sensitive the change in EPS is vis-à-vis change in sales. The leverages, operating, financial and combined are used as measurement of risk.

ILLUSTRATION

Calculate the Operating leverage , Financial Leverage and combined Leverage from the following data under situation I and II and Financial Plan A and B

Installed Capacity	4,000 units
Actual Production and Sales	75% of the capacity
Selling Price	Rs. 30 per Units
Variable Cost	Rs. 15 per Units
Fixed Cost	
Under Situation I	Rs. 15,000
Under Situation II	Rs. 20,000

	Financial Plan	
	A	B
Capital Structure	Rs.	Rs.
Equity	10,000	15,000
Debt (Rate of Interest at 20%)	10,000	5,000
Total	20,000	20,000

PROFITABILITY STATEMENT AND COMPUTATION OF LEVERAGES

SR.NO	PARTICULARS	FINANCIAL PLAN A		FINANCIAL PLAN B	
		SITUATION 1	SITUATION 2	SITUATION 1	SITUATION 2
A	INSTALLED CAPACITY	4000	4000	4000	4000
B	ACTUAL SALES (75% OF A)	3000	3000	3000	3000
C	SELLING PRICE	30	30	30	30
D	SALES (B*C)	90000	90000	90000	90000
E	VARIABLE COST (15*B)	45000	45000	45000	45000
F	**CONTRIBUTION (D-E)**	**45000**	**45000**	**45000**	**45000**
G	FIXED COST	15000	20000	15000	20000
H	**EBIT (F-G)**	30000	25000	30000	25000
I	INTEREST	2000	2000	1000	1000
J	**EBT (H-I)**	28000	23000	29000	24000
K	**DOL (F/H)**	1.50	1.80	1.50	1.80
L	**DFL (H/J)**	1.07	1.09	1.03	1.04
M	**DCL (F/J)**	1.61	1.96	1.55	1.88

thank you!

COST OF CAPITAL

COST OF IRREDEEMABLE DEBT

Formula

$$k_d = \frac{I(1-t)}{NP} \times 100$$

Term Used

- k_d = Cost of Debt
- I = Amount of interest
- T = Tax rate (not tax amount)
- NP = Net proceeds
- NP = Face value- Discount on issue + premium on issue – Flotation issue cost exp.

Important Points

- k_d may be calculation either for one debenture or for all debenture.
- Interest is calculated on face value of debt.
- Interest is multiplied by (I-t) because it is tax deductible.
- If period of debt is not given assume as irredeemable debt.
- Flotation cost includes expenses of issue like advertisement, printing prospectus etc.

COST OF IRREDEEMABLE DEBT

ILLUSTRATION

Five years ago, Sona Limited issued 12 per cent irredeemable debentures at ₹ 103, at ₹ 3 premium to their par value of ₹ 100. The current market price of these debentures is ₹ 94. If the company pays corporate tax at a rate of 35 per cent CALCULATE its current cost of debenture capital?

Cost of irredeemable debenture:

$$K_d = \frac{I}{NP}(1-t)$$

$$K_d = \frac{₹\ 12}{₹\ 94}(1-0.35) = 0.08297 \text{ or } 8.30\%$$

COST OF REDEEMABLE DEBT (APPROXIMATION METHOD)

Formula

$$k_d = \frac{I(1-t) + \left(\frac{RV - NP}{N}\right) \times 100}{\frac{RV + NP}{2}}$$

Term Used

- k_d = Cost of Debt
- I = Amount of Interest
- T = Tax Rate
- RV = Face value + Premium on redemption
- NP = Net proceeds
- NP = Face value – Discount on issue +Premium on Issue - Flotation cost,
- N = term/period of debt

COST OF REDEEMABLE DEBT (APPROXIMATION METHOD)

COST OF REDEEMABLE DEBT (APPROXIMATION METHOD)

Important Points

- Numerator is annual cost of debt and denominator is average investment
- If nothing is given regarding RV assume redemption is done at par
- Premium on issue is gain but premium on redemption is expenditure
- Premium on redemption is expressed as certain % face value
- $\frac{(RV - NP)}{N}$ is also tax deductible. However, tax shield is not considered on it.
- If Flotation cost is given in Rupees, then k_(d)is calculated for all debentures put together.
- Flotation cost includes expenses of issue like advertisement, printing of prospectus etc.
- If period of debt is not given assume as irredeemable debt
- In This Method, Higher the Difference Between RV & NP, Lower the Accuracy of Answer
- This Formula is not suitable in case gradual Redemption of Bonds & Debentures

ILLUSTRATION

A company issued 10,000, 10% debentures of ₹ 100 each at a premium of 10% on 1.4.2017 to be matured on 1.4.2022. The debentures will be redeemed on maturity. COMPUTE the cost of debentures assuming 35% as tax rate.

The cost of debenture (K_d) will be calculated as below:

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

$$K_d = \frac{₹\,10(1-0.35)+\frac{(₹\,100-₹\,110)}{5\text{years}}}{\frac{(₹\,100+₹\,110)}{2}}$$

$$\text{Or, } K_d = \frac{₹10\times0.65-₹2}{₹105} = \frac{₹\,4.5}{₹\,105} = 0.0428 \text{ or } 4.28\%$$

The relevant cash flow are as follows:

Year	Cash Flows
0	Net proceeds in case of new Issue / current market price in case of existing debt (NP OR P_0)
1 to n	Interest net of tax [I(1-t)]
N	Redemption value (RV)

Steps to calculate relevant cash flows:

- Step- 1 Identify cash flows.
- Step-2 Calculate NPVs of cash flows as identified above using two discount rates (guessing)
- Step-3 Calculate IRR

$$\text{IRR} = \text{Start Rate} + \frac{\textit{Surplus at Start Rate}}{\textit{Surplus at Start rate-Deficit at End Rate}} \textit{(Difference Between Rates)}$$

Important Points

- YTM or Present Value method is a Superior method of Determining Cost of Debt of company to Approximation method and it is also Preferred in The Field of Finance.
- In This Method, Higher the Difference Between Start rate & End rate, Lower the Accuracy of Answer.

COST OF REDEEMABLE DEBT (YTM APPROACH)

ILLUSTRATION

A company issued 10,000, 10% debentures of ₹ 100 each on 1.4.2013 to be matured on 1.4.2018. The company wants to know the current cost of its existing debt if the market price of the debentures is ₹ 80, assuming 35% tax rate.

Statement Showing NPV at 10% & 15%

Year	Cash Flow	PVF @ 10%	DCF	PVF @ 15%	DCF
0	(80)	1.00	(80)	1.00	(80)
1-5	6.5	3.791	24.64	3.352	21.79
5	100	.621	62.10	.497	49.7
			6.74		(8.51)

Kd By Interpolation formula – 12.21%

COST OF REDEEMABLE DEBT (APPROXIMATION METHOD)
(NO TAX BENEFIT ON LOSS ON ISSUE)

$$K_d = \frac{I(1-t)+\left(\frac{RV-NP}{N}\right)}{\frac{RV+NP}{2}} \times 100$$

COST OF REDEEMABLE DEBT (APPROXIMATION METHOD)
(TAX BENEFIT ON LOSS ON ISSUE)

$$K_d = \frac{I+\left(\frac{RV-NP}{N}\right)(1-t)}{\frac{RV+NP}{2}} \times 100$$

COST OF CONVERTIBLE DEBENTURES

1. Determination of Redemption Value in Shares & in cash
2. Redemption value in Shares - Calculate Share price per Share At the Time of Redemption & Multiple the Share Price With The No of shares being Allotted at the time of Redemption
3. Redemption value in Cash – given in Question
4. Consider RV Highest of 2 & 3
5. Use Approximation Method or YTM Approach

ILLUSTRATION

A company issued 10,000, 15% Convertible debentures of ₹ 100 each with a maturity period of 5 years. At maturity, the debenture holders will have an option to convert the debentures into equity shares of the company in the ratio of 1:10 (10 shares for each debenture). The current market price of the equity shares is ₹ 12 each and historically the growth rate of the shares is 5% per annum. Compute the cost of debentures assuming 35% tax rate.

Determination of Redemption value.

RV shall be higher of

A] Cash = 100

B] Shares = 10 shares × 12(1+0.05)^5

= 10 shares × 15.32

= 153.20

∴ Redemption value in shares is higher, Debentureholders shall prefer redemption in shares

Approximation method

$$K_d = \frac{I(1-t) + \frac{RV - NP}{N}}{\frac{RV + NP}{2}} \times 100$$

$$= \frac{15(1-0.35) + \frac{153.20 - 100}{5}}{\frac{153.20 + 100}{2}} \times 100$$

$$= 16.11\%$$

YTM Approach

Year	Cash flow	PVf@ 10%	DCF	PVf@ 20%	DCF
0	(100)	1.00	(100)	1.00	(100)
1-5	9.75	3.791	36.96	2.991	29.16
5	153.20	0.621	95.14	0.402	61.59
			32.1		(9.25)

$$IRR = Kd = 10 + \frac{32.10}{32.10 - (9.25)} \times 10$$

$$= 10 + \frac{32.10}{41.35} \times 10$$

$$= 17.76\%$$

COST OF IRREDEEMABLE PREFRENCE SHARE

Formula	$k_p = \frac{PD}{NP} \times 100$
Term Used	PD = Amount of preference dividend NP = Net proceeds of issue NP = Face Value – Discount on issue + Premium on issue – Flotation cost K_p = Cost of preference shares
Important Points	• Preference dividend is not tax deductible. • Cost of preference shares is generally more than cost of debt because preference shareholders take more risk.

COST OF IRREDEEMABLE PREFERENCE SHARES

ILLUSTRATION

If R Energy is issuing preferred stock at ₹ 100 per share, with a stated dividend of ₹ 12, and a floatation cost of 3% then, CALCULATE the cost of preference share?

Here, Net Proceeds (P_o) will be issue price less floatation cost.

P_o = ₹ 100 - 3% of ₹ 100 = ₹ 97

$$K_p = \frac{PD}{P_0}$$

$$= \frac{₹\ 12}{₹\ 97} = 0.1237 \text{ or } 12.37\%$$

COST OF REDEEMABLE PREFRENCE SHARE

Formula

$$K_p = \frac{PD + \left(\frac{RV - NP}{N}\right)}{\left(\frac{RV + NP}{2}\right)} \times 100$$

Term Used

PD = Amount of preference dividend, RV = Redemption value, Np = Net proceeds, Np = Face value- discount on issue + premium on issue – flotation cost, K_p = Cost of preference shares, N = period/ no years

Important Points

- Numerators is annual cost of preference shares and denominators is average investment
- If nothing is given regarding RV assume redemption is done at par.
- Premium on issue is gain but premium on redemption is expenditures
- Premium on redemption is expressed as certain % of face value
- PD id not tax deductible hence we have not multiplied by (1-t)
- K_p may be calculated for one preference share or all preference shares put together.

COST OF REDEEMABLE PREFERENCE SHARES

ILLUSTRATION

XYZ Ltd. issues 2,000 10% preference shares of ₹ 100 each at ₹ 95 each. The company proposes to redeem the preference shares at the end of 10^{th} year from the date of issue. CALCULATE the cost of preference share?

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

$$K_p = \frac{10 + \left(\frac{100 - 95}{10}\right)}{\left(\frac{100 + 95}{2}\right)} = 0.1077 \text{ or } 10.77\% \text{ (approx.)}$$

COST OF EQUITY SHARES – DIVIDEND /PRICE APPROACH

Formula

$$K_e = \frac{D}{Po}$$

Term Used

p_o = current market price of equity share,

D = amount of dividend,

K_e = Cost of equity

Important Points

- The formula assumes constant dividend in future
- This formula is derived from the formula of present value of perpetuity
- Po is present value of future dividends discounted at cost of equity
- If floatation cost is giving then it is reduced from po to arrive at net proceeds from share

COST OF EQUITY (DIVIDEND / PRICE APPROACH)

COST OF EQUITY SHARES – EARNING PRICE APPROACH

Formula	$K_e = \frac{EPS}{Po}$
Term Used	p_o = current market price of equity share, EPS = Earnings per share, K_e = cost of equity
Important Points	• This formula assumes constant EPS in future

COST OF EQUITY (EARNING/PRICE APPROACH)

COST OF EQUITY SHARES- GROWTH APPROACH

The Growth Approach is based on Growth in Dividend and Earning over the period of time.

Formula	$K_e = \frac{D1}{Po} + G$ $\quad P_o = \frac{D1}{K_e - G}$
Term Used	• D_1 = expected dividend for next year, • K_e = cost of equity, • P_o = current market price of equity share, • G = Growth in rate of dividend
Important Points	• Please read carefully whether questions give dividend or expected dividend • Growth rate in dividend is assumed to be constant and hence this formula is derived from formula of growing perpetuity • Sometimes growth rate is required to be calculated using FV formula

COST OF EQUITY (GROWTH APPROACH)

DETERMINATION OF GROWTH RATE

Growth rate can be found as follow:

- **Step- I** : Divide D_o by D_n, find out result, then refer the FVIF table
- **Step- II** : Find out the result found at step – I in corresponding year's row.
- **Step- III** : See the interest rate for the corresponding column. This is the growth rate

Where,

D_o = current dividend , D_n = Dividend in n years ago

DETERMINATION OF GROWTH RATE

EXAMPLE

The current dividend (D_0) is ₹ 16.10 and the dividend 5 year ago was ₹10.

Find Growth Rate

$$= \frac{D_0}{D_n}$$

$$= \frac{16.10}{10} = 1.61$$

1.61 is FVIF @ 10% for 5 years

Hence growth rate shall be 10%.

Future value interest factor of ₹1 per period at i% for n periods, FVIF(i,n).

(The Compound Sum of One Rupee)

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	1.010	1.020	1.030	1.040	1.050	1.060	1.070	1.080	1.090	1.100
2	1.020	1.040	1.061	1.082	1.103	1.124	1.145	1.166	1.188	1.210
3	1.030	1.061	1.093	1.125	1.158	1.191	1.225	1.260	1.295	1.331
4	1.041	1.082	1.126	1.170	1.216	1.262	1.311	1.360	1.412	1.464
5	1.051	1.104	1.159	1.217	1.276	1.338	1.403	1.469	1.539	1.611
6	1.062	1.126	1.194	1.265	1.340	1.419	1.501	1.587	1.677	1.772
7	1.072	1.149	1.230	1.316	1.407	1.504	1.606	1.714	1.828	1.949
8	1.083	1.172	1.267	1.369	1.477	1.594	1.718	1.851	1.993	2.144
9	1.094	1.195	1.305	1.423	1.551	1.689	1.838	1.999	2.172	2.358
10	1.105	1.219	1.344	1.480	1.629	1.791	1.967	2.159	2.367	2.594

Formula	$g = b \times r$
Term Used	• g = Growth rate, • b= Earnings Retention ratio/Rate, • r= Rate of return
Important Points	• This Formula determines growth rate. • This said Approach shall be Dealt in Detailed Manner in Topic of Dividend Decision

DETERMINATION OF GROWTH RATE BY GORDON'S GROWTH MODEL

$$Ke = \frac{\text{Dividend Per year} + \text{Increase in Market price of share}}{\text{Amount Invested}} \times 100$$

COST OF EQUITY (REALISED YIELED APPROACH)

ILLUSTRATION

Mr. Mehra had purchased a share of Alpha Limited for ₹ 1,000. He received dividend for a period of five years at the rate of 10 percent. At the end of the fifth year, he sold the share of Alpha Limited for ₹ 1,128. You are required to COMPUTE the cost of equity as per realised yield approach.

$$K_e = \frac{\text{Earning Per Year}}{\text{Amount Invested}}$$

$$= \frac{\left(\text{Dividend in Rs} + \text{Increase in market price in Rs}\right) \text{ Rs}}{\text{Amount Invested}} \times 100$$

$$= \frac{(500 + 128) \text{ Rs}}{1000} \times 100$$

$$= \frac{125.60 \times 100}{1000}$$

$$= 12.56\%$$

COST OF EQUITY SHARES- CAPM MODEL

Formula	$K_e = R_f + \beta (R_m - R_f)$
Term Used	R_f = risk free rate, β = beta of company R_m = market rate of return, K_e = cost equity
Important Points	• Higher the beta higher the risk and higher the return • $R_m - R_f$ is known as market risk premium • β measures the non diversifiable risk present in the company

COST OF EQUITY (CAPM)

ILLUSTRATION

CALCULATE the cost of equity capital of H Ltd., whose risk-free rate of return equals 10%. The firm's beta equals 1.75 and the return on the market portfolio equals to 15%.

$$K_e = R_f + \beta (R_m - R_f)$$

$$K_e = 0.10 + 1.75 (0.15 - 0.10)$$

$$= 0.10 + 1.75 (0.05) = 0.1875 \text{ or } 18.75\%$$

COST OF RETAINED EARNING

Formula	• If personal taxation rate is not giving K_r is same as K_e • If personal taxation rate is giving: $K_r = K_e (1 - T_p) (1-f)$
Term Used	• K_r = cost if retained earnings, • K_e = cost of equity, • T_p = personal taxation rate of shareholder • f = Floatation Cost
Important Points	• Retained earnings belong to shareholders and hence they have cost. • Retained earnings do not have any floatation cost • Normally Ke remains higher than Kr, Due to issue of shares at a price Lower than CMP and Flotation Cost.

COST OF RETAINED EARNINGS

ILLUSTRATION

Face value of equity shares of a company is ₹ 10, while current market price is ₹ 200 per share. Company is going to start a new project, and is planning to finance it partially by new issue and partially by retained earnings. You are required to CALCULATE cost of equity shares as well as cost of retained earnings if issue price will be ₹ 190 per share and floatation cost will be ₹ 5 per share. Dividend at the end of first year is expected to be ₹ 10 and growth rate will be 5%.

$$K_r = \frac{D_1}{P_0} + g = \frac{10}{200} + 0.05 = 10\%$$

$$K_e = \frac{D_1}{P_0} + g = \frac{10}{190\text{-}5} + 0.05 = 10.41\%$$

WEIGTED AVERAGE COST OF CAPITAL (Ko)

STATEMENT SHOWING COMPUTAION OF WACC

SL. NO.	SOURCE	BV OR MV	PROPORTION	COST	WACC
1	2	3	4	5	6=5*4
A	EQUITY SHARE CAPITAL	XXX	XXX	Ke	XXX
B	RETAINED EARNINGS	XXX	XXX	Kr	XXX
C	PREFRENCE SHARE CAPITAL	XXX	XXX	Kp	XXX
D	LONG TERM DEBT	XXX	1	Kd	XXX

WEIGHTED AVERAGE COST OF CAPITAL

ILLUSTRATION (RTP MAY 2019)

As a financial analyst of a large electronics company, you are required to DETERMINE the weighted average cost of capital of the company using (a) book value weights and (b) market value weights. The following information is available for your perusal.

The Company's present book value capital structure is:

	(₹)
Debentures (₹100 per debenture)	8,00,000
Preference shares (₹100 per share)	2,00,000
Equity shares (₹10 per share)	10,00,000
	20,00,000

All these securities are traded in the capital markets. Recent prices are:

Debentures, ₹110 per debenture, Preference shares, ₹120 per share, and Equity shares, ₹ 22 per share

Anticipated external financing opportunities are:

(i) ₹ 100 per debenture redeemable at par; 10 year maturity, 11 per cent coupon rate, 4 per cent flotation costs, sale price, ₹ 100

(ii) ₹ 100 preference share redeemable at par; 10 year maturity, 12 per cent dividend rate, 5 per cent flotation costs, sale price, ₹100.

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

In addition, the dividend expected on the equity share at the end of the year is ₹ 2 per share, the anticipated growth rate in dividends is 7 per cent and the firm has the practice of paying all its earnings in the form of dividends. The corporate tax rate is 35 per cent.

Computation of ke

(iii) Cost of Equity shares (K_e) $= \frac{D_1}{P_0} + G = \frac{₹\,2}{₹\,22 - ₹\,2} + 0.07 = 0.17$ or 17%

Computation of kp

$$\text{Cost of Preference Shares } (K_p) = \frac{PD + \frac{(RV - NP)}{N}}{\frac{(RV + NP)}{2}} = \frac{₹12 + \frac{(₹100 - ₹95)}{10\text{ years}}}{\frac{(₹100 + ₹95)}{2}}$$

$$= \frac{₹12 + ₹0.5}{₹97.5} = 0.1282 \text{ or } 12.82\%$$

Computation of kd

$$\text{Cost Debt } (K_d) = \frac{\text{Interest}\,(1-t)+\dfrac{(RV-NP)}{N}}{\dfrac{(RV+NP)}{2}} = \frac{₹11(1-0.35)+\dfrac{(₹100-₹96)}{10\,\text{years}}}{\dfrac{(₹100+₹96)}{2}}$$

$$= \frac{₹7.15+₹0.4}{₹98} = 0.077 \text{ or } 7.70\%$$

Statement Showing WACC using Book Value Weights

Source of capital	Book value (₹)	Weights	Specific cost (%)	WACC (%)
Debentures	8,00,000	0.40	7.70	3.08
Preferences shares	2,00,000	0.10	12.82	1.28
Equity shares	10,00,000	0.50	17.00	8.50
	20,00,000	1.00		12.86

Statement Showing WACC using Market Value Weights

Source of capital	Market value (₹)	Weights	Specific cost (%)	WACC (%)
Debentures $\left(\frac{₹8,00,000}{₹100} \times ₹110\right)$	8,80,000	0.265	7.70	2.04
Preferences shares $\left(\frac{₹2,00,000}{₹100} \times ₹120\right)$	2,40,000	0.072	12.82	0.92
Equity shares $\left(\frac{₹10,00,000}{₹10} \times ₹22\right)$	22,00,000	0.663	17.00	11.27
	33,20,000	1.000		14.23

- If share prices is given as cum dividend inclusive of dividend then amount of dividend is to be deducted from such price to arrive at p_o.

- WACC may be calculated using either book value or market values. While calculating WACC on market value basis market value of retained earnings is not written separately, it is included in the market value of share capital only.

- In case Ke & Kr differs then to give market value weights. Market value of Equity shares should be apportioned in the ratio of book value of paid-up equity capital and book value of retained earnings.

- If company has only equity shares then cost of equity itself become WACC. Company with only Debt is not possible.

- If no approach is specified in the problem for calculation of WACC then calculate the WACC using book value approach and write note to the effect.

IMPORTANT POINTS

- There is no market value for term loan. Hence while calculating WACC on market value basis face value itself will be written as market value.

- Whenever Cost & Market price Both are Given take Market Price. As it is Assumed That Securities are issued at Current market Price.

- While Computing Kr if both Current market price & fresh issue price of Share is given , Preferably take Current market price as retained earnings belongs to Earlier issue & Does Not Relate to Fresh Issue.

IMPORTANT POINTS

thank you!

CAPITAL STRUCTURE

CAPITAL STRUCTURE THEORIES – FORMULAS

Value of Firm	Value of Firm = Market value of equity + Market value of debt OR Value of the Firm = EBIT/Ko
Market Value of Equity	Market value of Equity = $\frac{NI/EBT}{Ke}$ Where, NI = EBT = EAES = Since No Taxes & No Preference Shares OR Market value of Equity = Market Value Of Firm – Market Value of Debt
Market value of Debt	Market value of Debt = $\frac{Interest}{Kd}$ OR Market Value of Debt = Market Value of Firm – Market Value of Equity
WACC	If No Taxes (Ko) = WACC = $\frac{EBIT}{value\ of\ the\ firm}$ OR WACC Computation Statement If Taxes (Ko) = WACC = WACC Computation Statement OR $\frac{EBIT\ (1\text{-}t)}{value\ of\ the\ firm}$

CAPITAL STRUCTURE THEORIES FORMULA

ILLUSTRATION

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

Value of Equity = $\frac{EAEI}{Ke}$

$= \frac{EBIT - Interest}{Ke}$

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

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

Value of firm = Value of Equity + Value of Debt

= 1875000 + 2000000

= 3875000

Overall Cost of Capital = EBIT / Value of firm

= 500000 / 3875000

= 0.1290

That is 12.90%.

Statement showing Computation of WACC

Sr. NO	Source	Amt	Propn	Cost	WACC
A	Equity	1875 CR	0.48	16%	0.0768
B	Debt	2000 CR	0.52	10%	0.052
		3875 CR			0.1288

∴ WACC ≈ 12.90% (approx)

ILLUSTRATION

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

Value of firm = EBIT / K_O

= 500000 / 15%

= 33 33 333

Value of Equity = $\frac{EAIS}{Ke}$

Value of firm - Value of Debt = $\frac{EBIT - Interest}{Ke}$

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

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

$\therefore Ke = 350000 / 1833333 = 0.1909$ that is 19.09%

SR.NO	PARTICULARS	LEVERED FIRM	UNLEVERED FIRM
A	VALUE OF FIRM	Equal to Value of unlevered firm	EBIT / KO
B	COST OF EQUITY	Ke = KO(VL) + D/E (KO - Kd) OR EAEI / VOE	Ke
C	OVERALL COST OF CAPITAL	WACC Statement OR KO = EBIT / VOF	Ki = WACC

MM THEORY WITHOUT TAXES

SR.NO	PARTICULARS	LEVERED FIRM	UNLEVERED FIRM
A	VALUE OF FIRM	Value of UL + Tax Benefit	EBIT/KO
B	COST OF EQUITY	Ke = Ko(UL) + D(1-t)/E (Ko - Kd) or EAES/VOE	Ke
C	OVERALL COST OF CAPITAL	EBIT(1-t)/VOF or WACC statement or See core	Ke = WACC

MM THEORY WITH TAXES

ILLUSTRATION

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

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

REQUIRED:

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

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

If No taxes

Value of Unlevered Firm = Value of Levered Firm

Value of B Ltd = Value of A Ltd

Value of B Ltd = NOI/Ko = 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

$$Ke = Ko + \frac{Debt}{Equity}(Ko - Kd)$$

$$= 0.18 + \frac{5400000}{4600000}(0.18 - 0.12)$$

$$= 0.18 + 0.0704 = 0.2504$$ That is 25.04%.

If 40% Taxes

Value of Unlevered Firm (B Ltd) = EAES/Ko = (1800000-40% 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

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

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

$$= 13.23\%$$

Alternate way of calculating Ke of Ahd

$$Ke = Ko + \frac{Debt(1-t)}{Equity}(Ko - Kd)$$

$$= 0.18 + \frac{\$400000(1-0.40)}{2760000}(0.18 - 0.12)$$

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

$$= 0.18 + 0.0704$$

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

Alternate way of calculating WACC of A Ltd.

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

$= 0.18 \times \left[1 - \left(0.40 \times \frac{5400}{8100}\right)\right]$

$= 0.18 \times (1 - 0.2647)$

$= 0.18 \times 0.7353$

$= 0.1323$ that is 13.23%.

ILLUSTRATION 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

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.

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	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)

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

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 Ko = 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.

ILLUSTRATION

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.

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 saved (3000 × 12.50%)	375

ILLUSTRATION

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.

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

Sr. NO	Particulars	Amt
A	Amount recieved on Sale of Shares of unlevered co. (240000 x 15%)	36000
B	Amount paid on Purchase of Shares of levered co. (200000 x 15%)	30000
C	Amount Saved (A - B)	6000
D	Amount Invested in Debt (C x 50%)	3000
E	Amount Invested in Equity (C x 50%)	3000

F	Amount earned on investment in Debt (3000 × 10%)	300
G	Amount earned on investment in equity (3000 × 20%)	600
H	Total Earnings (F+G)	900

EBIT – EPS – MPS ANALYSIS FOR OPTIMAL 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 EP
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

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 - FORMULAE

Formulae

EPS of plan A = EPS of plan B

$$\frac{(EBIT-I1)(1-t)-PD1}{N1} = \frac{(EBIT-I2)(1-t)-PD2}{N2}$$

Term 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 favourably & EPS is maximized

ILLUSTRATION (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:

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

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

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

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

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

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

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

EBIT = ₹ 16,20,000

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

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 earning 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

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

$$\text{MPS} = \text{PE Ratio} * \text{EPS}$$

$$\text{EPS} = \text{MPS}/\text{PE Ratio}$$

ILLUSTRATION

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	80000
B	Less : Interest	0	8000	0
C	EBT (A - B)	80000	72000	80000
D	Less : Tax @ 50%	40000	36000	40000
E	EAT (C - D)	40000	36000	40000
F	Less : Pref. Dividend	–	–	8000
G	EAES	40000	36000	32000
H	No. of Eq. Shares	10000 (200000/20)	5000 (100000/20)	5000 (100000/20)
I	EPS	4	7.20	6.40

Computation of FBEP Under Plan A , B & C

Plan A

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

Plan B

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

Plan C

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

Verification

	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
EAES	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

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

Let the figures be in thousand

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

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

$$2.50\,EBIT = 5\,EBIT - 40$$

$$-2.50\,EBIT = -40$$

$$\therefore EBIT = 16$$

∴ Indifference Point between A & B = 16000

Computation of Indifference Point between Plan A & Plan C

EPS of Plan A = EPS of Plan C

Indifference Point between Plan A & C = 32000

Computation of Indifference Point between Plan B & Plan C

EPS of Plan B = EPS of Plan C

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

Let the figures be in thousand.

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

$$0.50\,EBIT - 4 = 0.50\,EBIT - 8$$

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.

thank you!

CAPITAL BUDGETING

INITITAL CASH FLOWS

PARTICULARS	Rs.
Cost of New Asset	XXX
Add-Installation/Set up costs	XXX
Add/Less - Increase (Decrease) in Working capital level	XXX
Less-Net proceeds after capital gain tax from sale of old Asset (If it is a replacement situation)	XXX
Less - Subsidy received from Government if any	XXX
Initial Cash Outflow	XXX

INTERIM CASH FLOWS – CFAT

PARTICULARS	Rs.
Operating Revenue i.e. Sales	XXX
Less - Cash Operating Expenses variable costs + cash fixed cost (excluding depreciation)	XXX
Cash inflow before taxes	XXX
Less – Depreciation	XXX
Profit after tax (PBT)	XXX
Less - Amount of income tax	XXX
Profit after tax (PAT)	XXX
Add – Depreciation	XXX
Cash flows after tax (CFAT)	XXX

CFAT - IMPORTANT POINTS

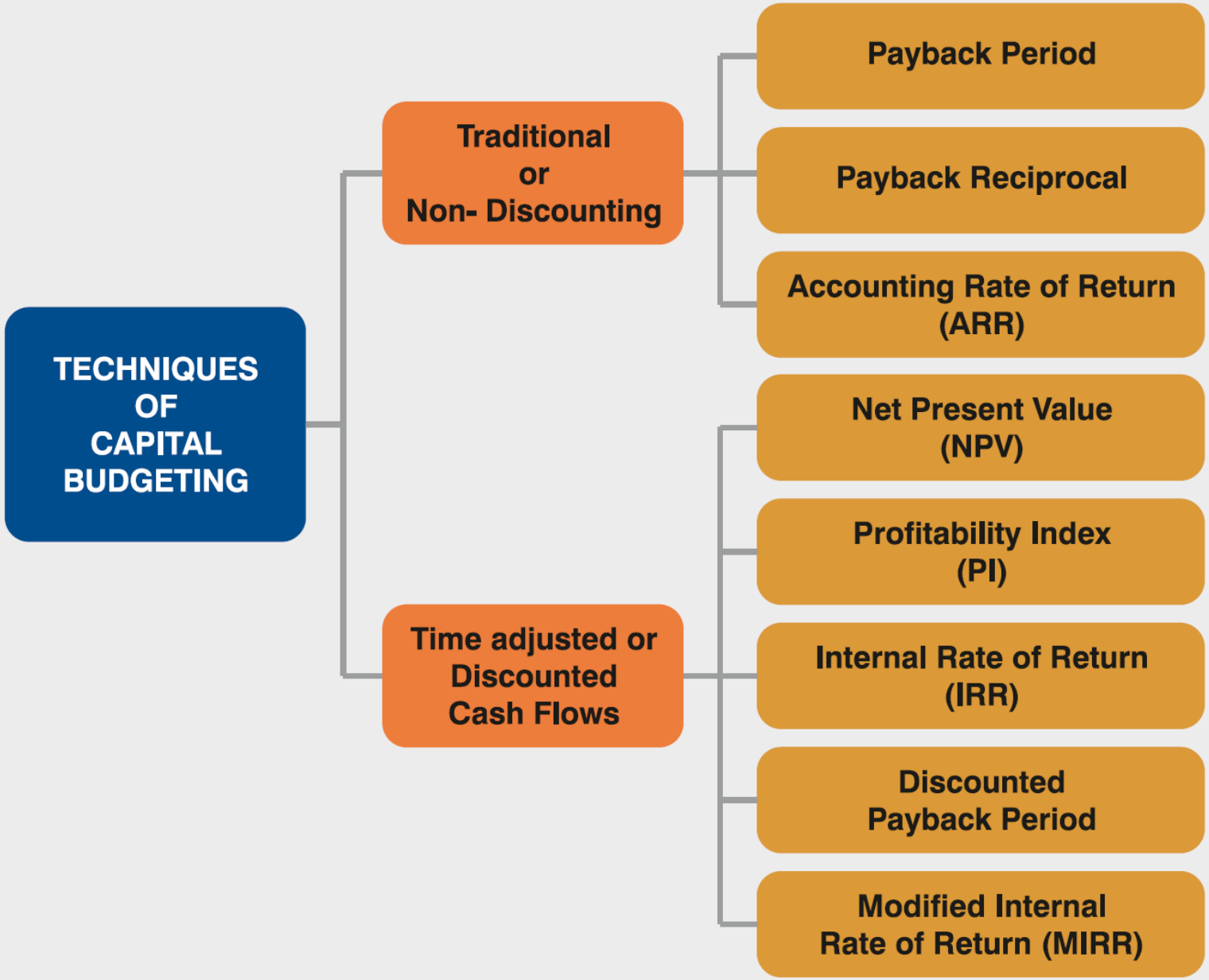
- Depreciation is calculated on cost of asset after deduction of amount of subsidy received if any.
- If there is loss in any year such loss may be either carried forward or set off in the same year. If it is carried forward then tax paid would be zero. If it is set off in the same year against any other existing income then we will consider tax saving in the above statement.
- Interest / preference dividend is not to be deducted because it is financial cost and it is considered in the weighted average cost of capital i.e. discount rate.

TERMINAL CASH FLOWS – CFAT

PARTICULARS	Rs.
Final salvage value (disposal value) of asset after capital gain	XXX
Add: Release of net working capital	XXX
Terminal year net cash flow (cash flow at the end)	XXX

1. Capital gain/loss from depreciable asset is short term capital gain/loss as per Sec 50 of Income Tax Act.
2. If nothing is given assume that amount of working capital is recovered completely (100%) at the end of project life and write note to that effect.

TECHNIQUES OF CAPITAL BUDGETING



PAYBACK PERIOD

a) **When the Annual Expected Cash Flow After taxes are uniform over the useful life of the project**

$$\text{Payback period} = \frac{\text{total initial capital investment}}{\text{annul expected Cash Flow After Taxes}}$$

a) **When the Annual Expected Cash Flow After taxes are not uniform over the useful life of the project**

The cumulative CFAT is to be calculated until the total is equal to the initial capital investment the period in which cumulative CFAT is equal to initial outlay it is known as payback period.

ACCEPT OR REJECT CRITERIA

A project whose actual pay-back period is more than what has been predetermined by the management will be straightway rejected. The fixation of maximum acceptable pay- back period is generally done by taking into account the reciprocal of the cost of capital

The payback period can also be used in case of mutually exclusive projects. The projects are then arranged in ascending order according to the length of their pay back periods.

IMPORTANT POINTS

I. The payback period of an investment is the length of time required for the cumulative total net cash flows from the investment to equal the total initial cash outlays.

II. Payback period answers following question - at what point of time, the investor has recovered the money invested in the project?

III. Go on calculating cumulative CFAT until cumulative CFAT matches with the initial cash outflow.

IV. For the last year we need to compute the fraction of the year that is needed to complete the total payback by using cross multiplication.

EXAMPLE

XYZ Ltd is Analyzing A Project Requiring an initial cash Outlay of 2,05,000 and is Expected to generate Cash Flows as Follows -

Year	Annual Cash Inflows (₹)
1	80,000
2	60,000
3	60,000
4	20,000

Calculate Payback Period

Statement Showing Cumulative Cash Flows

YEAR	ANNUAL CASH INFLOWS	CUMULATIVE CASH FLOWS
1	80 000	80 000
2	60 000	140 000
3	60 000	200 000
4	20 000	220 000

Payback Period = 3 years + $\frac{5\,000}{20\,000}$

= 3.25 years

PAYBACK RECIPROCAL

$$\text{Payback Reciprocal} = \frac{\text{annual cash inflow}}{\text{intiial investment}} \text{ X } 100$$

EXAMPLE

Suppose a project requires an initial investment of ₹ 20,000 and it would give annual cash inflow of ₹ 4,000. The useful life of the project is estimated to be 5 years.

Calculate Payback Reciprocal

$$\text{Payback reciprocal} = \frac{\text{Annual CFAT}}{\text{Initial Investment}} \times 100$$

$$= \frac{4000}{20000} \times 100$$

$$= 20\%.$$

ACCOUNTING RATE OF RETURN

Formula

$$\text{Accounting rate of return} = \frac{\text{Average Annual Net Income}}{\text{Initial/Average Investment}}$$

Term Used

I. Average annual net income = accounting profit after tax and depreciation

II. The denominator can be either the initial investment or the a verage investment over the useful life of the project.

Average investment =

$$\frac{\text{original investment-scrap value}}{2} + \text{additional working capital} + \text{scrap value}$$

ACCEPT OR REJECT CRITERIA

Any project expected to give a return below minimum desired rate of return will be straightway rejected. In case of several projects, where a choice has to be made, the different projects may be ranked in the descending order on the basis of their rate of return

IMPORTANT POINTS

I. This formula does not consider time value of money

II. Project expected to give more return than the desired return would be selected.

III. Please note CFAT is not considered here. It is accounting profit that is considered

ILLUSTRATION

A project requiring an investment of ₹ 10,00,000 and it yields profit after tax and depreciation which is as follows:

Years	Profit after tax and depreciation (₹)
1	50,000
2	75,000
3	1,25,000
4	1,30,000
5	80,000
Total	4,60,000

Suppose further that at the end of the 5th year, the plant and machinery of the project can be sold for ₹ 80,000. DETERMINE Average Rate of Return.

$$ARR = \frac{\text{Average Annual Profit}}{\text{Average Investment}} \times 100$$

$$= \frac{(₹\ 460000/5)}{\frac{\text{Cost} - SV}{2} + \text{WC} + SV} \times 100$$

$$= \frac{92000}{\frac{1000000 - 80000}{2} + 80000} \times 100$$

$$= 92000/₹ 540000 \times 100 = 17.04\%$$

NET PRESENT VALUE

YEAR	CASH FLOW	DISCOUNTING FACTOR AT... %	DISCOUNTED CASH FLOW

ACCEPT OR REJECT CRITERIA

Where NPV > Zero = accept the proposal

NPV = 0 = indifference point NPV

NPV < Zero = Reject the proposal

IMPORTANT TERMS

a) **Cash outflows -** generally, cash outflows consist of (a) initial investment which occurs at time "O" and (b) special payments and outflows e.g. working capital outflow which arises in the year of commercial production , Tax paid on capital gain made by sale of old assets, if any.

b) **Cash inflows -** Cash flows = CFAT = PAT + depreciation. Also specific cash inflows like salvage value of new assets and recovery of working capital at the end of the project , tax savings on loss due to sale of old asset, should be carefully considered. The general assumption is that all cash inflows occur at the end of each year.

c) **Discounting cash inflow and outflows -** each item of cash inflows and outflows is discounted to ascertain its present value. For this purpose the discounting rate generally taken as the cost of capital. The present value tables are used to calculate the present value of various cash flows.

d) **Use of discounting rate** - instead of using the PV factor tables, the relevant discount factor can be computed as

$$= \frac{1}{(1+K)n}$$

Where, k = cost of capital, N = year in which the inflow or outflow takes place

Hence, PV factor at 10% after one year = 1/1.10 = 0.9091

Similarly, PV factor at the end of two years = 1 / (1.10)2 = 0.8264 and so on

IMPORTANT POINTS

I. if there is only proposal it would be selected if NPV is zero or positive, in case of mutually exclusive proposal, the proposal having highest NPV would be selected for implementation.

II. NPV indicates value addition to the wealth of company

III. NPV is calculated by discounting cash flows at discount rate which is equal to cost of capital

IV. If NPV is positive, it means that project is expected to earn more than the expectations of Investors.

V. In case of annuity of cash flows, the annuity factor would be written in the discounting factor column.

VI. If some cash flows are given at the beginning of some year, then take the discounting factor of the previous year. Eg for cash flows taking place at the beginning of 3rd year discounting factor of 2nd year would be applied.

VII. Discounting factor is one for initial investment.

VIII. Please remember the terminal cash flows i.e. sale value of asset and recovery of working capital.

ILLUSTRATION (PYP NOV 2020) 5 MARKS

CK Ltd. is planning to buy a new machine. Details of which are as follows:

Cost of the Machine at the commencement	*₹ 2,50,000*
Economic Life of the Machine	*8 year*
Residual Value	*Nil*
Annual Production Capacity of the Machine	*1,00,000 units*
Estimated Selling Price per unit	*₹ 6*
Estimated Variable Cost per unit	*₹ 3*
Estimated Annual Fixed Cost (Excluding depreciation)	*₹ 1,00,000*

Advertisement Expenses in 1st year in addition of annual fixed cost ₹ 20,000

Maintenance Expenses in 5th year in addition of annual fixed cost ₹ 30,000

Cost of Capital 12%

Ignore Tax.

Analyse the above mentioned proposal using the Net Present Value Method and advice.

P.V. factor @ 12% are as under:

Year	1	2	3	4	5	6	7	8
PV Factor	0.893	0.797	0.712	0.636	0.567	0.507	0.452	0.404

STATEMENT SHOWING NPV

YEAR	PARTICULARS	CASH FLOW	PVF AT 12%	DCF
0	INITIAL CASH OUTFLOW	(250000)	1.00	(250000)
1	ADVERTISEMENT EXPENSES	(20000)	0.893	(17860)
5	MAINTAINANCE EXP	(30000)	0.567	(17010)
1-8	ANNUAL CFAT	200000	4.968	993600
			NPV	708730

Advise: CK Ltd. should buy the new machine, as the net present value of the proposal is positive i.e ₹ 7,08,730.

WN 1 - CALCULATION OF ANNUAL CFAT		
SR.NO	PARTICULARS	AMOUNT
A	Units Sold	100000
B	Contribution [(6-3) *A]	300000
C	Less – Fixed Cost	100000
D	Annual CFAT (B-C)	200000

PROFITABILITY INDEX/DESIRABILITY FACTOR

PROFITABILITY INDEX

$$\text{Profitability index} = \frac{\textbf{discounted cash } \boldsymbol{inflow}}{\textbf{discounted cash } \boldsymbol{outflow}}$$

OR

$$\text{Profitability ratio} = \frac{\textbf{discounted cash } \boldsymbol{inflow}}{\textbf{discounted cash } \boldsymbol{outflow}} \text{x100}$$

ACCEPT OR REJECT CRITERIA

PI > 1 = Accept the proposal

PI = 1 = Accept the proposal

PI < 1 = Reject the proposal

IMPORTANT POINTS

1. If NPV is positive , PI is greater than one
2. PI is used when projects involving different cash outflow are to be compared
3. PI indicates amount of cash inflow for every one rupee of cash outflow
4. If cash outflow takes place at multiple points of time then total of all cash outflow is required to be taken
5. PI is calculated by discounting cash flow at discount rate which is equal to cost of capital.

ILLUSTRATION

Suppose we have three projects involving discounted cash outflow of ₹ 5,50,000, ₹ 75,000 and ₹ 1,00,20,000 respectively. Suppose further that the sum of discounted cash inflows for these projects are ₹ 6,50,000, ₹ 95,000 and ₹ 1,00,30,000 respectively. CALCULATE the desirability factors for the three projects.

1) Desirability Factor = 6,50,000 / 5,50,000 = 1.18

2) Desirability Factor = 95,000 / 75,000 = 1.27

3) Desirability Factor = 1,00,30,000 / 1,00,20,000 = 1.00

IRR
(WHEN CASH FLOWS ARE UNIFORM)

Steps for calculation of IRR

1. Divide the investment by the annual cash inflow. The result is called the 'Factor' or Payback'.

2. Go across the row of the year (equivalent to the project) of table II and check up the closed figures to the fact (as determined in step (1) above) and ascertain the rate.

3. If IRR is greater or equal to minimum desired rate of return accept the project, if IRR is less than minimum desired rate of return reject the project.

ILLUSTRATION

A Ltd. is evaluating a project involving an outlay of ₹10,00,000 resulting in an annual cash inflow of ₹2,50,000 for 6 years. Assuming salvage value of the project is zero; DETERMINE the IRR of the project.

Present value interest factor of an (ordinary) annuity of Re 1 per period at i% for n periods, PVIFA(i,n).

Period	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	1.713	1.690	1.668	1.647	1.626	1.605	1.585	1.566	1.547	1.528
3	2.444	2.402	2.361	2.322	2.283	2.246	2.210	2.174	2.140	2.106
4	3.102	3.037	2.974	2.914	2.855	2.798	2.743	2.690	2.639	2.589
5	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127	3.058	2.991
6	4.231	4.111	3.998	3.889	3.784	3.685	3.589	3.498	3.410	3.326
7	4.712	4.564	4.423	4.288	4.160	4.039	3.922	3.812	3.706	3.605
8	5.146	4.968	4.799	4.639	4.487	4.344	4.207	4.078	3.954	3.837
9	5.537	5.328	5.132	4.946	4.772	4.607	4.451	4.303	4.163	4.031
10	5.889	5.650	5.426	5.216	5.019	4.833	4.659	4.494	4.339	4.192

Investment / Annual Inflow = 10,00,000 / 2,50,000 = 4

The PVAF Table Suggest That the IRR will be Between 12% and 13%, Now we Shall Find NPV at Both these Rates.

Find Out Actual IRR

NPV @12% = (1000000) + (4.111 X 250000)
= 27750

NPV @13% = (1000000) + (3.998 X 250000)
= (500)

Interpolation Formula

IRR = [Start Rate] + [Surplus at Start Rate] / [Surplus at start rate - Dificit at End Rate] x Difference in Rate

IRR = 12 + 27750 / 27750+500 X 1

IRR = 12+27750 / 28250

IRR = 12+0.98

IRR = 12.98

IRR
(WHEN CASH FLOWS ARE NOT UNIFORM)

Trial & Error Method

$$\text{Start rate} + \frac{\text{surplus at Start } Rate}{\text{surplus at start} - \text{deficit at End rate}} \text{x difference in start and end rate}$$

ILLUSTRATION

A company proposes to install machine involving a capital cost of ₹3,60,000. The life of the machine is 5 years and its salvage value at the end of the life is nil. The machine will produce the net operating income after depreciation of ₹68,000 per annum. The company's tax rate is 45%.

The Net Present Value factors for 5 years are as under:

Discounting rate	*14*	*15*	*16*	*17*	*18*
Cumulative factor	*3.43*	*3.35*	*3.27*	*3.20*	*3.13*

You are required to COMPUTE the internal rate of return of the proposal.

Statement Showing Annual CFAT		
Sr. No.	Particulars	Amount
A	Income After Depreciation	68000
B	Less : Tax @45%	30600
C	Profit After Tax	37400
D	Add : Depreciation (360000/5)	72000
E	CFAT (C+D)	109400

Annuity Factor at 5 Year = 360000 / 109400 = 3.290

NPV @15% = (360000) + (109400 X 3.35)
= (360000) + 366490
= 6490

NPV @16% = (360000) + (109400 X 3.27)
= (360000) + 357738
= (2262)

IRR = [Start Rate] + [Surplus at Start Rate] / [Surplus at start rate - Deficit at End Rate] x Difference in Rate

IRR = 15 + 6490 / 6490 + 2262 X 1

IRR = 15 + 6490 / 8752

IRR = 15 + 0.7415

IRR = 15.74%

ACCEPT REJECT CRITERIA

IRR > cut off rate = Accept the proposal

IRR = cut off rate = Accept the proposal

IRR < cut off rate = Reject the proposal

IMPORTANT POINTS

1. Unlike the net present value method, the internal rate of return method does not use the cost of capital as discount rate but calculates discount rate which makes NPV as zero.
2. If IRR is more than cost of capital then project is accepted and vice-versa.
3. This IRR is compared with organization's desired rate of return for evaluating capital Investments

IRR assumes that the intermediate cash flows received during the continuance of the project are reinvested at the IRR itself. This assumption is not practical

DISCOUNTED PAYBACK PERIOD

The following format may be adopted for presentation of the answer

YEAR	CFAT	PV FACTOR	DCFAT = CFAT x PV FACTOR	CUMULATIVE DCFAT

MODIFIED INTERNAL RATE OF RETURN

As mentioned earlier, there are several limitations attached with the concept of the conventional Internal Rate of Return (IRR). The MIRR addresses some of these deficiencies e.g., it eliminates multiple IRR rates it addresses the reinvestment rate issue and produces results which are consistent with the Net Present Value method. This method is also called Terminal Value method.

Under this method, all cash flows, apart from the initial investment are brought to the terminal value using an appropriate discount rate (usually the Cost of Capital). This results in a single stream of cash inflow in the terminal year. The MIRR is obtained by assuming a single outflow in the zeroth year and the terminal cash inflow as mentioned above. The discount rate which equates the present value of the terminal cash inflow to the zeroth-year outflow is called the MIRR

The decision criterion of MIRR is same as IRR i.e. you accept an investment if MIRR is larger than required rate of return and reject if it is lower than the required rate of return

ILLUSTRATION

An investment of ₹ 1,36,000 yields the following cash inflows (profits before depreciation but after tax). DETERMINE MIRR considering 8% as cost of capital.

Year	(₹)
1	30,000
2	40,000
3	60,000
4	30,000
5	20,000
	1,80,000

Statement Showing Future Value of Cash flow at the End of Project Life

Year	Cash Flow	FVF @8%	Future Value
1	30,000	1.3605	40,815
2	40,000	1.2597	50,388
3	60,000	1.1664	69,984
4	30,000	1.08	32,400
5	20,000	1.00	20,000
			2,13,587

PVF = 136000 / 213587 = 0.6367

MIRR = 9% Approx

Present value interest factor of Re 1 per period at i% for n periods, PVIF(i,n).

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386

NPV V/S IRR

NPV Versus IRR - Higher the NPV, higher will be the IRR However, NPV and IRR may give conflicting results in Following Situations

a) Initial Investment Disparity, i.e different project sizes,

b) Project life Disparity, i.e different in project lives,

c) Outflows Patterns, i.e when cash outflows arise at different point of time during the project life, rather than as initial investment (Time 0) only.

d) Cash flow Disparity, i.e when there is a huge difference between initial CFAT and later years CFAT. A project with heavy initial CFAT than compared to later years will have higher IRR, and vice-versa.

The presumption in IRR is that intermediate cash inflows will be reinvested at that rate (IRR); Whereas in the case of NPV method, intermediate cash inflows are presumed to be reinvested at the Cut-off rate. The latter presumption viz. Reinvestment is at the Cut-off rate is more realistic than reinvestment at IRR. Hence, in case of conflicting decisions based on NPV And IRR , The NPV Method must prevail.

PROJECT WITH VARYING LIVES

In appraising projects with varying lives, due thought must be given to the reinvestment opportunities existing at the end of the different economic lives of the project. A Simple Comparison of NPV is Not Justifiable. The problem can be handled by annualizing the respective cash flow patterns of the alternative projects under study. The process of annualizing the net present value of the cash inflow or outflow of an investment proposal involves conversion of the present value into an annuity over the economic life of the proposal at suitable opportunity Cost.

$$\text{Annualized net Cost/ benefit/ NPV} = \frac{NPV}{\textit{PV Annuity factor over the project life}}$$

or

NPV x capital recovery factor over the project life

ACCEPT REJECT CRITERIA

1. If the proposals are cost proposal, the proposal with minimum annualized cost shall be selected.
2. If the proposals are cost & benefit proposals, the proposal with maximum annualized NPV shall be selected.

ILLUSTRATION

Ae Bee Cee Ltd. is planning to invest in machinery, for which it has to make a choice between the two identical machines, in terms of Capacity, 'X' and 'Y'. Despite being designed differently, both machines do the same job. Further, details regarding both the machines are given below:

Particulars	Machine 'X'	Machine 'Y'
Purchase Cost of the Machine (₹)	15,00,000	10,00,000
Life (years)	3	2
Running cost per year (₹)	4,00,000	6,00,000

The opportunity cost of capital is 9%.

You are required to IDENTIFY the machine which the company should buy?

The present value (PV) factors at 9% are:

Year	t_1	t_2	t_3
$PVIF_{0.09.t}$	0.917	0.842	0.772

Computation of Equivalent Annual Present value of Cash outflow of Machine X

$$\text{Equal Annual PV of Cost} = \frac{\text{Present value of Initial investment} + \text{PV of running cost of 400000 per annum for 3 years}}{\text{PVAF @ 9\% for 3 years}}$$

$$= \frac{(1500000 \times 1) + (400000 \times \text{PVAF @ 9\% for 3 yrs})}{2.531}$$

$$= \frac{1500000 + 400000 \times 2.531}{2.531}$$

$$= \frac{1500000 + 1012400}{2.531}$$

$$= \underline{992651}$$

Computation of Equalised Annual Present Value of Cash outflow of machine.

Equal Annual Cost PV of = PV of Initial Investment + PV of running cost of 600 000 for 2 yrs

PVAF @ 9%, for 2 years.

$$= \frac{(1000000 \times 1) + (600000 \times \text{PVAF @ 9\% for 2 yrs})}{\text{PVAF @ 9\% for 2 yrs.}}$$

$$= \frac{1000000 + (600000 \times 1.759)}{1.759}$$

$$= \frac{1000000 + 1055400}{1.759}$$

$$= 2055400 / 1.759 = 1168505$$

Conclusion :- As Equalised Annual present value of machine X is lower than machine Y, it is advisable to adopt project X.

CAPITAL RATIONING

A firm normally fixes up maximum amount that can be invested in capital projects during a given period of time. The firm then attempts to select a combination of investment proposals, that will within the specific limits provide maximum profitability and put them in descending order according to their rate of return. Such a situation is called Capital Rationing. The situation may arise due to-

- Financing capital expenditure only by way of retained earnings.
- Allocation of specified departmental limits
- Restricted availability of own funds and thereby restrictions on borrowings.

The Investment proposals are classified as under

NATURE OF PROJECT	INDIVISIBLE	DIVISIBLE
Meaning	Investment should be made in full, Partial or proportionate investment is not possible	Partial investment is possible & proportionate NPV can be generated.
Steps involved in decision making	• Determine the combination of projects to utilize amount Available. • Compute NPV of each combination • Select Combination with maximum NPV	• Compute PI of various projects & rank them • Projects are selected based on maximum Profitability Index.

ILLUSTRATION (PYP NOV 2019) 5 MARKS

A company has ₹ 1,00,000 available for investment and has identified the following four investments in which to invest.

Project	Investment (₹)	NPV (₹)
C	40,000	20,000
D	1,00,000	35,000
E	50,000	24,000
F	60,000	18,000

You are required to optimize the returns from a package of projects within the capital spending limit if-

(i) The projects are independent of each other and are divisible.

(ii) The projects are not divisible.

(i) Optimizing returns when projects are independent and divisible.

Statement Showing PI of all Projects and Ranking

Project	Calculation of PI $\frac{\text{NPV + Cash Outflow}}{\text{Cash Outflow}}$	PI	Ranking
C	(20000+40000)/40000	1.50	1
D	(35000+100000)/100000	1.35	3
E	(24000+50000)/50000	1.48	2
F	(18000+60000)/60000	1.30	4

Building up of a Package of Projects based on their Rankings

Project	Investment (₹)	NPV (₹)
C	40,000	20,000
E	50,000	24,000
D (1/10th of Project)	10,000	3,500
Total	1,00,000	47,500

The company would be well advised to invest in Projects C, E and D (1/10th) and reject Project F to optimise return within the amount of ₹ 1,00,000 available for investment.

(ii) Optimizing returns when projects are indivisible.

Package of Project	Investment (₹)	Total NPV (₹)
C and E	90,000 (40,000 + 50,000)	44,000 (20,000 + 24,000)
C and F	1,00,000 (40,000 + 60,000)	38,000 (20,000 + 18,000)
Only D	1,00,000	35,000

The company would be well advised to invest in Projects C and E to optimise return within the amount of ₹ 1,00,000 available for investment.

thank you!

DIVIDEND DECISIONS

THEORIES OF DIVIDEND

THEORIES OF DIVIDEND

Irrelevance Theory (Dividend is irrelevant)	Relevance Theory (Dividend is relevant)	Other Models
M.M Approach	Walter's Model	Dividend Discount Model (DDM)
	Gordon's Model	Linter's Model

DETERMINATION OF SHARE PRICE UNDER (MM) APPROACH

Formula

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

Where,

P_0 = Price in the beginning of the period

P_1 = Price at the end of the period

D_1 = Dividend at the end of the period

K_e = Cost of equity/rate of capitalization/discount rate

DETERMINATION OF VALUE OF FIRM UNDER (MM) APPROACH

Formula

$$\text{Value of Firm} = (\text{No. of Shares Outstanding at The Beginning} + \text{No of Shares issued to raise Funds}) * \text{Price at The End of period} - \frac{\text{Investment Req.} + \text{Earnings}}{(1 + Ke)}$$

ILLUSTRATION

AB Engineering Ltd. belongs to a risk class for which the capitalization rate is 10%. It currently has outstanding 10,000 shares selling at ₹ 100 each. The firm is contemplating the declaration of a dividend of ₹ 5 share at the end of the current financial year. It expects to have a net income of ₹ 1,00,000 and has a proposal for making new investments of ₹ 2,00,000. CALCULATE the value of the firm when dividends (i) are not paid (ii) are paid.

CASE A

Value Of Firm When Dividends Are Not Paid

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$100 = \frac{P_1 + 0}{1 + 0.10}$$

$$\therefore 110 = P_1 + 0$$

$$\therefore P_1 = 110$$

Value of firm

Value of firm = No. of shares outstanding at the beginning + No. of shares to be issued × P1 − Investment required + Earnings after tax

$$= \left[10000 + \left(\frac{200000 - 100000}{110}\right)\right] \times 110 - \frac{200000 + 10000}{110.10}$$

$$= \frac{(10000 + 909.09) \times 110 - 200000 + 10000}{1.10}$$

$= 10\,00\,000$

CASE B

Value Of Firm When Dividends Are Paid

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$100 = \frac{P_1 + 5}{1 + 0.10}$$

$$110 = P_1 + 5$$

$$\therefore P_1 = 105$$

Value of Firm

$$\text{Value of firm} = \frac{(\text{No. of shares outstanding} + \text{No. of shares to be issued}) \times P_1 - \text{Investment required} + \text{Earnings}}{1 + K_e}$$

$$= \frac{(10\,000 + (200000 - 50000)/105) \times 105 - 200\,000 + 100000}{1 + 0.10}$$

$$= 10\,00\,000$$

DETERMINATION OF PRICE UNDER WALTER'S MODEL

Formula

$$\text{Market price (p)} = \frac{D + \frac{r}{K_e}(E - D)}{K_e}$$

Where,

P = Market price of the share.
E = Earnings per share.
D = Dividend per share.
K_e = Cost of equity / rate of capitalization/ discount rate.
r = Internal rate of return/ return on investment.

DETERMINATION OF OPTIMUM PAYOUT RATIO UNDER WALTER'S MODEL

Company	Condition Of r vs K_e	Correlation between size of Dividend and Market Price of shares	Optimum dividend payout ratio
Growth	$r > K_e$	Negative	Zero
Constant	$r = K_e$	No correlation	Every payout ratio is optimum
Decline	$r < K_e$	Positive	100%

ILLUSTRATION

The following information pertains to M/s XY Ltd.

Earnings of the Company	*₹ 5,00,000*
Dividend Payout ratio	*60%*
No. of shares outstanding	*1,00,000*
Equity capitalization rate	*12%*
Rate of return on investment	*15%*

CALCULATE:

(i) Market value per share as per Walter's model.

(ii) Optimum dividend payout ratio according to Walter's model and the market value of Company's share at that payout ratio.

(i) Market value Per Share As Per Walter's Model

EPS = 500000 / 100000 shares = 5

DPS = 5 × 60% = 3

$$P = \frac{DPS + \frac{r}{Ke}(EPS - DPS)}{Ke}$$

$$= \frac{3 + \frac{0.15}{0.12}(5-3)}{0.12}$$

$$= 45.83$$

(ii) Optimum Payout Ratio & Market Price of Share at that Payout Ratio

As r (0.15) > Ke (0.12) Optimum Payout ratio shall be zero

$$P = \frac{DPS + \frac{r}{Ke}(EPS - DPS)}{Ke}$$

$$= \frac{0 + \frac{0.15}{0.12}(5 - 0)}{0.12}$$

$$= \text{₹ } 52.08$$

DETERMINATION OF PRICE UNDER GORDON'S MODEL

Formula

$$P_0 = \frac{E_1(1-b)}{K_e - Br}$$

Where,

P_0 = price per share
E_1 = Earning per share
B = Retention ratio; (1- b = payout ratio)
K_e = Cost of capital
r = IRR
br = Growth rate (g)

DETERMINATION OF OPTIMUM PAYOUT RATIO UNDER GORDON'S MODEL

Company	Condition Of r vs K_e	Optimum dividend payout ratio
Growth	$r > K_e$	Zero
Constant	$r = K_e$	There is no optimum ratio
Decline	$r < K_e$	100%

ILLUSTRATION

The following figures are collected from the annual report of XYZ Ltd.:

Net Profit	***₹ 30 lakhs***
Outstanding 12% preference shares	*₹ 100 lakhs*
No. of equity shares	*3 lakhs*
Return on Investment	*20%*
Cost of capital i.e. (K_e)	*16%*

CALCULATE price per share using Gordon's Model when dividend pay-out is (i) 25%; (ii) 50% and (iii) 100%.

CASE A

$$P_0 = \frac{EPS \times Payout\ ratio}{Ke - (br)}$$

$$= \frac{6 \times 25\%}{0.16 - (0.75 \times 0.20)}$$

$$= \frac{1.5}{0.16 - 0.15}$$

$$= 150$$

CASE B

$$P_0 = \frac{EPS \times Payout\ ratio}{Ke - (br)}$$

$$= \frac{6 \times 50\%}{0.16 - (0.50 \times 0.20)}$$

$$= \frac{3}{0.16 - 0.10}$$

$$= \frac{3}{0.06} = 50$$

CASE C

$$P_0 = \frac{EPS \times Payout\ ratio}{K_e - br}$$

$$= \frac{6 \times 100\%}{0.16}$$

$$= \frac{6}{0.16}$$

$$= 37.50$$

WN 1 – Statement Showing Computation of EPS

SR.NO	PARTICULARS	AMOUNT
A	Profit after Tax	3000000
B	Less- Preference Dividend (1000000 x 12%)	120000
C	EAES (A-B)	1800000
D	No. of Eq. shares (given)	300000
E	EPS (C/D)	6 Per share

DETERMINATION OF PRICE UNDER GORDON'S REVISED MODEL

Formula

$$\text{Market price per share } (P_0) = \frac{D_0(1 + g)}{K_e - g}$$

Where,

P_0 = Market price per share (ex- dividend)

D_0 = Current year dividend

g = Constant annual growth rate of dividends

K_e = Cost of equity capital (expected rate of return)

DIVIDEND DISCOUNT MODEL

Possible situation

Zero growth	Constant growth	Variable growth

ZERO GROWTH RATE

It assumes all dividend paid by a stock remains same.

Formula

$$\text{Stock's intrinsic value} = \frac{\text{Annual dividend}}{\text{Required rate of retun}}$$

i.e. $$P_0 = \frac{D}{K_e}$$

Where,
D = Annual dividend
K_e = Cost of capital
P_0 = Current market price of share

ILLUSTRATION

X Ltd. is a no growth company, pays a dividend of ₹ 5 per share. If the cost of capital is 10%, COMPUTE the current market price of the share?

$$K_e = \frac{D}{\rho_0}$$

$$0.10 = \frac{5}{\rho_0}$$

$$\therefore \rho_0 = 50$$

CONSTANT GROWTH RATE

It assumes constant growth of dividend.

Formula

$$\text{Market price per share (p)} = \frac{D_0 (1+g)}{K_e - g}$$

Where,

P = Market price per share

D_0 = Current year dividend

g = Growth rate of dividend

K_e = Cost of equity capital/ expected rate of return

ILLUSTRATION

XYZ is a company having share capital of ₹ 10 lakhs of ₹ 10 each. It distributed current dividend of 20% per annum. Annual growth rate in dividend expected is 2%. The expected rate of return on its equity capital is 15%. CALCULATE price of share applying Gordon's growth Model.

$$Ke = \frac{D1}{P0} + G$$

$$0.15 = \frac{2.04}{P0} + 0.02$$

$$0.15 - 0.02 = \frac{2.04}{P0}$$

$$0.13\,P0 = 2.04$$

$$\therefore P0 = 15.69$$

DETERMINATION OF CURRENT YEAR'S DIVIDEND UNDER LINTER'S MODEL

Formula

$$D_1 = D_0 + [(EPS \times \text{Target payout}) - D_0] \times Af$$

Where,

D_1 = Dividend in year 1

D_0 = Dividend in year 0 (last year dividend)

EPS = Earnings per share

Af = Adjustment factor or speed of adjustment

ILLUSTRATION

A&R Ltd. is a large-cap multinational company listed in BSE in India with a face value of ₹ 100 per share. The company is expected to grow @ 15% p.a. for next four years then 5% for an indefinite period. The shareholders expect 20% return on their share investments. Company paid ₹ 120 as dividend per share for the FY 2020-21. The shares of the company traded at an average price of ₹ 3,122 on last day. FIND out the intrinsic value of per share and state whether shares are overpriced or underpriced.

STATEMENT SHOWING COMPUTATION OF INTRINSIC VALUE OF SHARES

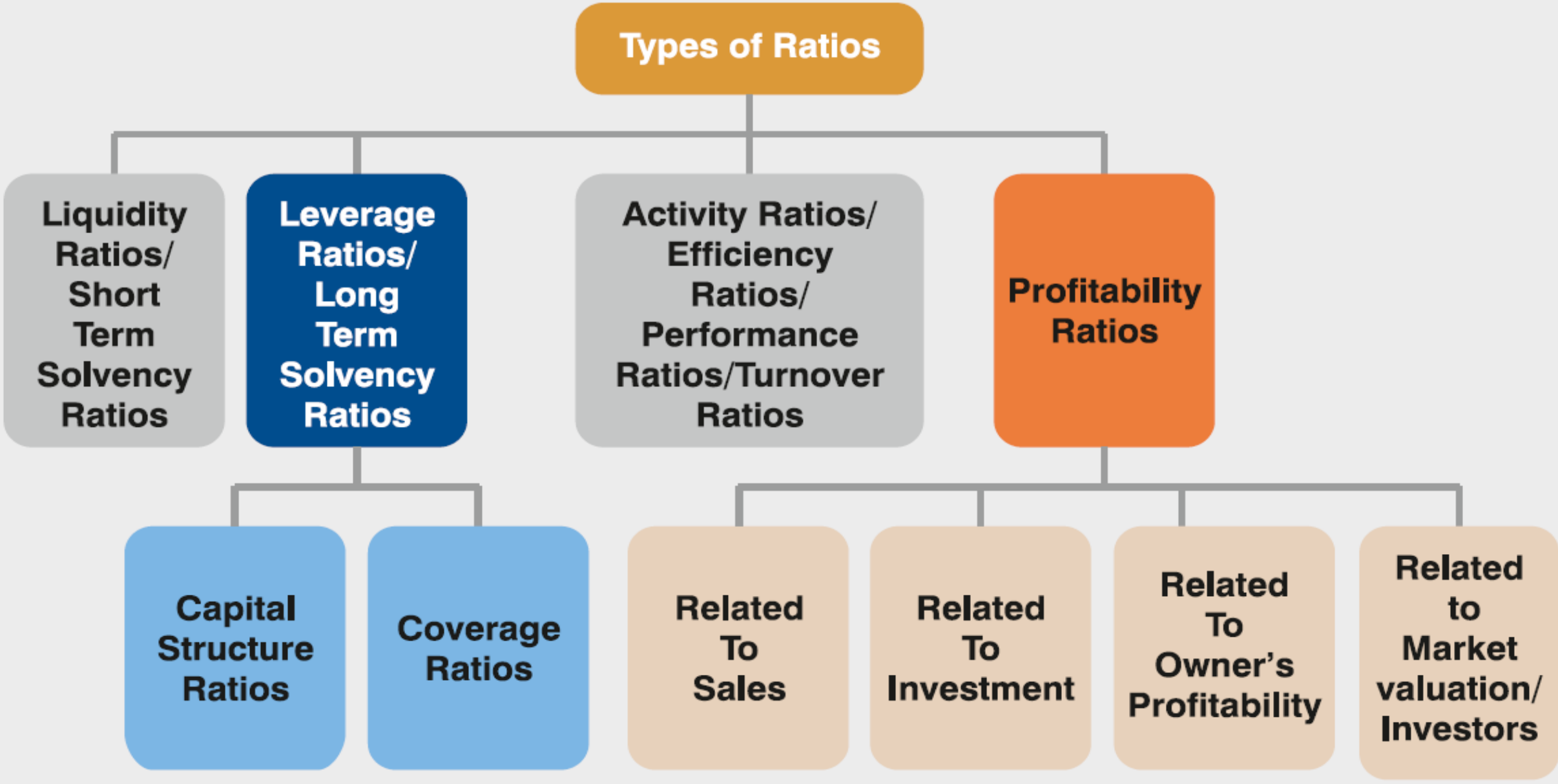
YEAR	PARTICULARS	CASH FLOW	PVF AT 20%	PV OF CASH FLOW
1	Dividend [120+15%]	138	0.833	114.95
2	Dividend [138+15%]	158.70	0.694	110.14
3	Dividend [158.70+15%]	182.51	0.579	105.67
4	Dividend [182.51+15%]	209.89	0.482	101.17
4	Price of share At the end of 4th year with constant growth rate perpetuity	1469.20 $\frac{D_5}{K_e - g}$ $\frac{209.89 + 15\%}{0.20 - 0.05}$	0.482	708.15
				1140.08

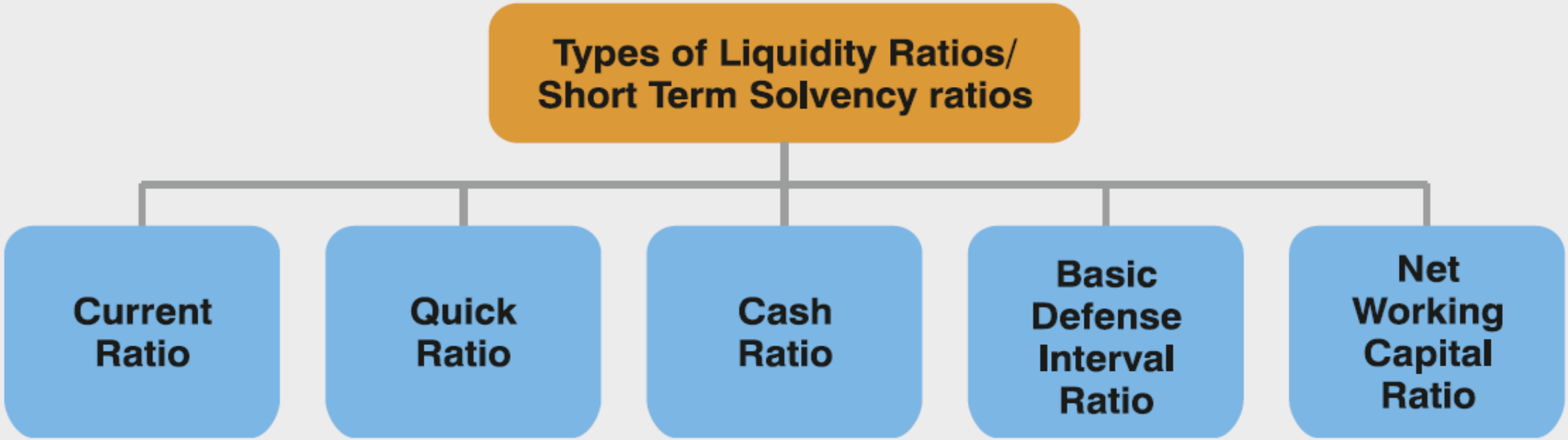
Conclusion :- The current market Price of Share is 3122 & the Intrinsic Value of Share is 1140 (approx) Hence it can be said that Share is currently Overpriced by Rs. 1982 (3122 - 1140)

thank you!

RATIO ANALYSIS

TYPES OF RATIOS




Types of Liquidity Ratios/
Short Term Solvency ratios
Current Ratio
Quick Ratio
Cash Ratio
Basic Defense Interval Ratio
Net Working Capital Ratio

LIQUIDITY RATIO

Current ratio	$\frac{\text{Current assets}}{\text{current liabilities}}$	A simple measure that estimates whether the business can pay short term debts. Ideal ratio is 2.
Quick Ratio	$\frac{\text{Quick assets}}{\text{current liabilities}}$	It measures the ability to meet current debt immediately. Ideal ratio is 1.
Cash ratio	$\frac{\text{(Cash and bank balances + marketable securities)}}{\text{current liabilities}}$	It measures absolute liquidity of the business.
Basic defence interval ratio	$\frac{\text{(Cash and bank balances + net receivables + marketable securities)}}{\text{Daily Operating expenses}}$	It measures the ability of the business to meet regular cash expenditures.
Net working capital	Current assets – current liabilities	It is a measure of cash flow to determine the ability of business to survive financial crises.

LONG TERM SOLVENCY RATIOS / LEVERAGE

Leverage Ratios /
Long term Solvency Ratios

Capital Structure Ratios

- Equity Ratio
- Debt Ratio
- Debt Equity Ratio
- Debt to Total Asset Ratio
- Capital Gearing Ratio
- Proprietary Ratio

Coverage Ratios

- DSCR
- Interest Coverage Ratio
- Preference Dividend Coverage Ratio
- Equity Dividend Coverage Ratio
- Fixed Charges Coverage Ratio

CAPITAL STRUCTURE RATIO

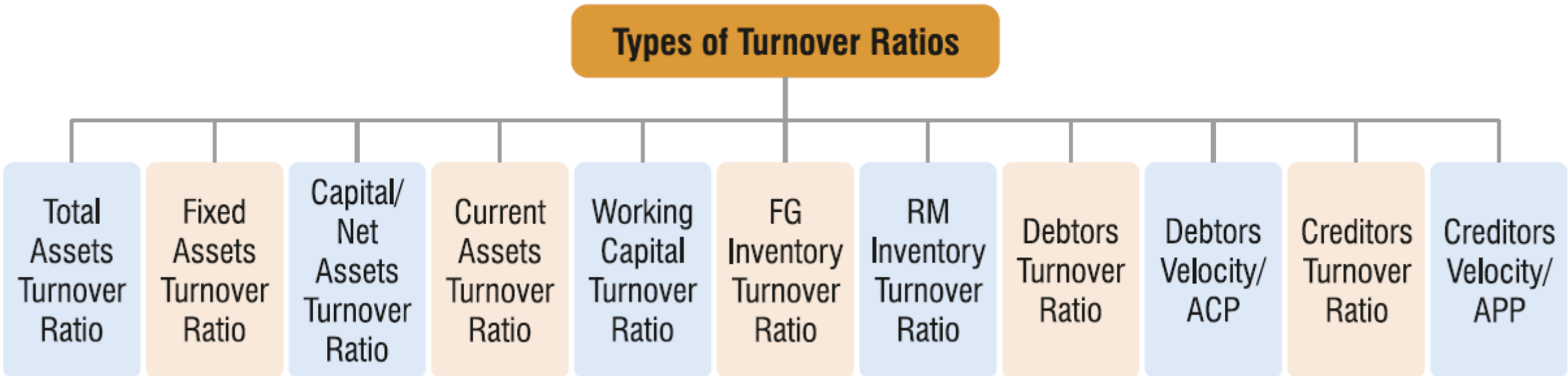
Equity ratio	$\frac{\text{Shareholder's equity}}{\text{Net Assets/Capital employed}}$	It indicates owner's fund in companies to total fund invested.
Debt ratio	$\frac{\text{Total debt}}{\text{Net Assets/Capital employed}}$	It is an indicator of use of outside funds.
Debt equity ratio	$\frac{\text{Total debt}}{\text{shareholder's equity}}$	It indicates the composition of capital structure in terms of debt and equity.
Debt to total assets ratio	$\frac{\text{Total debt}}{\text{total assets}}$	It measures how much of total assets is financed by the debt.
Capital gearing ratio	$\frac{\text{(Preference share capital +debentures + other borrowed funds)}}{\text{Equity share capital + reserves and surplus – losses}}$	It shows the proportion of fixed interest-bearing capital to equity shareholder's fund. It also signifies the advantage of financial leverage to the equity shareholder.
Proprietary ratio	$\frac{\text{Proprietary fund}}{\text{total assets}}$	It measures the proportion of total assets financed by shareholders.

COVERAGE RATIOS

Debt service coverage ratio (DSCR)	$\frac{\text{Earnings available for debt services}}{\text{interest + instalments}}$	It measures the ability to meet the commitment of various debt services like interest, instalment, etc. ideal ratio is 2.
Interest coverage ratio	$\frac{\text{EBIT}}{\text{interest}}$	It measures the ability of the business to meet interest obligations. Ideal ratio is > 1.
Preference dividend coverage ratio	$\frac{\text{Net profit/earning after taxes (EAT)}}{\text{preference dividend liability}}$	It measures the ability to pay the preference shareholder's dividend. Ideal ratio is > 1.
Equity dividend coverage ratio	$\frac{\text{Earnings Available For Equity Shareholders}}{\text{Equity dividend}}$	It measures the ability to pay the Equity shareholder's dividend.
Fixed charges coverage ratio	$\frac{\text{EBIT + depreciation}}{\text{interest + Principle}}$	This ratio shows how many times the cash flow before interest and taxes covers all fixed financing charges. The ideal ratio is > 1.

ACTIVITY RATIOS/EFFICIENCY RATIOS/ PERFORMANCE RATIOS/TURNOVER RATIOS

ACTIVITY RATIOS/ EFFICIENCY RATIOS / PERFORMANCE RATIOS / TURNOVER RATIOS

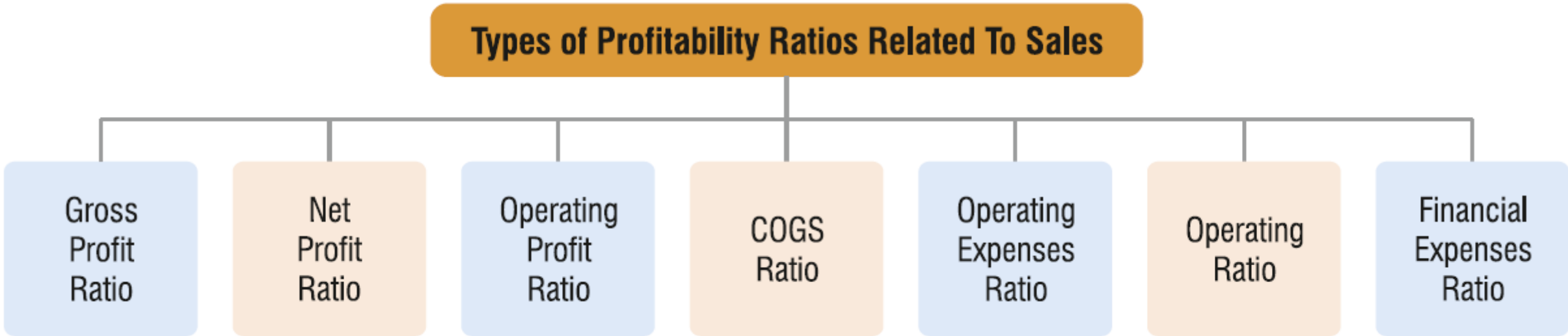


ACTIVITY RATIO/ EFFICIENCY RATIO/ PERFORMANCE RATIO/ TURNOVER RATIO

Total asset turnover ratio	$\frac{\text{Sales/COGS}}{\text{Total assets}}$	A measure of total asset utilisation. It helps to answer the question – What sales are being generated by each rupee's worth of assets invested in the business?
Fixed assets turnover ratio	$\frac{\text{Sales/COGS}}{\text{fixed assets}}$	This ratio is about fixed asset capacity. A reducing sales or profit being generated from each rupee invested in fixed assets may indicate overcapacity or poorer-performing equipment.
Capital/Net Assets turnover ratio	$\frac{\text{Sales/COGS}}{\text{Net Assets/Capital Employed}}$	This indicates the firm's ability to generate sales per rupee of long-term investment.
Current Asset turnover ratio	$\frac{\text{Sales / Cost of Goods Sold}}{\text{Current Assets}}$	This indicates the firm's ability to generate sales per rupee of Current Asset.
Working capital turnover ratio	$\frac{\text{Sales/COGS}}{\text{Working capital}}$	It measures the efficiency of the firm to use working capital.
FG Inventory turnover ratio	$\frac{\text{COGS/Sales}}{\text{average inventory of FG}}$	It measures the efficiency of the firm to manage its inventory of FG.
RM Inventory turnover ratio	$\frac{\text{Raw Material Consumed}}{\text{Average Inventory of RM}}$	It measures the efficiency of the firm to manage its inventory of RM.

Receivables (debtor's) Turnover ratio	$\frac{\text{Credit sales}}{\text{average accounts receivables}}$	It measures the efficiency at which firm is managing its receivables.
Debtors velocity/ ACP	$\frac{\text{Average accounts receivables}}{\text{average daily credit sales)}}$ Or $\frac{\text{360days/12months/52 weeks}}{\text{DTR}}$	It measures the velocity of collection of receivables.
Payables (Creditors) turnover ratio	$\frac{\text{Annual net credit purchases}}{\text{average account payables}}$	It measures how fast a company makes payment to its creditors
Creditors velocity/ APP	$\frac{\text{Average accounts payable}}{\text{average daily credit purchases)}}$ Or $\frac{\text{360 days/12months/52weeks}}{\text{CTR}}$	It measures the velocity of payment of payables.

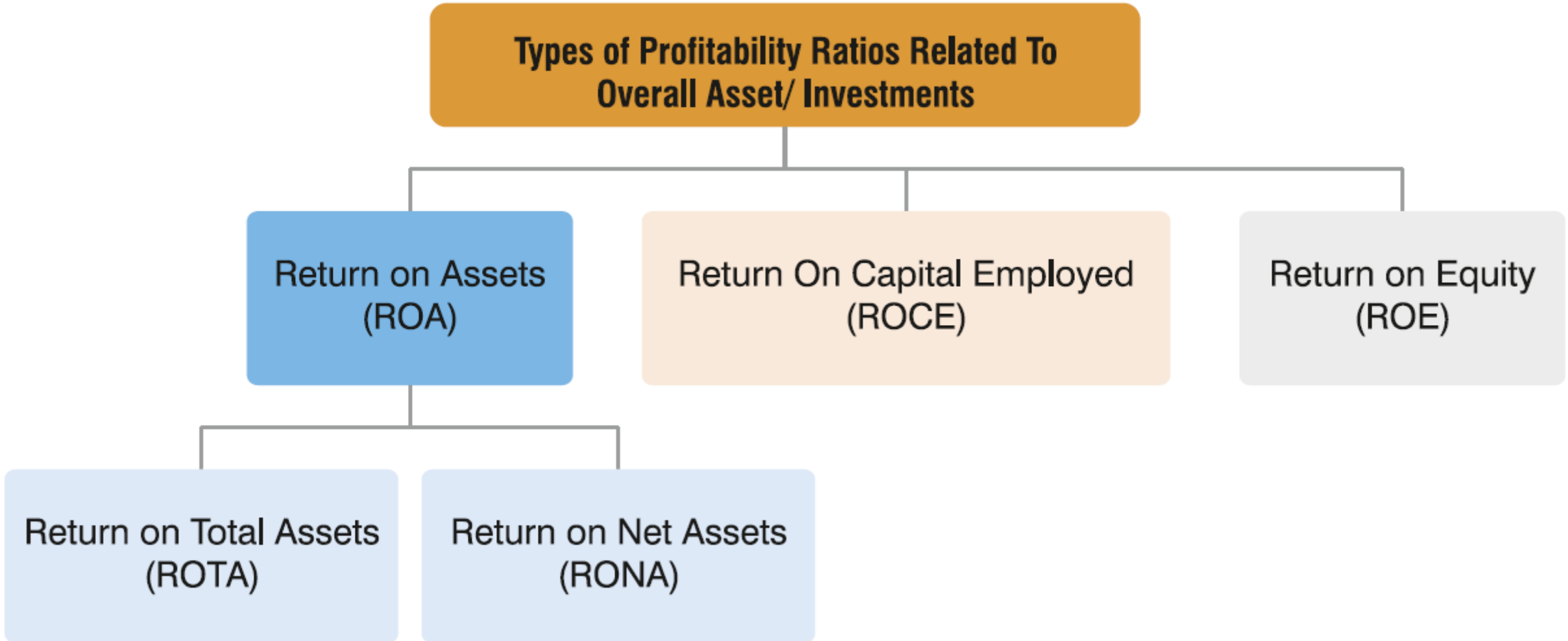
PROFITABILITY RATIOS



PROFITABILITY RATIOS RELATED TO SALES

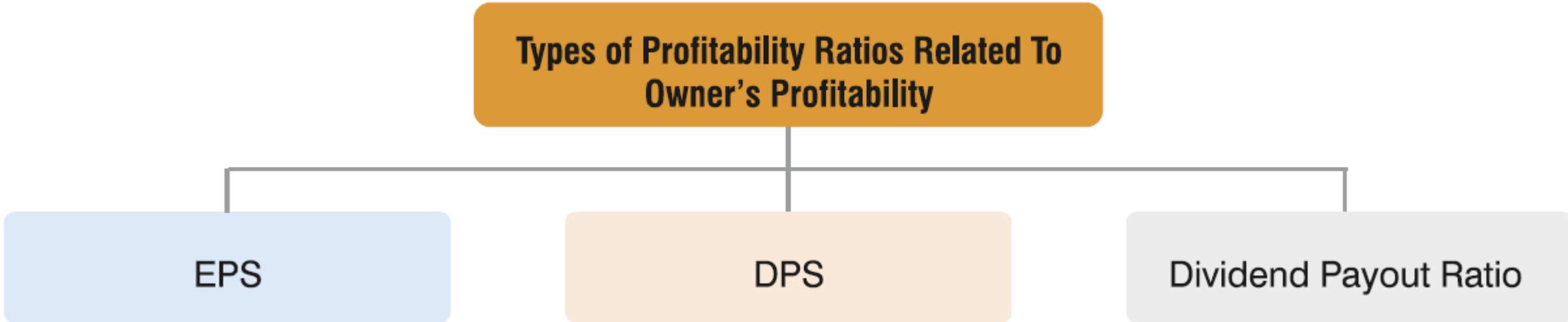
Gross profit ratio	$\frac{\text{Gross profit}}{\text{sales}} \times 100$	This ratio tells us something about the business's ability consistently to control its production costs or to manage the margins it makes on products it buys and sells.
Net profit ratio	$\text{Net Profit Ratio} = \frac{\text{Net Profit}}{\text{Sales}} \times 100$ or $\text{Net Profit Ratio (Post tax)} = \frac{\text{EAT}}{\text{Sales}} \times 100$ or $\text{Net Profit Ratio (Pre tax)} = \frac{\text{EBT}}{\text{Sales}} \times 100$	It measures the relationship between net profit and sales of the business.
Operating profit ratio	$\text{Operating Profit Ratio} = \frac{\text{Operating Profit}}{\text{Sales}} \times 100$ or $\text{Operating Profit Ratio} = \frac{\text{EBIT}}{\text{Sales}} \times 100$	It measures operating performance of business.

Cost of goods sold (COGS)	$\frac{\text{COGS}}{\text{sales}} \times 100$	It measures portion of a particular expenses in comparison to sales.
Operating expenses ratio	$\frac{\text{(Administrative exp. + selling \& distribution overhead)}}{\text{sales}} \times 100$	
Operating ratio	$\frac{\text{COGS + Operating expenses}}{\text{sales}}$	
Financial expenses ratio	$\frac{\text{Financial expenses}}{\text{sales}}$	


Types of Profitability Ratios Related To Overall Asset/ Investments
Return on Assets (ROA)
Return On Capital Employed (ROCE)
Return on Equity (ROE)
Return on Total Assets (ROTA)
Return on Net Assets (RONA)

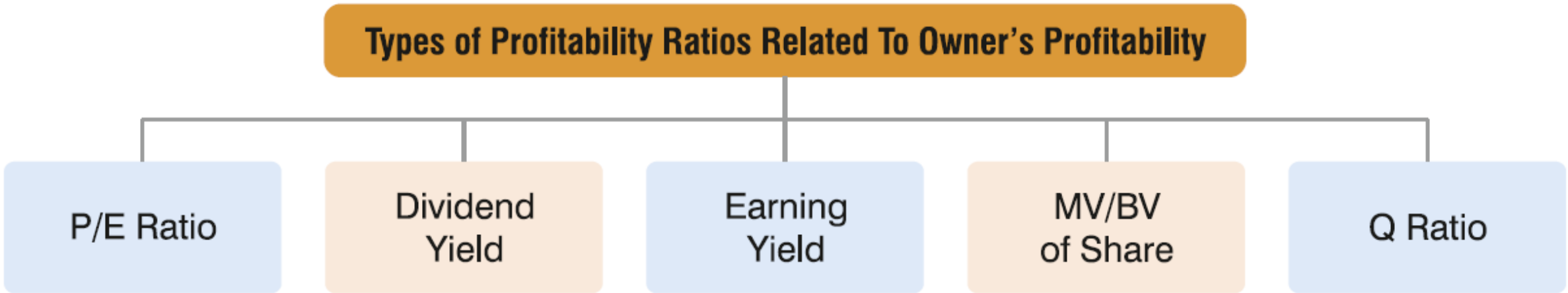
PROFITABILITY RATIOS RELATED TO OVERALL RETURN ON ASSETS/ INVESTMENTS

Return On Total Assets (ROTA)	$\frac{\text{EBIT (1-t))}}{\text{Average Total Assets}}$	It measures net profit per rupee of average total assets
Return On Net Assets (RONA)	$\frac{\text{EBIT (1-t)}}{\text{Average Net Assets}}$	It measures net profit per rupee of average Net assets
ROCE (Pre-Tax)	$\frac{\text{EBIT}}{\text{Capital employed}} \times 100$	It measures overall earnings (Pre-tax) on total capital employed.
ROCE (Post-tax)	$\frac{\text{EBIT (1-T)}}{\text{Capital employed}} \times 100$	It measures overall earnings (Post-tax) on total capital employed.
Return on equity (ROE)	$\frac{\text{(Net profit after taxes – preference dividend (if any)}}{\text{net worth or equity shareholder's fund)}} \times 100$	This ratio indicates Return earned by equity Shareholder


Types of Profitability Ratios Related To Owner's Profitability
EPS
DPS
Dividend Payout Ratio

PROFITABILITY RATIOS RELATED TO OWNER'S PROFITABILITY

Earnings per share (EPS)	$\frac{\text{Net profit available to equity shareholders}}{\text{number of equity shares outstanding}}$	EPS measures the overall profit generated for each share in existence over a particular period.
Dividend per share (DPS)	$\frac{\text{Dividend paid to equity shareholders}}{\text{number of equity shares outstanding}}$	Proportion of profit distributed per equity share.
Dividend payout ratio (DP Ratio)	$\frac{\text{Dividend per equity share}}{\text{earning per share (EPS)}}$	It shows % of EPS paid as dividend and retained earnings.


Types of Profitability Ratios Related To Owner's Profitability
P/E Ratio
Dividend Yield
Earning Yield
MV/BV of Share
Q Ratio

PROFITABILITY RATIOS RELATED TO MARKET/ VALUATION/ INVESTORS		
Price-earnings per share (P/E Ratio)	$\frac{\text{Market price per share (MPS)}}{\text{earning per share (EPS)}}$	At any time, the P/E ratio is an indication of how highly the market "rates" or "values" a business. A P/E ratio is best viewed in the context of a sector or market average to get a feel for relative value and stock market pricing.
Dividend yield	$\frac{\text{Dividend +or- change in share price}}{\text{initial share price}} \times 100$ Or $\frac{\text{Dividend per share (DPS)}}{\text{market price per share (MPS)}} \times 100$	It measures dividend paid based on market price of shares.
Earnings yield	$\frac{\text{Earnings per share (EPS)}}{\text{market price per share (MPS)}} \times 100$	It is the relationship of earning per share and market value of shares.
Market value/ book value per share	$\frac{\text{Market value per share}}{\text{book value per share}}$	It indicates market response of the shareholder's investment
Q ratio	$\frac{\text{Market value of equity and liabilities}}{\text{estimated replacement cost of assets}}$	It measures market value of equity as well as debt in comparison to all assets at their replacement cost.

ILLUSTRATION

Following information has been provided from the books of Laxmi Pvt. Ltd. for the year ending on 31st March, 2021:

Net Working Capital	₹ 4,80,000
Bank overdraft	₹ 80,000
Fixed Assets to Proprietary ratio	0.75
Reserves and Surplus	₹ 3,20,000
Current ratio	2.5
Liquid ratio (Quick Ratio)	1.5

You are required to PREPARE a summarised Balance Sheet as at 31st March, 2021 assuming that there is no long term debt.

Balance Sheet

LIABILITIES	AMOUNT	ASSETS	AMOUNT
Shareholders funds 1600000		Fixed Assets	1440000
Equity share Capital			
Reserves & surplus 320000	1920000		
Current Liabilities		Current Assets	
Bank OD 80000		Inventory 320000	
Other CL 240000	320000	Other CA 480000	800000
	2240000		2240000

Working :

1] Working Capital = 480 000

∴ WC = CA - CL

480 000 = CA - CL

The current ratio of 2.5 indicates 2.5 of CA for Rs. 1 CL

∴ Let the CL be x

WC = 2.5x - x

480 00 = 1.5 x

∴ x = 320 000

∴ CL = 320 000, CA = 320 00 × 2.5 = 800 000

2] Liquid ratio = $\frac{CA - Inventory}{CL}$

$1.5 = \frac{800000 - Inventory}{320000}$

$480000 = 800000 - Inventory$

$\therefore$ Inventory = 320000

3] Fixed Assets Proprietary ratio :

$$0.75 = \frac{\text{Fixed Assets}}{\text{Proprietary fund}}$$

$\therefore$ Fixed Assets = 0.75 Proprietor fund.

4) Total Liabilities = Total Assets.

Proprietory funds + Current Liabilities = fixed Assets + Current Assets

Let the Prop. fund be x

$$x + 320000 = 0.75x + 800000$$

$$0.25x = 480000$$

$$\therefore x = 1920000$$

$\therefore$ Proprietory funds = 1920000

5) Proprietary funds = Equity share capital + Reserves & Surplus.

1920000 = Equity share capital + 320000

∴ Equity share capital = 1920000 - 320000

= 1600000

ILLUSTRATION PYQ MAY 23 (10 MARKS)

Following information and ratios are given in respect of AQUA Ltd. for the year ended 31st March, 2023:

Current ratio	4.0
Acid test ratio	2.5
Inventory turnover ratio (based on sales)	6
Average collection period (days)	70
Earnings per share	₹ 3.5
Current liabilities	₹ 3,10,000
Total assets turnover ratio (based on sales)	0.96
Cash ratio	0.43
Proprietary ratio	0.48
Total equity dividend	₹ 1,75,000
Equity dividend coverage ratio	1.60

Assume 360 days in a year.

You are required to complete Balance Sheet as on 31st March, 2023.

Balance Sheet as on 31st March, 2023.

Liabilities	₹	*Assets*	₹
Equity share capital (₹10 per share)	*XXX*	*Fixed assets*	*XXX*
Reserves & surplus	*XXX*	*Inventory*	*XXX*
Long-term debt	*XXX*	*Debtors*	*XXX*
Current liabilities	*3,10,000*	*Loans & advances*	*XXX*
		Cash & bank	*XXX*
Total	*XXX*	*Total*	*XXX*

Solution

Balance Sheet as on 31st March 2023

Liabilities	₹	Assets	₹
Equity Share Capital (₹ 10 per share)	8,00,000	Fixed Assets	16,66,250
Reserves & Surplus	5,95,000	Inventory	4,65,000
Long-term debt *(B/F)	12,01,250	Receivables	5,42,500
Current Liabilities	3,10,000	Loans & Advances	99,200
		Cash & Bank	1,33,300
Total	**29,06,250**	**Total**	**29,06,250**

(i) Current Ratio = 4

$$\frac{\text{Current Assets}}{\text{Current Liabilities}} = 4$$

$$\therefore \quad \frac{\text{Current Assets}}{3,10,000} = 4$$

$\therefore$ Current Assets = ₹ 12,40,000

(ii) Acid Test Ratio = 2.5

$$\frac{\text{Current Assets - Inventory}}{\text{Current Liabilities}} = 2.5$$

$$\therefore \quad \frac{12,40,000 - \text{Inventory}}{3,10,000} = 2.5$$

$\therefore$ 12,40,000 – Inventory = ₹ 7,75,000

Inventory = ₹ 4,65,000

(iii) Inventory Turnover Ratio (on Sales) = 6

$$\frac{\text{Sales}}{\text{Inventory}} = 6$$

$$\frac{\text{Sales}}{4,65,000} = 6$$

∴ Sales = ₹ 27,90,000

(iv) Debtors Collection Period = 70 days

∴ (Debtors / sales) x 360 = 70

∴ (Debtors / 27,90,000) x 360 = 70

Debtors = ₹ 5,42,500

(v) Total Assets Turnover Ratio (on Sales) = 0.96

$$\therefore \frac{\text{Sales}}{\text{Total Assets}} = 0.96$$

$$\therefore \frac{27,90,000}{\text{Total Assets}} = 0.96$$

Total Assets = ₹ 29,06,250

(vi) Fixed Assets (FA) = Total Assets – Current Assets

= 29,06,250 – 12,40,000

Fixed Assets = ₹ 16,66,250

(vii) $\text{Cash Ratio} = \frac{\text{Cash}}{\text{Current Liabilities}} = 0.43$

$\therefore \frac{\text{Cash}}{3,10,000} = 0.43$

$\therefore$ Cash = ₹ 1,33,300

(viii) $\text{Proprietary Ratio} = \frac{\text{Proprietary Fund}}{\text{Total Assets}} = 0.48$

$\therefore \frac{\text{Proprietary Fund}}{29,06,250} = 0.48$

$\therefore$ Proprietary Fund = ₹ 13,95,000

(ix) Equity Dividend Coverage Ratio = 1.6

$$\text{or } \frac{EPS}{DPS} = \frac{3.5}{DPS}$$

$\therefore$ DPS = ₹ 2.1875

$$DPS = \frac{\text{Total Dividend}}{\text{Number of Equity Shares}}$$

$$\therefore 2.1875 = \frac{1,75,000}{\text{Number of Equity Shares}}$$

$\therefore$ Number of Equity Shares = 80,000

$\therefore$ Equity Share Capital = 80,000 x 10 = ₹ 8,00,000

$\therefore$ Reserves &Surplus = 13,95,000 - 8,00,000 = ₹ 5,95,000

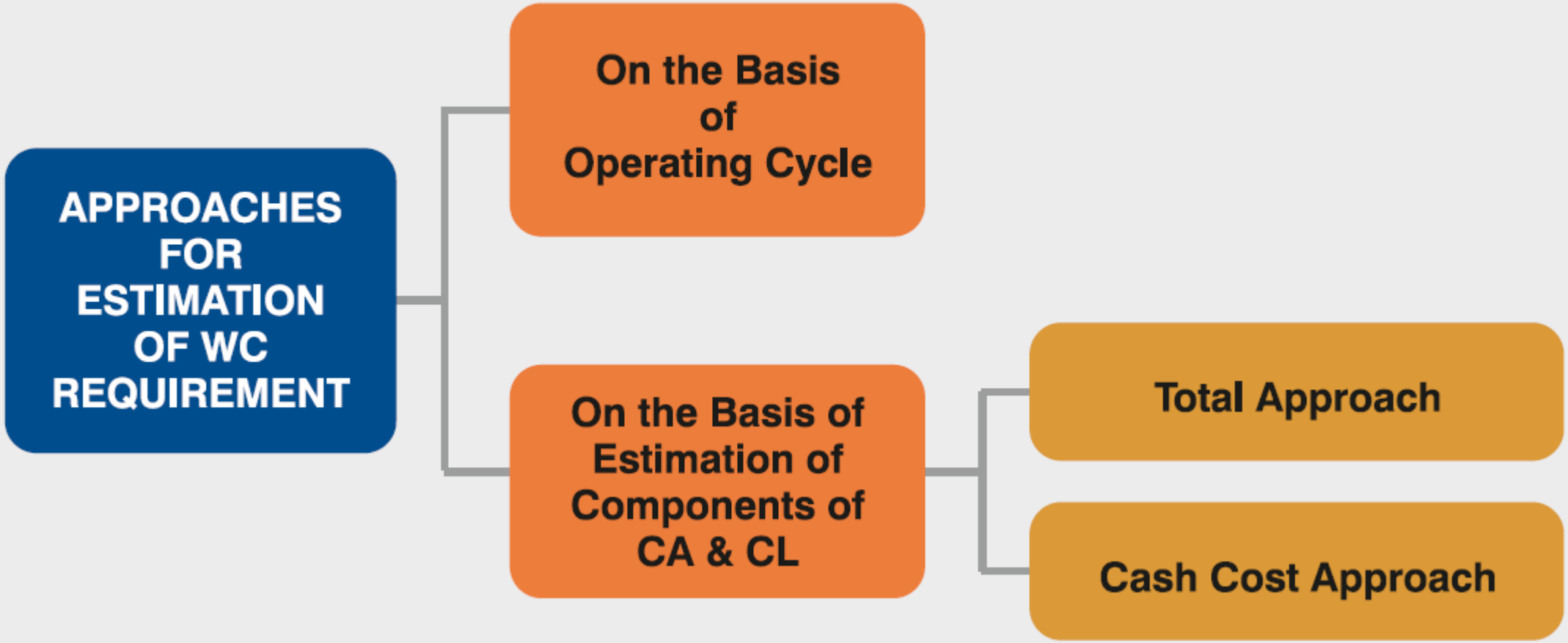
(x) Loans and Advances = Current Assets - (Inventory + Receivables + Cash & Bank)

= ₹ 12,40,000 - (₹ 4,65,000 + 5,42,500 + 1,33,300) = ₹ 99,200

thank you!

ESTIMATION & FINANCING OF WORKING CAPITAL

APPROACHES FOR ESTIMATION OF WC



COMPUTATION OF OPERATING CYCLE

OPERATING CYCLE = R+W+F+D-C

Where,
R = Raw Material Storage Period

W = Work in Progress Holding Period

F = Finished Goods Storage Period

D = Receivables (Debtors) Collection Period

C = Credit Period Allowed by Suppliers

COMPUTATION OF COMPONENTS OF WC CYCLE

Components	Formula
Raw Materials Storage Period	$\frac{Average\ Stock\ Raw\ Materials}{Average\ Cost\ of\ RM\ Consumed\ per\ day}$
WIP Holding Period	$\frac{Average\ \text{WIP Inventory}}{Average\ Cost\ of\ Production\ Per\ Day}$
Finished Goods Storage Period	$\frac{Average\ \text{Stock}\ of\ Finished\ Goods}{Average\ Cost\ of\ Goods\ sold\ per\ day}$
Receivables Collection Period	$\frac{Average\ Accounts\ Receivables}{Average\ Credit\ Sale\ per\ day}$
Creditors Payment Period	$\frac{Average\ Accounts\ Payble}{Average\ Credit\ Purchase\ per\ day}$

ILLUSTRATION (PYP JAN 2021) 5 MARKS

The following information is provided by MNP Ltd. for the year ending 31st March, 2020:

Raw Material Storage period	*45 days*
Work-in-Progress conversion period	*20 days*
Finished Goods storage period	*25 days*
Debt Collection period	*30 days*
Creditors payment period	*60 days*
Annual Operating Cost	*₹ 25,00,000*
(Including Depreciation of ₹ 2,50,000)	

Assume 360 days in a year.

You are required to calculate:

(i) Operating Cycle period

(ii) Number of Operating Cycle in a year.

(iii) Amount of working capital required for the company on a cost basis.

(iv) The company is a market leader in its product and it has no competitor in the market. Based on a market survey it is planning to discontinue sales on credit and deliver products based on pre-payments in order to reduce its working capital requirement substantially. You are required to compute the reduction in working capital requirement in such a scenario.

(i) Calculation of Operating Cycle Period:

Operating Cycle Period = R + W + F + D – C

= 45 + 20 + 25 + 30 – 60 = **60 days**

(ii) Number of Operating Cycle in a Year

$$= \frac{360}{\text{Operating cycle period}} = \frac{360}{60} = \mathbf{6}$$

(iii) Amount of Working Capital Required

$$= \frac{\text{Annual operating cost}}{\text{Number of operating cycl}} = \frac{₹\,25,00,000 - ₹\,2,50,000}{6}$$

$$= \frac{₹\,22,50,000}{6} = \mathbf{₹\ 3,75,000}$$

(iv) Reduction in Working Capital

Operating Cycle Period = R + W + F – C

= 45 + 20 + 25 – 60 = **30 days**

Amount of Working Capital Required = $\frac{₹\ 22,50,000}{360}$ x 30 = ₹ 1,87,500

Reduction in Working Capital = ₹ 3,75,000 – ₹ 1,87,500 = **₹ 1,87,500**

DETERMINATION OF EACH COMPONENT OF CA AND CL

Component	Total Approach	Cash Cost Approach
Raw Materials	Purchase price net of discount	Purchase price net of discount
Work in Progress	Raw Materials + 50% of (Direct Labour + Direct Expenses + All production overheads)	Raw Materials + 50% of (Direct Labour + Direct Expenses + Production Overheads excluding depreciation)
Finished Goods	Cost production	Cost of production Less Depreciation
Sundry Debtors	Cost of Sales	Cost of Sales Less Depreciation
Sundry Creditors	Purchase price net of discounts	Purchase price net of discounts.

Note – In The Absense of Information , It is Advisable To Solve The Question by Cash Cost Approach

STATEMENT SHOWING ESTIMATION OF WC

Sr. No.	Particulars	Calculation	Amount (RS)
A	**Current Assets**		
(I)	Raw Material		
(ii)	Work –in – process		
(iii)	Finished goods		
(iv)	Trade Receivables/Debtors		
(v)	Prepaid Expenses		
(vi)	Minimum Cash Balance		
	Total (A)		—
B	**Current Liabilities**		
(I)	Trade payables/Creditors		
(ii)	Wages payables		
(iii)	Overheads payable		
	Total (B)		—
C	**Excess of current Assets over Current Liabilities (A-B)**		—
D	Safety Margin		—
E	**Net working capital (C+D)**		—

RAW MATERIAL STOCK HOLDING VALUATION

Sentence

Material in hand is of 2 Months consumption.

Interpretation

On an average material required to be consumed for 2 months is in Stock at any given point of time during year.

$$\textbf{Raw Material Stock} = \frac{\textit{Annual Consumption}}{\textit{12 months}} \times \textit{2 months}$$

Important points

- Raw material is consumed in producing finished goods and it is to be calculated by preparing cost sheet or following formula –

  RM Consumed = Opening Stock + Purchase – Closing stock

- In The Absence of Information , Opening Stock of raw Material & Closing Stock of Raw Material is Assumed to be Same.

WIP HOLDING VALUATION

Sentence

Production time is 1-month or material remains in process on an average for 1 month.

Raw Material	$= \frac{\text{Annual cost of production}}{\text{12 months}} \times 1 \text{ Month}$	XXX
Wages	$= \frac{\text{Annual wages}}{\text{12 months}} \times 1 \text{ Month} \times 50\%$	XXX
Overheads	$= \frac{\text{Annual Overheads}}{\text{12 months}} \times 1 \text{ Month} \times 50\%$	XXX
	Total	XXX

Important points

- In above calculation wages and overheads are multiplied by 50% assuming material is charged in initial stage and wages and overheads accrue evenly.
- In case problem gives degree of completion for WIP then taken multiply by that % to raw material, wages as well overheads.
- In The Absence of Information , Opening Stock of WIP & Closing Stock of WIP is Assumed to be Same.

RECEIVABLES/DEBTORS VALUATION

Sentence

Credit period given to customer is 6 weeks

Interpretation

On an average at any point of time during the year sale of 6 weeks remains outstanding as of sundry Debtors

Debtors	$\frac{\textit{Annual Cost of Sales}}{\textit{52 weeks}} \times \textit{6 weeks}$

Assumption: it is assumed that sales take place evenly throughout the year.

Important points	• Sundry debtors are to be valued at Cost of Sales. If Cost of Sales is Not Available It May be valued at Sales. • Under Cash cost approach debtors have to be valued at cost of sales (Excluding Depreciation) Compulsorily.

PREPAID EXPENSES VALUATION

Sentence

Expenses are paid quarterly in advance

Interpretation

Expenditures of April is paid in Jan. Expenses of May is paid in Feb. This means expenses of 3 months are paid in advance

Prepaid Expenses $\dfrac{\textit{Annual expenses}}{\textit{12 months}} \times 3 \text{ months}$

CREDITORS VALUATION

Sentence

Supplier gives 2-months credit.

Interpretation

Amount of creditors, will be equal to purchases of 2 months.

Creditors	$\frac{\textit{Annual cost of production}}{12} \times \textit{2 months}$
Important points	• If opening and closing stock is same then consumption and purchases are same. • For new company opening stock of RM is zero and hence we have to calculate purchase separately using consumption formula.

OUTSTANDING WAGES VALUATION

Sentence

Lag in payment of wages is 30 days

OR

Wages are on arrears (outstanding) for month.

Interpretation

Wages of jan.1 are paid after 30 days. i.e., jan 30 wages of Jan. 2 are paid of Feb. 2 wages of Jan. 10 are paid after 30 days. i.e. 10 Feb. This means wages of 30 days are outstanding at any points of time.

Outstanding wages $\dfrac{\textit{Annual wages}}{\textit{360 days}} \times \textit{30 days}$

ILLUSTRATION (PYP MAY 2019) 10 MARKS

Bita Limited manufactures used in the steel industry. The following information regarding the company is given for your consideration:

(i) Expected level of production 9000 units per annum.

(ii) Raw materials are expected to remain in store for an average of two months before issue to production.

(iii) Work-in-progress (50 percent complete as to conversion cost) will approximate to 1/2 month's production.

(iv) Finished goods remain in warehouse on an average for one month.

(v) Credit allowed by suppliers is one month.·

(vi) Two month's credit is normally allowed to debtors.

(vii) A minimum cash balance of ₹67,500 is expected to be maintained.

(viii) Cash sales are 75 percent less than the credit sales.

(ix) Safety margin of 20 percent to cover unforeseen contingencies.

(x) The production pattern is assumed to be even during the year.

(xi) The cost structure for Bita Limited's product is as follows:

	₹
Raw Materials	80 per unit
Direct Labour	20 per unit
Overheads (including depreciation ₹20)	80 per unit
Total Cost	180 per unit
Profit	20 per unit
Selling Price	200 per unit

You are required to estimate the working capital requirement of Bita limited.

Statement Showing Computation of WC

Sr.No	Particulars	Calculation	Amount
A	**Current Assets**		
I	Raw Material	720000/12*2	120000
II	WIP	1080000/12*0.50	45000
III	Finished Goods	1440000/12*1	120000
IV	Debtors	1152000/12*2	192000
V	Cash		67500
	Total (A)		**544500**
B	**Current Liabilities**		
I	Creditors	720000/12*1	60000
	Total (B)		**60000**

C	Working Capital Required		484500
	(A-B)		
D	Add – Safety Margin 20%		96900
E	Net WC Required (C+D)		581400

Note – In The Absence of Information WIP , FG & Debtors are Valued on Cash Cost Basis

INNI - Ascertainment of Cash Cost of Debtors.

Total Sales = Cash sales + Credit Sales.

Let the credit sales be x

$$9000 \times 160 = 0.25x + x$$

$$144000 = 1.25x$$

$$x = 115200$$

IMPACT OF DOUBLE SHIFT WORKING ON WC

Item	Effect on Quantity	Effect on Rate
Raw Materials	Stock requirements may double since consumption per day will be twice as earlier.	Due to bulk purchasing, the Firm may be able to avail quantity discounts. Hence, average cost per unit of Raw Material may be reduced.
Work-in-Progress	There will be no change in the quantity of WIP, since work commenced in the first shift will be completed in the second shift. Hence, at the end of any day, the quantity of WIP will remain the same as it was in single shift working.	Due to reduction in Raw Material cost and economies of fixed costs, the average cost per unit of WIP may be reduced.
Finished Goods	Due to greater production, Finished Goods Stocks may **double** in quantity.	Cost of production per unit will be **reduced**, due to lower cost of materials and economies of fixed costs per unit.

Sundry Debtors	Increase in demand and increased sales will lead to **higher amount of** Debtors, for the same credit period. In case of reduction in credit period, the increase may not be proportional or double.	Selling Price per unit may be **reduced** on account of price elasticity of demand. Additional quantities could be sold only by reducing the price.
Sundry Creditors	Raw Materials purchase quantity and Creditors bill quantity may double, subject to credit period remaining constant. In case of extended credit periods, Creditors may increase more than proportionately or double.	Due to bulk purchasing and better bargaining power, the Firm may obtain discounts. Hence, amount payable per unit of purchase stands **reduced.**

Note - Generally, the quantity of all items except WIP may be doubled, unless other indications are available in the question.

ILLUSTRATION

Samreen Enterprises has been operating its manufacturing facilities till 31.3.2021 on a single shift working with the following cost structure:

	Per unit (₹)
Cost of Materials	6.00
Wages (out of which 40% fixed)	5.00
Overheads (out of which 80% fixed)	5.00
Profit	2.00
Selling Price	18.00
Sales during 2020-21 – ₹ 4,32,000	

As at 31.3.2021 the company held:

	(₹)
Stock of raw materials (at cost)	36,000
Work-in-progress (valued at prime cost)	22,000
Finished goods (valued at total cost)	72,000
Sundry debtors	1,08,000

In view of increased market demand, it is proposed to double production by working an extra shift. It is expected that a 10% discount will be available from suppliers of raw materials in view of increased volume of business. Selling price will remain the same. The credit period allowed to customers will remain unaltered. Credit availed of from suppliers will continue to remain at the present level i.e., 2 months. Lag in payment of wages and expenses will continue to remain half a month.

You are required to PREPARE the additional working capital requirements, if the policy to increase output is implemented.

STATEMENT SHOWING REQUIREMENT OF WC UNDER SINGLE SHIFT AND DOUBLE SHIFT

SR.NO	PARTICULARS	SINGLE SHIFT			DOUBLE SHIFT		
		UNIT	PER UNIT	TOTAL	UNIT	PER UNIT	TOTAL
A	CURRENT ASSETS						
1	RAW MATERIAL	*6000	6	36000	12000	5.4	64800
2	WIP	*2000	11	22000	2000	9.4	18800
3	FINISHED GOODS	*4500	16	72000	9000	12.4	111600
4	DEBTORS	6000	16	* 96000	12000	12.4	148800
	TOTAL (A)			226000			344000

STATEMENT SHOWING REQUIREMENT OF WC UNDER SINGLE SHIFT AND DOUBLE SHIFT

SR.NO	PARTICULARS	SINGLE SHIFT	DOUBLE SHIFT
B	CURRENT LIABILITIES		
1	CREDITORS	24000 (144000/12*2)	43200 (259200/12*2)
2	WAGES	5000 (120000/12*0.50)	8000 (192000/12*0.50)
3	OVERHEADS	5000 (120000/12*0.50)	6000 (144000/12*0.50)
	TOTAL (B)	34000	57200
C	NET WORKING CAPITAL	192000	286800

INCREASE IN WC = 286800-192000 = 94800

WN -1 COST SHEET OF COMPANY					
SR.NO	PARTICULARS	24000 UNITS		48000 UNITS	
		PER UNIT	TOTAL	PER UNIT	TOTAL
A	RAW MATERIAL	6	144000	5.4	259200
B	WAGES				
	FIXED	2	48000	*1	48000
	VARIABLE	3	72000	3	144000
C	PRIME COST (A+B)	11	264000	9.4	451200
D	OVERHEADS				
	FIXED	4	96000	*2	96000
	VARIABLE	1	24000	1	48000
E	COST OF PRODUCTION (C+D)	16	384000	12.4	595200
F	PROFIT	*2	*48000	*5.60	*268800
G	SALES	18	432000	18	864000

MAXIMUM PERMISSIBLE BANK FINANCE (MPBF)

Tondon Committee Norms

I. The borrower has to contribute a minimum of 25% of working capital gap from long term funds.

MPBF = 75% of [current assets less current liabilities] i.e. 75% of Net Working Capital

II. The borrower has to contribute a minimum of 25% of the total current assets from long term funds.

MPBF = 75% of current assets Less current liabilities

III. The borrower has to contribute the entire hard core current assets and a minimum of 25% of the balance of the current assets from long term funds.

MPBF = 75% Of (Total Current Assets – Core Current Assets) less current liabilities

Core current assets is permanent component of current assets which is required throughout the year for a company to run continuously and to stay viable. The term ' core current assets' was framed by Tondon committee while explaining the amount of stock a company can hold in its current assets. Generally, such assets are financed by long term funds. Sometimes core current assets are also referred to as "Hardcore Working Capital."

ILLUSTRATION

Balance sheet of X Ltd for the year ended 31st March,2022 is given below:

Liabilities	**Amount**	**Assets**	**Amount**
Equity Shares ₹10 each	200	Fixed Assets	500
Retained earnings	200	Raw materials	150
11% Debentures	300	W.I.P	100
Public deposits (Short-Term)	100	Finished goods	50
Trade Creditors	80	Debtors	125
Bills Payable	100	Cash/Bank	55
	980		**980**

Calculate the amount of maximum permissible bank finance under three methods as per Tandon Committee lending norms.

The total core current assets are assumed to be ₹30 lakhs.

Method I

Maximum Permissible Bank Finance = 75% of (Current Assets – Current Liabilities)

= 75% of (480 - 280)

= **₹ 150 Lakhs**

Method II

Maximum Permissible Bank Finance = 75% of Current Assets – Current Liabilities

= 75 % of 480 – 280

= **₹ 80 Lakhs**

Method III

Maximum Permissible Bank Finance = 75% of (Current Assets – Core Current Assets) – Current Liabilities

= 75 % of (480 - 30) – 280

= **₹ 57.5 Lakhs**

MANAGEMENT OF RECIEVABLES

IMPORTANT FORMULAS
CALCULATION OF OPPORTUNITY COST

Formula	$\text{Opportunity cost} = \frac{\text{Annual Investment}}{12} \times \text{credit period} \times \text{Rate of opportunity cost}$
Term Used	Annual Investment = Annual variable cost + Annual Fixed cost that is Cost of Sales
Important Points	Opportunity cost is to be Calculated on Total Cost (Variable Cost + Fixed Cost) or Variable Cost or Sales Whatever option you choose write a note in examination.

DEBTORS TURNOVER RATIO

Formula	$\text{DTR} = \frac{\text{Net Credit Sales}}{\text{Average Account Receivable}}$
Term Used	Average Account Receivable = Average Debtors + Average Bills Receivable
Important Points	• DTR indicates Number of times credit sales is as compared to Average Account Receivable. • Using DTR we can calculate Average Collection Period (ACP) • Average collection period $= \frac{\text{360 days/ 12 months/52 weeks}}{\text{Debtors Turnover Ratio}}$ • Higher the DTR lower the ACP

ILLUSTRATION

A trader whose current sales are in the region of ₹6 lakhs per annum and an average collection period of 30 days wants to pursue a more liberal policy to improve sales. A study made by a management consultant reveals the following information:-

Credit Policy	Increase in collection period	Increase in sales	Present default anticipated
A	10 days	₹30,000	1.5%
B	20 days	₹48,000	2%
C	30 days	₹75,000	3%
D	45 days	₹90,000	4%

The selling price per unit is ₹3. Average cost per unit is ₹2.25 and variable costs per unit are ₹ 2. The current bad debt loss is 1%. Required return on additional investment is 20%. Assume a 360 days year.

ANALYSE which of the above policies would you recommend for adoption?

Statement Showing Evaluation of present & Proposed credit Policy (Total Approach)

Sr.No	Particulars	Present Policy	Policy A	Policy B	Policy C	Policy D
A	Credit period (Days)	30	40	50	60	75
B	Sales	600000	630000	648000	675000	690000
C	Selling Price Per Unit	3	3	3	3	3
D	No. of Units Sold (B/C)	200000	210000	216000	225000	230000
E	Variable Cost (D*2)	400000	420000	432000	450000	460000
F	Fixed Cost 200000*(2.25 - 2)	50000	50000	50000	50000	50000
G	Total Cost (E+F)	450000	470000	482000	500000	510000
H	Profit (B-G)	150000	160000	166000	175000	180000
I	Opportunity Cost at 20% (G/360*A)*20%	7500	10444	13389	16667	21250
J	Bad Debts	6000	9450	12960	20250	27600

FINANCING OF RECEIVABLES

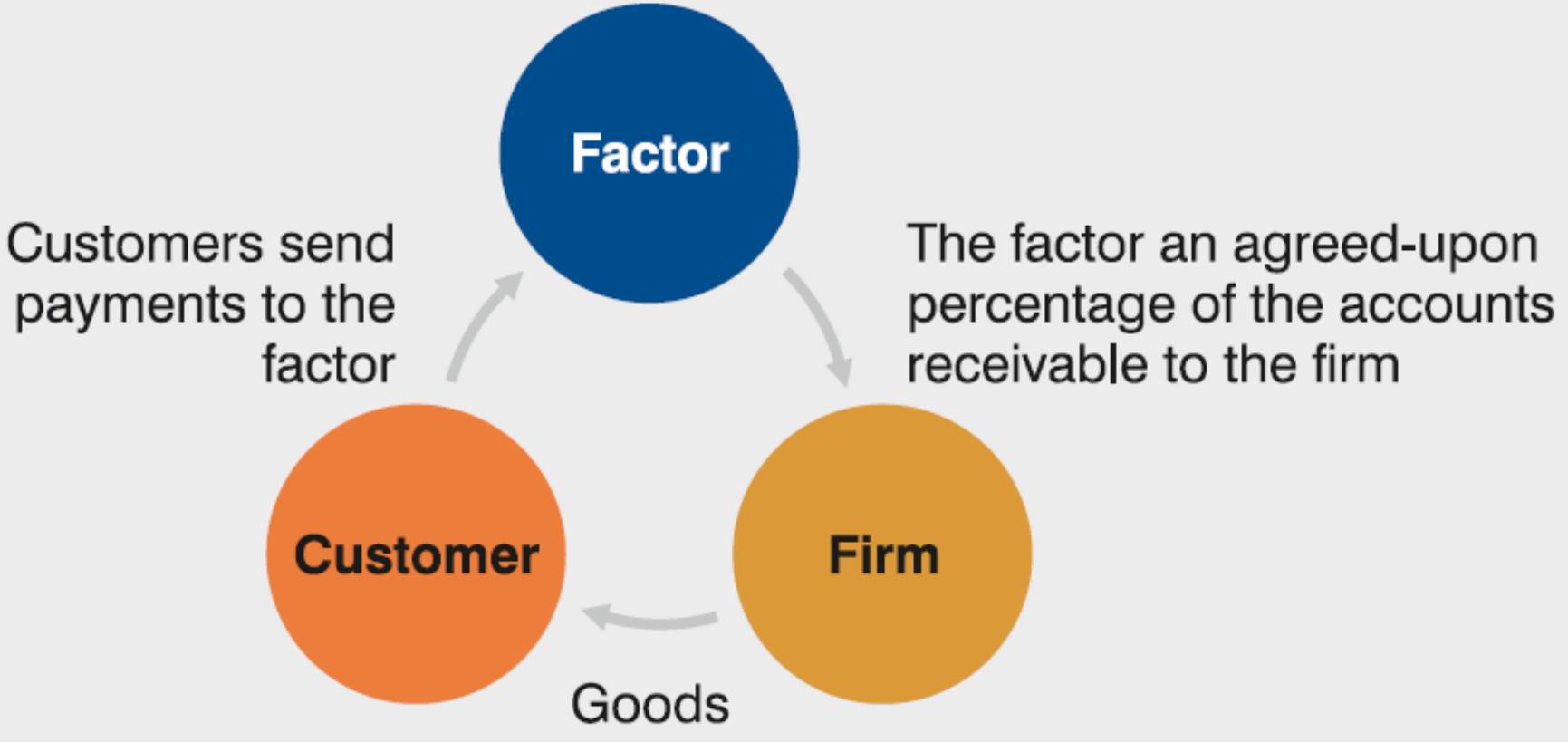
- Pledging
- Factoring
- Fortaiting

PLEDGING

This refers to the use of firm's receivable to secure a short-term loan. After cash, a firm's receivables can be termed as its most liquid assets and this serve as prime collateral for a secure loan. The lender scrutinizes the quality of the account receivables, selects acceptable accounts, creates a lien on the collateral and fixes the percentage of financing receivables which ranges around 50 to 90%. The major advantage of pledging accounts receivables is the ease and flexibility it provides to the borrow. Moreover, financing is done regularly. This, however, suffers on account of high cost of financing. Also being a loan, it leaves an impact on the debt equity ratio as well by increasing the amount of debt.

FACTORING

Factoring is a relatively new concept in financing of accounts receivables. This refers to outright sale of accounts receivables to a factor or a financial agency. A factor is a firm that acquires the receivables of other firms. The factoring lays down the conditions of the sale in a factoring agreement. The factoring agency bears the risk of collection and services the account for a fee.



TYPES OF FACTORING

Recourse: In cash factor is unable to collect the amount from receivables then, factors can turn back the same to the organization for resolution (which generally is by replacing those receivables with new receivables).

Non- Recourse: The factor bears the ultimate risk of loss in case of default and hence in such cases they charge higher commission.

ILLUSTRATION

A Factoring firm has credit sales of ₹ 360 lakhs and its average collection period is 30 days. The financial controller estimates, bad debt losses are around 2% of credit sales. The firm spends ₹ 1,40,000 annually on debtors administration. This cost comprises of telephonic and fax bills along with salaries of staff members. These are the avoidable costs. A Factoring firm has offered to buy the firm's receivables. The factor will charge 1% commission and will pay an advance against receivables on an interest @15% p.a. after withholding 10% as reserve. ANALYSE what should the firm do?

Assume 360 days in a year.

Statement Showing Amount To Be Advanced By Factor

Sr.No	Particulars	Amount
A	Gross Amount of Receivables (360 Lakhs/360 Days *30)	3000000
B	Factoring Commission (A*1%)	30000
C	10% of Reserve (A*10%)	300000
D	Amount of Advance to Be Given By Factoring Agency (A-B-C)	2670000
E	Interest Payable to factor (2670000*15%/360*30)	33375
F	Net Amount Advanced By Factor (D-E)	2636625

Statement Showing Evaluation of Proposed Factoring Arrangement

Sr. No	Particulars	Amount
A	**Cost of Factoring**	
i)	Factoring Commission (30000*12 Months)	360000
ii)	Interest Cost (33375*12 Months)	400500
	Total (A)	**760500**
B	**Benefits of Factoring**	
i)	Saving in Bad Debts (360 Lakhs *2%)	720000
ii)	Saving in Administration Cost	140000
	Total (B)	**860000**
C	Net Benefit (B-A)	**99500**

Note – In The Absence of Relevant Information , Opportunity Cost on Reserves With Factoring Agency is Ignored.

Conclusion – As The Net Benefit is 99500 on Entering the Factoring Agreement , It is Suggested to Go For Factoring.

FORFAITING

'Forfait' is a French term which means "relinquish a right: Forfeiting is an arrangement of bill discounting in which a financial institution or bank buys the trade bills (invoices) or trade receivables from exporters of goods or services, where the exporter relinquish his right to receive payment from importer. Financial institution or banks provides immediate finance to exporter 'without recourse' basis in which risk and rewards related with the bill/receivables transferred to the financial institution /banks. It is a unique credit facility arrangement where an overseas buyer (importer) can open a "letter of credit" (or other negotiable instruments) in favors of the exporter and can import goods and services on deferred payment terms.

FUNCTIONS OF FORFAITING

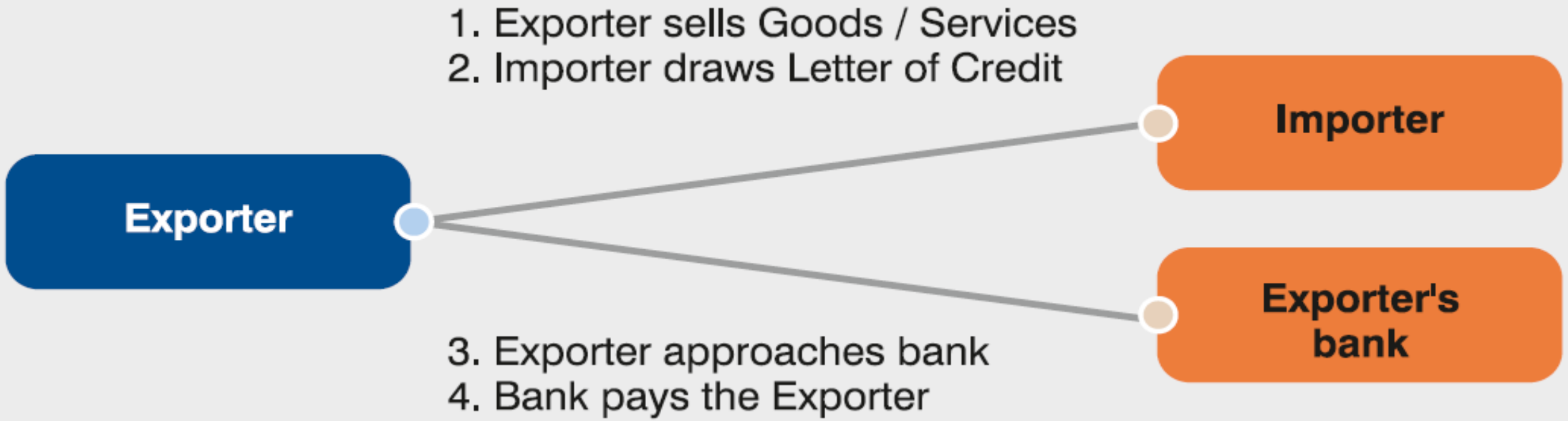
The functionality can be understood in the following manner:

i. Exporter sells goods or services to an overseas buyer.

ii. The overseas buyers i.e., the importer on the basis trade bill and import documents draws a letter of credit (or other negotiable instruments) through its bank (known as importer's bank).

iii. The exporter on receiving the letter of credit (or other negotiable instrument) approaches to its banks (known as exporter's bank).

iv. The exporter's bank buys the letter of credit (or other negotiable instruments) Without recourse Basis' and provides the exporter the payment for the bill.



FEATURES OF FORFAITING

- It motivates exporters to explore new geographies as payment is assured.
- An overseas buyer (importer) can import goods and services an deferred payment terms.
- The exporter enjoys reduced transaction costs and complexities of international trade transactions.
- The exporter gets to complete in the international market and can continue to put his working capital to good used to scale up operations.
- While importers avail of forfaiting facility from international financial institutions in order to finance their imports at comparative rates.

MANAGEMENT OF CASH , TREASURY & MARKETABLE SECURITIES

FORMAT OF CASH BUDGET

_____Co. Ltd.

Cash Budget

Period_____

	Month 1	Month 2	Month 3		Month 12
Receipts:					
1. Opening balance					
2. Collection from debtors					
3. Cash sales					
4. Loans from banks					
5. Share capital					

6. Miscellaneous receipts					
7. Other items					
Total					
Payments:					
1. Payments to creditors					
2. Wages					
3. Overheads					
(a)					
(b)					
(c)					
4. Interest					
5. Dividend					

6. Corporate tax					
7. Capital expenditure					
8. Other items					
Total					
Closing balance					
[Surplus (+)/Shortfall (-)]					

ILLUSTRATION (5 MARKS)

A garment trader is preparing cash forecast for first three months of calendar years 2021. His estimated sales for the forecasted periods are as below:

	January (RS. 000)	February (RS. 000)	March (RS. 000)
Total sales	600	600	800

i. The trader sells directly to public against cash payment and to other entities on credit. Credit sales are expected to be four times the value of direct sales to public. He expected 15% customers to pay in the month in which credit sales are made, 25% to pay in the next month and 58% to pay in the next-to-next month. The outstanding balance is expected to be written off.

ii. Purchase of goods are made in the month prior to sales and it amount to 90% of sales and are made on credit. Payment of these occur in the month after the purchase. No inventories of goods are held.

iii. Cash balance as on 1st January, 2021 is RS 50,000.

iv. Actual sales for the last two months of calendar year 2020 are as below.:

	November (RS. 000)	December (RS. 000)
Total sales	640	880

You are required to prepare a monthly cash budget for the three months from January to March,2021.

Cash Budget For Jan To March 21

SR.NO	PARTICULARS	JAN	FEB	MAR
A	RECIEPTS			
1	Collection From Cash Sales	120000	120000	160000
2	Collection From Credit Sales (WN 1)	544960	600320	494400
	Total (A)	664960	720320	654400
B	PAYMENTS			
1	Payment For Purchases	540000	540000	720000
	Total (B)	540000	540000	720000
C	OPENING BALANCE	50000	174960	355280
D	SURPLUS/DEFICIT	124960	180320	(65600)
E	CLOSING BALANCE	174960	355280	289680

WN - 1 Collection of Amount From Debtors

SR.NO	PARTICULARS	NOV	DEC	JAN	FEB	MARCH
A	Total Sales	640000	880000	600000	600000	800000
B	Credit Sales (80% of A)	512000	704000	480000	480000	640000
C	Same Month credit Sales Collection			72000	72000	96000
	(15% of Current Month Sales)					
D	Previous Month credit Sales Collection			176000	120000	120000
	(25% of Previous month's cr Sales)					
E	Previous to previous Month credit Sales Collection			296960	408320	278400
	(58% of Previous to previous month's cr Sales)					
F	Total			544960	600320	494400

WILLIAM J BAUMOL'S EOQ MODEL FOR OPTIMUM CASH BALANCE

Formula

$$C = \sqrt{\frac{2A \times P}{I}}$$

Term Used

- C = optimum cash balance,
- A = Annual (or monthly) cash disbursement
- P = Fixed cost per transaction,
- I = opportunity cost of one rupee p.a. (or p.m.)

Important Points

The model is based on the following assumptions:

- Cash needs of the firm are known with certainty.
- The cash is used uniformly over a period of time and it is also known with certainty.
- The holding cost is known and it is constant.
- The transaction cost also remains constant.

ILLUSTRATION PYQ NOV 22 (5 MARKS)

K Ltd. has a Quarterly cash outflow of ₹ 9,00,000 arising uniformly during the Quarter. The company has an Investment portfolio of Marketable Securities. It plans to meet the demands for cash by periodically selling marketable securities. The marketable securities are generating a return of 12% p.a. Transaction cost of converting investments to cash is ₹ 60. The company uses Baumol model to find out the optimal transaction size for converting marketable securities into cash.

Consider 360 days in a year.

You are required to calculate

(i) Company's average cash balance,

(ii) Number of conversions each year and

(iii) Time interval between two conversions.

(i) Computation of Average Cash balance:

Annual cash outflow (U) = 9,00,000 x 4 = ₹ 36,00,000

Fixed cost per transaction (P) = ₹ 60

Opportunity cost of one rupee p.a. (S) = $\frac{12}{100} = 0.12$

Optimum cash balance (C) = $\sqrt{\frac{2UP}{S}} = \sqrt{\frac{2 \times 36,00,000 \times 60}{0.12}}$ = ₹ 60,000

$\therefore$ Average Cash balance = $\frac{(0 + 60,000)}{2}$ = ₹ 30,000

(ii) Number of conversions p.a.

Annual cash outflow = ₹ 36,00,000

Optimum cash balance = ₹ 60,000

$$\therefore \text{ No. of conversions p.a. } = \frac{36,00,000}{60,000} = 60$$

(iii) Time interval between two conversions

No. of days in a year = 360

No. of conversions p.a. = 60

$\therefore$ Time interval = $\frac{360}{60}$ = 6 days

MANAGEMENT OF PAYABLES

ANNUAL COST OF PAYABLES (WITHOUT COMPOUNDING)

Formula

$$\frac{d}{100-d} \times \frac{365 \text{ days}}{t}$$

Where,
d = Discount per Rs.100
t = Credit period – Max period for availing discount

ANNUAL COST OF PAYABLES (WITH COMPOUNDING)

Formula

$$\left(\frac{100}{100-d}\right)^{\frac{365}{t}} - 1$$

Where,
d = Discount per Rs.100
t = Credit period – Max period for availing discount

ILLUSTRATION

Suppose ABC Ltd. has been offered credit terms from its major supplier of 2/10, net 45. Hence the company has the choice of paying Rs.98 per Rs.100 or to invest Rs.98 for an additional 35 days and eventually pay the supplier Rs.100 per Rs.100. The decision as to whether the discount should be accepted depends on the opportunity cost of investing Rs.98 for 35 days.

a) Calculate Annual Cost of payables (without Compounding)

b) Calculate Annual Cost of payables (with Compounding)

c) Calculate Net Amount of payables Considering Rate of Return of 25% & Invoice Value of Rs. 100000 in Both Situations of accepting Discount & Refusing Discount & Give Your Conclusion Whether to Accept Discount or Refuse the Discount

1] Implied Annual Cost of Payably (without compounding)

$$= \frac{d}{100-d} \times \frac{365}{t}$$

$$= \frac{2}{100-2} \times \frac{365}{45-10}$$

$$= \frac{2}{98} \times \frac{365}{35}$$

$$= 0.2128 \text{ that is } 21.28\%.$$

2] Implied Annual Cost of Payables (with Compounding)

$$= \left(\frac{100}{100-d}\right)^{\frac{365}{t}} - 1$$

$$= \left(\frac{100}{100-2}\right)^{\frac{365}{45-10}} - 1$$

$$= \left(\frac{100}{98}\right)^{365/35} - 1$$

$$= (1.0264)^{10.4286} - 1$$

$$= 1.2344 - 1$$

$$= 0.2344 \text{ that is } 23.44\%$$

3] Evaluation of Discount Policy If Rate of Return is 25%.

Sr. NO	Particulars	Refuse Discount	Accept Discount
A	Invoice Value	100000	100000
B	Payment to Suppliers	100000	98000
C	Return on Investing 98000 for 35 Days.	2350	-

$$\left[\frac{98000 \times 25\% \times 35}{365}\right]$$

D.	Net Cost (B-C)	97650	98000

Conclusion :- Based on above computation, it is advised not to accept Discount offer & pay entire amount on 45th Day. [ROR > Annual cost of Payable]

thank you!