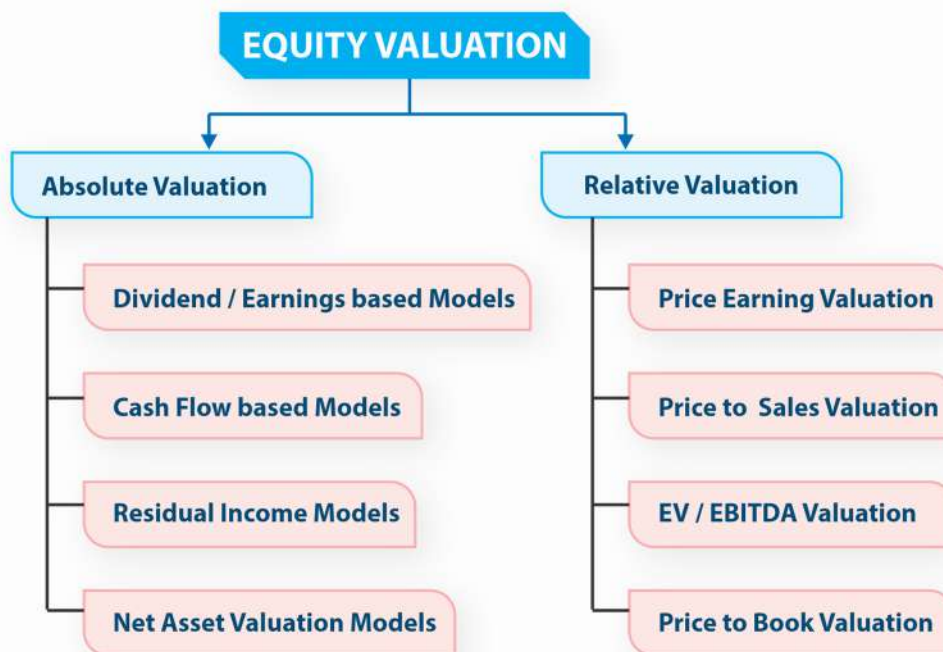


Security Valuation

Study Session 2

LOS 1 : Introduction



LOS 2 : Dividend Decision



Note: Total Earnings mean Earnings available to equity share holders

Income Statement

Sales
 Less: Variable cost
 Contribution
 Less: Fixed cost excluding Dep.
 EBITDA
 Less: Depreciation and Amortization
 EBIT

Less: Interest
EBT
Less: Tax
EAT
Less: Preference Dividend
Earnings Available to Equity Share holders
Less: Equity Dividend
T/F to R&S

LOS 3 : SOME BASIC RATIOS

- ❖ **EPS** $= \frac{\text{Total earning available to equity shareholders}}{\text{Total number of equity shares}}$
- ❖ **DPS** $= \frac{\text{Total dividend paid to equity shareholders}}{\text{Total number of equity shares}}$
- ❖ **MPS** $= \frac{\text{Total Market Value/ Market Capitalization/ Market Cap}}{\text{Total number of equity shares}}$
- ❖ **REPS** $= \frac{\text{Total Retained earnings}}{\text{Total number of equity shares}}$
- OR
- ❖ **REPS** $= \text{EPS} - \text{DPS}$
- ❖ **Dividend Yield** $= \frac{\text{Dividend per share}}{\text{Market price per share}} \times 100$
- ❖ **Dividend pay-out Ratio** $= \frac{\text{Dividend per share}}{\text{Earning per share}} \times 100$
- ❖ **Dividend Rate** $= \frac{\text{Dividend per share}}{\text{Face value per share}} \times 100$
- ❖ **Earning Yield** $= \frac{\text{Earning per share}}{\text{Market Price per share}} \times 100$
- ❖ **P/E Ratio** $= \frac{\text{MPS}}{\text{EPS}}$
- ❖ **Retention Ratio** $= \frac{\text{Retained Earning per share}}{\text{Earning per share}} \times 100$
- OR
- ❖ **Retention Ratio** $= \frac{\text{EPS} - \text{DPS}}{\text{EPS}} \times 100$
- OR
- ❖ **Retention Ratio** $= 1 - \text{Dividend Payout Ratio}$

Note :

Relationship Between DPR & RR:

RR + DPR = 100% or 1

✚ Dividend yield and Earning Yield is always calculated on annual basis.

- Dividend is 1st paid to preference share holder before any declaration of dividend to equity shareholders.
- Dividend is always paid upon FV(Face Value) not on Market Value.

LOS 4 : Define Cash Dividends, Stock Dividend ,Stock Split

Cash Dividends: As the name implies, are payments made to shareholders in cash. They come in 3 forms:

- Regular Dividends:** Occurs when a company pays out a portion of profits on a consistent basis. E.g. Quarterly, Yearly, etc.
- Special Dividends:** They are used when favourable circumstances allow the firm to make a one-time cash payment to shareholders, in addition to any regular dividends. E.g. Cyclical Firms
- Liquidating Dividends:** Occurs when company goes out of business and distributes the proceeds to shareholders.

Stock Dividends (Bonus Shares) :

- Stock Dividend are dividends paid out in new shares of stock rather than cash. In this case, there will be more shares outstanding, but each one will be worth less.
- Stock dividends are commonly expressed as a percentage. A 20% stock dividend means every shareholder gets 20% more stock.

Stock Splits :

- Stock Splits divide each existing share into multiple shares, thus creating more shares. There are now more shares, but the price of each share will drop correspondingly to the number of shares created, so there is no change in the owner's wealth.
- Splits are expressed as a ratio. In a 3-for-1 stock split, each old share is split into three new shares.
- Stock splits are more common today than stock dividends.

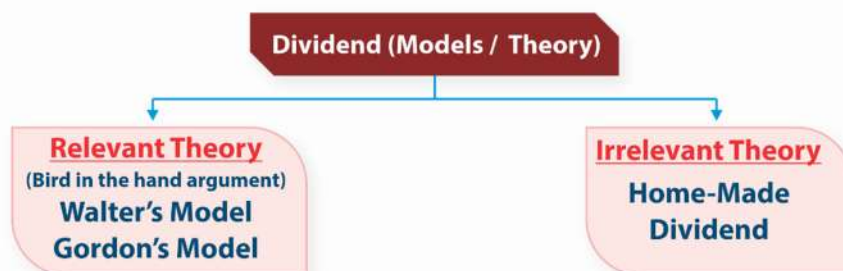
Effects on Financial ratios:

- Paying a cash dividend decreases assets (cash) and shareholders' equity (retained earnings). Other things equal, the decrease in cash will decrease a company's liquidity ratios and increase its debt-to-assets ratio, while the decrease in shareholders' equity will increase its debt-to-equity ratio.
- Stock dividends, stock splits, and reverse stock splits have no effect on a company's leverage ratio or liquidity ratios or company's assets or shareholders' equity.

LOS 5 : Ex – Dividend and Cum – Dividend Price of a share

- If Question is Silent, always Assume Ex- Dividend price of share.
- If cum-dividend price is given, we must deduct dividend from it.
- It may be noted that in all the formula, we consider Ex-Dividend & not Cum-Dividend.

LOS 6 : Valuation Models based on Earnings & Dividends



Walter's Model :

Walter's supports the view that the dividend policy plays an important role in determining the market price of the share.

He emphasis two factors which influence the market price of a share:-

- (i) Dividend Payout Ratio.
- (ii) The relationship between Internal return on Retained earnings (r) and cost of equity capital (K_e)

Walter classified all the firms into three categories:-**a) Growth Firm:**

- ❖ If ($r > K_e$). In this case, the shareholder's would like the company to retain maximum amount i.e. to keep payout ratio quite low.
- ❖ In this case, there is negative correlation between dividend and market price of share.
- ❖ If $r > K_e$, Lower the Dividend Pay-out Ratio Higher the Market Price per Share & vice-versa.

b) Declining Firm:

- ❖ If ($r < K_e$). In this case, the shareholder's won't like the firm to retain the profits so that they can get higher return by investing the dividend received by them.
- ❖ In this case, there is positive correlation between dividend and market price of share.
- ❖ If $r < K_e$, Higher the Dividend Pay-out Ratio, Higher the Market Price per Share & vice-versa.

c) Constant Firm:

- ❖ If rate of return on Retained earnings (r) is equal to the cost of equity capital (K_e) i.e. ($r = K_e$). In this case, the shareholder's would be indifferent about splitting off the earnings between dividend & Retained earnings.
- ❖ If $r = K_e$, Any Retention Ratio or Any Dividend Payout Ratio will not affect Market Price of share. MPS will remain same under any Dividend Payout or Retention Ratio.

Note: Walter concludes:-

- ✚ The optimum payout ratio is NIL in case of growth firm.
- ✚ The optimum payout ratio for declining firm is 100%
- ✚ The payout ratio of constant firm is irrelevant.

Summary: Optimum Dividend as per Walter's

Category of the Firm	r Vs. K_e	Correlation between DPS & MPS	Optimum Payout Ratio	Optimum Retention Ratio
Growth	$r > K_e$	Negative	0 %	100 %
Constant	$r = K_e$	No Correlation	Every payout is Optimum	Every retention is Optimum
Decline	$r < K_e$	Positive	100%	0 %

Valuation of Equity as per Walter's

Current market price of a share is the present value of two cash flow streams:-

- a) Present Value of all dividend.
- b) Present value of all return on retained earnings.

In order to testify the above, Walter has suggested a mathematical valuation model i.e.,

$$P_0 = \frac{DPS}{K_e} + \frac{\frac{r}{K_e} (EPS - DPS)}{K_e}$$

When

P_0	=	Current price of equity share (Ex-dividend price)/ Fair or Theoretical or Intrinsic or Equilibrium or present Value Price per Share
DPS	=	Dividend per share paid by the firm
r	=	Rate of return on investment of the firm / IRR / Return on equity
K_e	=	Cost of equity share capital / Discount rate / expected rate of return/opportunity cost / Capitalization rate
EPS	=	Earnings per share of the firm
EPS – DPS	=	Retained Earning Per Share

Assumptions :

- ✚ DPS & EPS are constant.
- ✚ K_e & r are constant.
- ✚ Going concern assumption, company has infinite life.
- ✚ No external Finance

QUESTION NO. 1B

Following figures are collected from annual report of A Ltd.

Net Profit	₹ 30.00 Lacs
Outstanding 12% Preference Shares	₹ 100.00 Lacs
Number of Equity Shares	3,00,000
Return on Investment	20%
K_e	16%

What should be the approximate dividend payout ratio so as to keep share price at ₹ 42, use Walter Model?

Solution :

Q.1B

PAT = 30 Lakhs
 $r = 20\%$ $K_e = 16\%$ $P_0 = ₹ 42$
DPS = ? DPR = ?

Solⁿ. W.No.1

PAT	30,00,000
(-) Pref. Div.	12,00,000
(12% of 100 Lakhs)	
Earnings for Equity	18,00,000
÷ No. of eq. shares	3,00,000
EPS	6/Share

As per Walter's :-

$$P_0 \Rightarrow \frac{DPS}{K_e} + \frac{r}{K_e} \frac{[EPS - DPS]}{K_e}$$

$$42 = \frac{DPS}{.16} + \frac{.20}{.16} [6 - DPS]$$

$$42 \Rightarrow \frac{DPS + 1.25[6 - DPS]}{.16}$$

$$42 = \frac{DPS + 7.5 - 1.25DPS}{.16}$$

$$6.72 = 7.5 - .25DPS \checkmark$$

$$-0.78 = -0.25DPS$$

$$DPS \Rightarrow \frac{+0.78}{+.25} \Rightarrow \underline{\underline{3.12/\text{share}}}$$

$$DPR \Rightarrow \frac{DPS}{EPS} \times 100$$

$$= \frac{3.12}{6} \times 100 \Rightarrow \underline{\underline{52\%}}$$

The approximate DPR should be 52%, so as to keep share price at ₹ 42/share.

LOS 7 : Gordon's Model/ Growth Model/ Dividend discount Model

- Gordon's Model suggest that the dividend policy is relevant and can effect the value of the share.
- Dividend Policy is relevant as the investor's prefer current dividend as against the future uncertain Capital Gain
- Current Market price of share = PV of future Dividend, growing at a constant rate

$$P_0 = \frac{D_0 (1+g)}{K_e - g_c} \text{ OR } P_0 = \frac{D_1 (\text{next expected dividend})}{K_e - g_c} \text{ OR } P_0 = \frac{EPS_1 (1-b)}{K_e - br}$$

P_0 = Current market price of share.

K_e = Cost of equity capital / Discount rate / expected rate of return / Opportunity cost/ Capitalization rate.

- g = Growth rate
 D_1 = DPS at the end of year / Next expected dividend / Dividend to be paid
 D_0 = Current year dividend / dividend as on today / last paid dividend
 EPS_1 = EPS at the end of the year
 b = Retention Ratio
 $1-b$ = Dividend payout Ratio

Note:

Watch for words like 'Just paid' or 'recently paid', these refers to the last dividend D_0 and words like 'will pay' or 'is expected to pay' refers to D_1 .

Assumptions:

- No external finance is available.
- K_e & r are constant.
- ' g ' is the product of its Retention Ratio ' b ' and its rate of return ' r '

$$g = b \times r \text{ OR } g = RR \times ROE$$

- $K_e > g$
- g & RR are constant.
- Firm has an infinite life

Applications**1. $EPS_1(1-b) = DPS_1$** **Proof :**

$$\begin{aligned}
 EPS_1(1-b) &= EPS_1 \times \text{Dividend payout Rate} \\
 &= EPS_1 \times \frac{DPS_1}{EPS_1} \\
 &= DPS_1
 \end{aligned}$$

We know that $DPR + RR = 1$ or 100%

2. If $EPS = DPS$, $RR = 0$ then $g = 0$

$$P_0 = \frac{D_0(1+g)}{K_e - g}$$

$$P_0 = \frac{D_0}{K_e} \text{ as } g = 0$$

$$P_0 = \frac{EPS}{K_e} \quad (\because EPS = DPS)$$

3. Calculation of P_1 (Price at the end of year 1)

Price at the beginning = PV of Dividend at end + PV of market price at end

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

4. $K_e = \frac{1}{\text{P.E Ratio}}$ **Note:**

The above equation for calculating K_e should only be used when no other method of calculation is available.

QUESTION NO. 2A

A share of T Ltd. is currently quoted at a price-earnings ratio of 7.5 times. The retained earnings per share being 37.5% is ₹ 3 per share. Compute:

- The company's cost of equity if investors expect annual growth rate of 12%

- b) If anticipated growth rate is 13% p.a., calculate indicated market price with same cost of equity.
 c) If the company's cost of Equity is 18% and anticipated growth rate is 15% p.a., calculate the market price per share assuming other conditions remain the same.

Solution :

Q.2A
 P/E Ratio $\Rightarrow 7.5 \text{ times}$
 $RR = 37.5\%$
 $R_{EPS} = 3/\text{Share}$

(a) $K_e = ?$ $g = 12\%$

W-No.1 $RR + D/R = 100\%$
 $37.5\% + ? = 100\%$
 $D/R \Rightarrow 62.5\%$

$RR = \frac{R_{EPS}}{EPS} \times 100$

$37.5\% = \frac{3}{EPS}$

$EPS = \frac{3}{37.5\%} \Rightarrow 8/\text{Share}$

Currently quoted @ P/E = 7.5 times

$\frac{MPS_0}{EPS_0} = 7.5 \text{ times}$

$MPS_0 = 7.5 \times 8 \Rightarrow 60/\text{Share}$

$EPS_0 = 8$ $R_{EPS_0} = 3$ $D/P_0 = 5$
 $(= 8 - 3)$

$M/P_0 = 60/\text{Share}$ $K_e = ?$ $g = 12\%$

As per Gordon's Model:-

(a) $K_e = ?$ $g = 12\%$
 $P_0 = \frac{D_0(1+g)}{K_e - g}$

$$K_e - j_c$$

$$60 \Rightarrow \frac{5(1+12)}{K_e - 12}$$

$$\Rightarrow 60K_e - 7.2 = 5(1+12)$$

$$\Rightarrow 60K_e - 7.2 = 5.60$$

$$\Rightarrow 60K_e \Rightarrow 12.8$$

$$K_e = \frac{12.8}{60}$$

$$K_e \Rightarrow 0.2133 \text{ or } 21.33\%$$

(b) $g = 13\%$ $b_0 = ?$

$$b_0 = \frac{D_0(1+g)}{K_e - j_c}$$

$$\Rightarrow \frac{5(1+13)}{21.33 - 13}$$

$$b_0 \Rightarrow ₹ 67.83 / \text{Share}$$

(c) $K_e = 18\%$ $g = 15\%$ $b_0 = ?$

$$b_0 = \frac{D_0(1+g)}{K_e - j_c}$$

$$\Rightarrow \frac{5(1+15)}{18 - 15} \Rightarrow ₹ 191.67 / \text{Share}$$

QUESTION NO. 2E

With the help of following figures calculate the market price of a share of a company by using
(i) Walter's Formula, (ii) Dividend Growth Model (Gordon's Formula)

Earnings per Share (EPS)	₹ 10
Dividend per Share (DPS)	₹ 6
Cost of Capital (K)	20%
Internal Rate of Return on Investment	25%
Retention Ratio	40%

Solution :

Q.2E

$EPS_1 = 10$ $DPS_1 = 6$ $K_e = 20\%$
 $r = 25\%$ $RR = 40\%$
 $DIR = 60\%$

(a) As per Walter's Model:-

$$P_0 = \frac{DPS}{K_e} + \frac{\frac{r}{K_e} [EPS - DPS]}{K_e}$$

$$P_0 = \frac{6}{.20} + \frac{.25}{.20} \frac{[10 - 6]}{.20}$$

$$P_0 \Rightarrow ₹ 30 + 25 \Rightarrow ₹ 55/\text{Share}$$

(b) As per Gordon's Model:-

$$P_0 \Rightarrow \frac{D_0 (1+g)}{K_e - g} \text{ or } \frac{D_1}{K_e - g}$$

$$P_0 = \frac{6}{.20 - .10} \Rightarrow ₹ 60/\text{Share}$$

W.No.1

$$g = RR \times ROE$$

$$= b \times r$$

$$\Rightarrow 40\% \times 25\%$$

$$g \Rightarrow 10\%$$

QUESTION NO. 2G

In December, 2011 AB Co.'s share was sold for ₹ 146 per share. A long term earnings growth rate of 7.5% is anticipated. AB Co. is expected to pay dividend of ₹ 3.36 per Share.

- What rate of return an investor can expect to earn assuming that dividends are expected to grow along with earnings at 7.5% per year in perpetuity?
- It is expected that AB Co. will earn about 10% on book Equity and shall retain 60% of earnings. In this case, whether, there would be any change in growth rate and Cost of Equity?

Solution :

Q.2G V.V. Jain.

$P_0 = 146/\text{Share}$ $D_1 = 3.36/\text{Share}$
 $g = 7.5\%$

(a) $K_e = ?$ $g = 7.5\% \text{ p.a.}$
As per Gordon's Model:—

$$P_0 = \frac{D_0(1+g)}{K_e - g} \text{ or } \frac{D_1}{K_e - g}$$

$$146 = \frac{3.36}{K_e - 0.075}$$

$K_e = 9.80\% \text{ p.a.}$

(b) $r = 10\%$ $RR = 60\%$
 $g = ?$ $K_e = ?$

Revised 'g' $\Rightarrow g \Rightarrow RR \times R \times E$
 $\Rightarrow 60\% \times 10\%$
 $g \Rightarrow 6\% \text{ p.a.}$

Hint:

DPS_1

$\rightarrow$

EPS_1

$\rightarrow$

DPS_1^{New}

$\swarrow$ old RR $\swarrow$ New RR / New DPR
 $\swarrow$ W.No.1 $\swarrow$ $60\% / 40\%$

$\Rightarrow$ Accordingly, dividend will also get changed and to cal. K_e , first we should calculate previous RR & then EPS_1 assuming the rate of return on

equity will be same.

$g \Rightarrow \text{constant}$



Previous RR :-

$$g = RR \times ROE_c$$

$$7.5\% = RR \times 10\%$$

$$\boxed{RR = 75\%} \quad \text{DPR} = 25\%$$

$$DPS_1 = 3.36 / \text{Share}$$

$$\downarrow$$

$$EPS_1 \Rightarrow 3.36 \text{ --- } 25\%$$

$$\text{Now } 100\% \text{ or } EPS_1 \Rightarrow \frac{3.36}{25\%}$$

$$\boxed{EPS_1 \Rightarrow \text{₹ } 13.44 / \text{Share}}$$

$$\text{Now revised } RR = 60\% \quad \text{DPR} = 40\%$$

$$\text{Now revised } DPS_1 = 13.44 \times 40\%$$

$$\Rightarrow \text{₹ } 5.376 / \text{Share}$$

$$b_0 = 146 \quad DPS_1 = 5.376 \quad g = 6\%$$

$$b_0 = \frac{D_1}{K_e - g_c}$$

$$146 = \frac{5.376}{K_e - 0.06}$$

$$K_e = \frac{5.376}{146} + 0.06$$

$$\text{Revised } K_e \Rightarrow 9.68\% \text{ p.a.} \quad \checkmark$$

Concept:- Determination of growth rate:-

Method 1:-
$$g_c = RR_c \times ROE_c$$

Method 2:- CAGR
[Compounded Annual growth rate]

Example: Year DPS
2015 (1.10) (PV)

QUESTION NO. 2H

Abinash is holding 5,000 shares of Future Group Limited. Presently the rate of dividend being paid by the company is ₹ 5 per share and the share is being sold at ₹ 50 per share in the market. However, several factors are likely to change during the course of the year as indicated below:

	Existing	Revised
Risk free rate	12.5%	10%
Market risk premium	6%	4.8%
Expected growth rate	5%	8%
Beta value	1.5	1.25

In view of the above factors whether Abinash should buy, hold or sell the shares? Narrate the reason for the decision to be taken.

Solution :

Q.2H
 $D_0 = 5/\text{Share}$ $\text{CMP} = ₹ 50/\text{Share}$
 (Existing Position) :-
W.No:-1 Cal. of K_e = ?

$$K_e = R_f + \beta [R_m - R_f]$$

$$\Rightarrow 12.5\% + 1.5 [6\%]$$

$$\Rightarrow \underline{21.5\%}$$

$$P_0 \Rightarrow \frac{D_0(1+g)}{K_e - g}$$

$$\Rightarrow \frac{5(1+.05)}{.215 - .05} \Rightarrow \text{₹ } 31.82/\text{Share}$$

Revised Location:-

W.No: 2 Cal. of K_e = ?

$$K_e = R_f + \beta [K_M - R_f]$$

$$\Rightarrow 10\% + 1.25 [4.8\%]$$

$$\Rightarrow \underline{16\%}$$

$$P_0 \Rightarrow \frac{D_0(1+g)}{K_e - g} \Rightarrow \frac{5(1+.08)}{.16 - .08}$$

$$\Rightarrow \text{₹ } 67.5/\text{Share}$$

Decision: Current Scenario:-

$$P_0 \Rightarrow \underline{31.82} \implies \underline{\text{CMP} = \text{₹ } 50}$$

over-priced
Decision:- Sell ⊕

Revised Scenario:-

$$P_0 \Rightarrow 67.5/\text{Share} \implies \underline{\text{CMP} = 50}$$

Under-priced
Decision:- Buy ⊕
Hold

In the current scenario, the stock is over-priced & we need to sell the stock at its CMP is ₹ 50/Share.

However, under the changed scenario where the K_e is less than current scenario & g is greater than current scenario, the stock is

under-priced & the investor should hold or buy more stock from the market, assuming other factors remaining the same.

QUESTION NO. 2J

Following Financial Data for Platinum Ltd. are available for the year 2011:

	(₹ In lacs)
Equity Shares (₹ 10 each)	100
8% Debentures	125
10% Bonds	50
Reserve and Surplus	200
Total Assets	500
Assets Turnover Ratio	1.1
Effective Tax Rate	30%
Operating Margin	10%
Required rate of return of investors	15%
Dividend payout ratio	20%
Current market price of shares	₹ 13

You are required to:

- Draw income statement for the year
- Calculate the sustainable growth rate
- Compute the fair price of the company's share using dividend discount model, and
- Draw your opinion on investment in the company's share at current price.

Solution :

Q.2J (F)

W.No.1 ATR (Asset Turnover Ratio) :-

$$\text{ATR} = \frac{\text{Sales}}{\text{Assets}} = \frac{100 \text{ cr}}{100 \text{ cr}} = 1$$

$\frac{\text{Sales}}{\text{Assets}} = 1.10$

$\Rightarrow \text{Sales} = 1.10 \times 500 \text{ lacs}$

$\Rightarrow \text{₹ 550 lacs}$

(a) Income Statement - (₹ lacs)

Sales	550
(-1) V/C @ 90% ✓	495

Contribution @ 10% 55

(-) FC ✓ -

EBIT 55

less:- Interest

Deb. $125 \times 8\% \Rightarrow 10$

Bonds $50 \times 10\% \Rightarrow 5$ 15 lable

EBT 40

(-) Tax @ 30% 12

PAT / EPE $\rightarrow$ 28

(-) Eq. Dividend 5.6 l.

(0.56×10)
or $28 \times 20\%$

RE / H to RE 22.4 lable

W.No:-2 Cal. of EPS

$$\Rightarrow \frac{28 \text{ lable}}{10 \text{ lable}} \Rightarrow 2.8 \text{ / Share}$$

$$\begin{aligned} \text{DPS} &= \text{EPS} \times \text{DPR} \\ &= 2.8 \times 20\% \Rightarrow 0.56 \text{ / Share} \end{aligned}$$

(b) $g = RR \times \text{ROE}$

(54R) $\Rightarrow 80\% \times 9.33\%$
 $\Rightarrow 7.464\%$

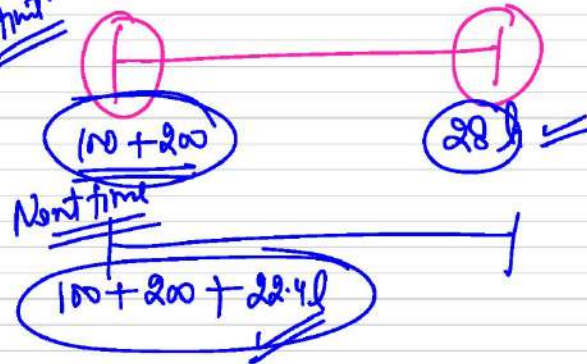
$\text{ROE} \Rightarrow \frac{\text{Earnings for Equity}}{\text{Equity ST's fund}}$

$\text{ROE} \Rightarrow \frac{28 \text{ lable}}{\text{---}} \times 100$

100 + 200 lakhs

$$ROE \Rightarrow \underline{9.33\% \text{ p.a.}}$$

Hint:



$$c) \quad b_0 = \frac{D_0 (1+g)}{K_e - g_c}$$

$$b_0 = \frac{0.58 (1 + 0.07464)}{0.15 - 0.07464}$$

$$b_0 \Rightarrow \frac{0.6018}{0.07536}$$

$$b_0 \Rightarrow 7.99 \text{ or } \underline{\underline{₹ 8/\text{share}}}$$

$$d) \quad b_0 = ₹ 8/\text{share} \Rightarrow \text{CMP} = \underline{\underline{₹ 13/\text{share}}}$$

over-priced

The stock is over-valued / over-priced.
It is recommended that investor
should "not invest" in the company
at CMP i.e. @ ₹ 13/share

LOS 8 : Determination of Growth rate

The sustainable growth rate is the rate at which equity, earnings and dividends can continue to grow indefinitely assuming that ROE is constant, the dividend payout ratio is constant, and no new equity is sold.

Method 1: Sustainable growth (g) = $(1 - \text{Dividend payout Ratio}) \times \text{ROE}$
OR

$$g = \text{RR} \times \text{ROE}$$

Method 2: $D_n = D_0 (1 + g)^{n-1}$

D_0 = Base year dividend

D_n = Latest (Current year dividend)

$n-1$ = No. Of times D_0 increases to D_n

LOS 9: Calculation of K_e in case of Floating cost is given

Floating Cost are costs associated with the issue of new equity. E.g. Brokerage, Commission, underwriting expenses etc.

If issue cost is given in question, we will take P_0 net of issue cost (Net Proceeds).

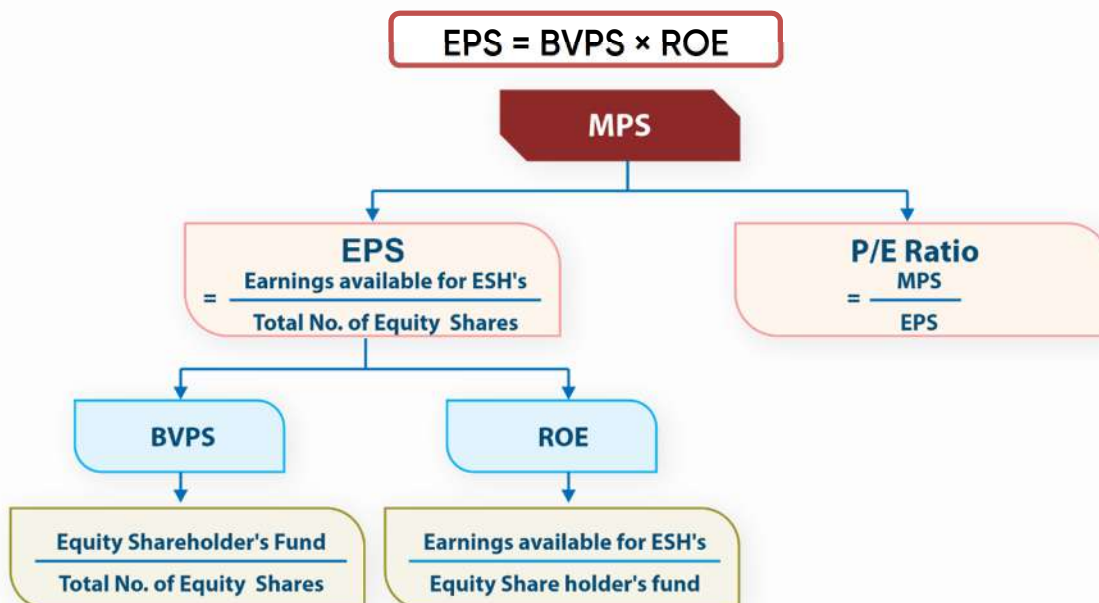
If floating Cost is expressed in % i.e. $P_0 (1 - f) = \frac{D_1}{K_e - g_c}$

If floating Cost is expressed in Absolute Amount i.e. $P_0 - f = \frac{D_1}{K_e - g_c}$

Note:

K_e of new equity will always be greater than K_e of existing equity.

Floatation Cost is only applicable in case of new equity and not on existing equity (or retained earnings).

LOS 10 : Return on Equity (ROE) and Book Value Per Share (BVPS)

Note : Calculate P / E Ratio at which Dividend payout will have no effect on the value of the share.

When $r = K_e$, dividend payout ratio will not affect value of share.

Example:

$$\text{If } r = 10\% \text{ then } K_e = 10\% \text{ and } K_e = \frac{1}{P/ERatio} \Rightarrow 0.10 = \frac{1}{P/ERatio}$$

$$\Rightarrow P/E \text{ Ratio} = 10 \text{ times}$$

QUESTION NO. 4A

The firm was started a year ago with an equity capital of ₹ 20 Lacs

Earning of the firm	₹ 2,00,000	Dividend paid	₹ 1,50,000	P/E Ratio	12.5
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Number of the shares outstanding, 20,000 @ ₹ 100 each. The firm is expected its current rate of earning on investment.

- Ascertain whether the company's D/P ratio is optimal according to Walter.
- What should be the P/E ratio at which the dividend pay-out ratio will have no effect on the value of the share?
- Will your decision change if the P/E ratio is 8, instead of 12.5?

Solution :

Q.4A (X)

W.No.1

$$EPS \Rightarrow \frac{EFE}{\text{No. of eq. shares}}$$

$$\Rightarrow \frac{2,00,000}{20,000} \Rightarrow ₹ 10/\text{share}$$

$$D/P \Rightarrow \frac{1,50,000}{20,000} \Rightarrow ₹ 7.5/\text{share}$$

(X) ROE $\Rightarrow \frac{EFE}{\text{Eq. SH's fund}}$

$$\Rightarrow \frac{2,00,000}{20,00,000} \times 100 \Rightarrow 10\% \text{ p.a.}$$

$$K_e \Rightarrow \frac{1}{P/ERatio} \Rightarrow \frac{1}{12.5}$$

$$K_e \Rightarrow 8\% \text{ p.a.}$$

$$DPR = \frac{DPS}{EPS} = \frac{7.5}{10} \times 100 = 75\%$$

$$RR \Rightarrow \underline{25\%}$$

$$(a) \quad r = 10\% \quad K_e = 8\%$$

$$DPR = 75\%$$

$$\underline{r > K_e} \quad \underline{10\% > 8\%} \quad \underline{\text{Optimum DPR} = 0\%}$$

Co's Dividend pay-out ratio is not optimum according to Walter's:-

Where $r > K_e$
i.e. $10\% > 8\%$

The optimum DPR should be 0%
At this point, MPS will be maximum

Proof:- At 75% DPR:-

As per Walter's:-

$$P_0 = \frac{DPS}{K_e} + \frac{r}{K_e} \frac{[EPS - DPS]}{K_e}$$

$$\Rightarrow \frac{7.5}{.08} + \frac{.10}{.08} \frac{[10 - 7.5]}{.08}$$

$$P_0 \Rightarrow \underline{\text{₹ } 132.81 / \text{Share}}$$

At 0% DPR:-

$$P_0 = \frac{DPS}{K_e} + \frac{r}{K_e} \frac{[EPS - DPS]}{K_e}$$

$$\Rightarrow \frac{0}{.08} + \frac{\frac{.10}{.08} [10 - 0]}{.08}$$

$$P_0 \Rightarrow \text{₹ } 156.25/\text{Share} \quad \text{Maximum}$$

Thus, MPS is maximum at 0% DPR

It can be seen that P_0 will increase by adopting 0% DPR.

(b) P/E Ratio = ?, At which DPR will not affect the MPS:-

Situation:-

When $r = K_e$, DPR will not affect the market price per share.

Hence,

$$r = 10\% \text{ then } K_e = 10\%$$

We know that,

$$K_e = \frac{1}{\text{P/E Ratio}}$$

$$\Rightarrow .10 = \frac{1}{\text{P/E Ratio}}$$

$$\boxed{\text{P/E Ratio} = 10 \text{ times}}$$

Hence, if P/E Ratio is 10 times, DPR will not affect the mkt. price of a share.

(c) If P/E Ratio = 8 times

$$K_e = \frac{1}{8} \Rightarrow \underline{12.5\%}$$

$$r = 10\%$$

If $r < K_e$ i.e. $10\% < 12.5\%$, the optimum DPR should be 100%.

$$\underline{DPR = 75\%}$$

This is not the optimum DPR as per Walter's.

If $r < K_e$, optimum $DPR = 100\%$,
At this DPR, MPS will be maximum.

Proof:-

$$P_0 \Rightarrow \frac{DIS}{K_e} + \frac{\frac{r}{K_e} [EPS - DPS]}{K_e}$$

$$\Rightarrow \frac{7.5}{12.5} + \frac{\frac{10}{12.5} [10 - 7.5]}{12.5}$$

$$P_0 \Rightarrow \underline{\text{₹ } 76 / \text{share}}$$

At 100% DPR:-

$$P_0 \Rightarrow \frac{10}{12.5} + \frac{\frac{10}{12.5} [10 - 10]}{12.5}$$

$$P_0 \Rightarrow \underline{\text{₹ } 80 / \text{share}}$$

Maximum

Thus, it can be seen that P_0 will increase by adopting 100% DPR.

QUESTION NO. 4B

A Ltd. has a book value per share of ₹ 137.80. Its return on equity is 15% and it follows a policy of retaining 60% of its earnings. If the opportunity cost of capital is 18%, what is price of share today.

Solution :

Q.4B

$$\begin{aligned} \Delta VPS &= 137.80 & ROE (\gamma) &= 15\% \\ RR &= 60\% / 40\% & K_e &= 18\% & P_0 &=? \end{aligned}$$

Soln. $\boxed{E/S = \Delta VPS \times ROE}$

$$E/S_1 = 137.80 \times 15\%$$

$$\Rightarrow \text{₹ } 20.67 \text{ / Share}$$

$$DPS_1 \Rightarrow 20.67 \times 40\%$$

$$\checkmark \boxed{D_1 \Rightarrow 8.268 \text{ / Share}}$$

Alt-1:- As per Walter's:-

$$P_0 = \frac{DPS}{K_e} + \frac{\gamma}{K_e} \frac{[E/S - DPS]}{K_e}$$

$$P_0 \Rightarrow \frac{8.268}{.18} + \frac{.15}{.18} \frac{[20.67 - 8.268]}{.18}$$

$$P_0 \Rightarrow \text{₹ } 45.93 + \frac{.15}{.18} \frac{[12.402]}{.18}$$

$$\Rightarrow \text{₹ } 45.93 + 57.42$$

$$\boxed{P_0 \Rightarrow \text{₹ } 103.35 \text{ / Share}}$$

Alt-2 As per Gordon's:-

$$D_1 \Rightarrow 8.268 \quad K_e = 18\%$$

$$g \Rightarrow RR \times ROE$$

$$\Rightarrow 60\% \times 15\% \Rightarrow 9\%$$

$$P_0 = \frac{D_1}{K_e - g_c} \Rightarrow \frac{8.268}{.18 - .09} \\ \Rightarrow \underline{\underline{₹91.87/\text{share}}}$$

QUESTION NO. 4C

X Ltd has an internal rate of return @ 20%. It has declared dividend @18% on its equity shares, having face value of ₹ 10 each. The payout ratio is 36% and Price Earnings Ratio is 7.25. Find the cost of equity according to Walter's Model and hence determine the limiting value of its shares in case the payout ratio is varied as per the said model.

Solution :

$$\begin{aligned} & \text{Q.4C} \quad \text{FV.} \\ & r = 20\% \quad \text{DK} = 18\% \text{ on ₹ 10/sha} \\ & \text{DKR} = 36\% \\ & \text{W.No.1} \quad \text{DPS} \Rightarrow 10 \times 18\% \Rightarrow \underline{\underline{1.8/\text{share}}} \\ & \text{DKR} = \frac{\text{DPS}}{\text{EPS}} \times 100 \\ & 36\% = \frac{1.8}{\text{EPS}} \\ & \text{OR EPS} = \frac{1.8}{36\%} \Rightarrow \underline{\underline{₹5/\text{share}}} \\ & \text{P/E Ratio} = \frac{\text{MPS}}{\text{EPS}} \\ & \text{MPS} \Rightarrow \text{EPS} \times \text{P/E Ratio} \\ & (b) \end{aligned}$$

$$\Rightarrow 5 \times 7.25 \Rightarrow \underline{\underline{36.25/\text{share}}}$$

As per Walter's Model:-

$$P_0 = \frac{DPS}{k_e} + \frac{Y}{k_e} [EPS - DPS]$$

$$36.25 \Rightarrow \frac{1.8}{k_e} + \frac{.20}{k_e} [5 - 1.8]$$

$$36.25 k_e \Rightarrow 1.8 + \frac{.20}{k_e} [3.2]$$

$$36.25 k_e^2 = 1.8 k_e + 0.64$$

$$\text{or } -36.25 k_e^2 + 1.8 k_e + 0.64 = 0$$

Quadratic Equation

$$-ax^2 + bx + c = 0$$

$$x \Rightarrow \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$k_e \Rightarrow \frac{-1.8 \pm \sqrt{(1.8)^2 - 4 \times -36.25 \times 0.64}}{2 \times -36.25}$$

$$k_e = \frac{-1.8 \pm 9.8}{-72.5}$$

$$A(+)\Rightarrow 11.03\%$$

$$A(-)\Rightarrow 16\%$$

$$k_e = 16\% \text{ p.a.}$$

(K_e cannot be negative) ←

(b)

Concept:- Cal. of Minimum & Maximum Value of a share as per Walter's:-

(a) $\gamma > K_e$ 20% > 15%

Case I

The optimum DPR = 0%

↓
(MPS will be Maximum)

DPR = 100%

↓
(MPS will be minimum)

Case II

$\gamma < K_e$ the optimum DPR = 100%

↓
MPS ⇒ Maximum

So γ DPR = 0%

↓
(MPS ⇒ Minimum)

Crux:-

Situation	Maximum MPS	Minimum MPS
I $\gamma > K_e$	0% DPR	100% DPR
II $\gamma < K_e$	100% DPR	0% DPR

(#) Range of Values:-

→ Minimum & Maximum Values as per the said model.

$$\textcircled{b} \quad \underline{\underline{r = 20\% , K_e = 16\%}}$$

if $r > K_e$ i.e. $20\% > 16\%$
then at 100% DPR, The m/s will be minimum.

$$\text{At 100\% DPR: - } \underline{\underline{DPS = 5/\text{Share}}}$$

$$P_0 = \frac{DPS}{K_e} + \frac{r}{K_e} \frac{EPS - DPS}{K_e}$$

$$P_0 \Rightarrow \frac{5}{.16} + \frac{.20}{.16} \frac{5 - 5}{.16}$$

$$P_0 \Rightarrow \underline{\underline{₹ 31.25/\text{Share}}}$$

LOS 11 : Over – Valued & Under – Valued Shares

Cases	Value	Decision
PV Market Price < Actual Market Price	Over – Valued	Sell
PV Market Price > Actual Market Price	Under – Valued	Buy
PV Market Price = Actual Market Price	Correctly Valued	Buy / Sell

LOS 12 : Holding Period Return (HPR)

$$\text{HPR} = \frac{(P_1 - P_0) + D_1}{P_0}$$

$$\text{HPR} = \frac{P_1 - P_0}{P_0} + \frac{D_1}{P_0}$$

(Capital gain Yield / Return) (Dividend Yield / Return)

LOS 13 : Multi-stage Dividend discount Model [If $g > K_e$] / Variable Growth Rate Model

- (iv) Growth model is used under the assumption of $g = \text{constant}$.
- (v) When more than one growth rate is given, then we will use this concept.
or
If $g > K_e$.
- (vi) A firm may temporarily experience a growth rate that exceeds the required rate of return on firm's equity but no firm can maintain this relationship indefinitely.
Value of a dividend- paying firm that is experiencing temporarily high growth =
PV of dividends expected during high growth period.

+

PV of the constant growth value of the firm at the end of the high growth period.

$$\text{Value} = \frac{D_1}{(1+k_e)^1} + \frac{D_2}{(1+k_e)^2} + \dots + \frac{D_n}{(1+k_e)^n} + \frac{P_n}{(1+k_e)^n}$$

$$\text{When } P_n = \frac{D_n(1+g_c)}{K_e - g_c}$$

QUESTION NO. 7C

X Limited, just declared a dividend of ₹14.00 per share. Mr. B is planning to purchase the share of X Limited, anticipating increase in growth rate from 8% to 9%, which will continue for three years. He also expects the market price of this share to be ₹ 360.00 after three years.

You are required to determine:

- The maximum amount Mr. B should pay for shares, if he requires a rate of return of 13% per annum.
- The maximum price Mr. B will be willing to pay for share, if he is of the opinion that the 9% growth can be maintained indefinitely and require 13% rate of return per annum.
- The price of share at the end of three years, if 9% growth rate is achieved and assuming other conditions remaining same as in (ii) above.

Calculate rupee amount up to two decimal points.

	Year-1	Year-2	Year-3
FVIF @ 9%	1.09	1.188	1.295
FVIF @ 13%	1.13	1.277	1.443
PVIF @ 13%	0.885	0.783	0.693

Solution :

Q.7C

$D_0 = ₹14/\text{Share}$ $g = 9\%$ $P_3 = ₹360/\text{Share}$

(a)

$P_0 = ?$	9%	9%	$9\% + P_3$
D_1	D_2	D_3	$D_3 + P_3$
$(1+k_e)^1$	$(1+k_e)^2$	$(1+k_e)^3$	$(1+k_e)^3$

$D_1 = ₹14(1.09) \Rightarrow ₹15.26$
 $D_2 = ₹14(1.188) \Rightarrow ₹16.63$
 $D_3 = ₹14(1.295) \Rightarrow ₹18.13$
 $P_3 \Rightarrow ₹360/\text{Share}$
 $P_0 = ?$

<u>Yr</u>	<u>CF's</u>	<u>PVF@13%</u>	<u>PV</u>
1	15.26	0.885	13.51
2	16.63	0.783	13.02
3	18.13	0.693	12.56
3	360	0.693	249.48

$$b \Rightarrow \frac{288.57}{\text{Share}}$$

(b) $g_c = 9\%$

$$b \Rightarrow \frac{D_0(1+g)}{k_c - g_c}$$

$$\Rightarrow \frac{14(1+0.09)}{0.13 - 0.09} \Rightarrow \frac{15.26}{0.04} \Rightarrow \frac{381.50}{\text{Share}}$$

(c) $g_c = 9\%$
 $g_3 = ?$ $k_c = 13\%$

$$b_3 \Rightarrow \frac{D_3(1+g_c)}{k_c - g_c}$$

$$\Rightarrow \frac{18.13(1+0.09)}{0.13 - 0.09}$$

$$\Rightarrow \frac{19.76}{0.04} \Rightarrow \frac{494.04}{\text{Share}}$$

QUESTION NO. 7D

X Ltd. is a Shoes manufacturing company. It is all equity financed and has a paid-up Capital ₹10,00,000 (₹10 per share)

X Ltd. has hired Swastika consultants to analyze the future earnings. The report of Swastika consultants states as follows :

1. The earnings and dividend will grow at 25% for the next two years.
2. Earnings are likely to grow at the rate of 10% from 3rd year and onwards.
3. Further, if there is reduction in earnings growth, dividend payout ratio will increase to 50%.

The other data related to the company are as follows :

Year	EPS(₹)	Net Dividend per share(₹)	Share Price (₹)
2010	6.30	2.52	63.00
2011	7.00	2.80	46.00
2012	7.70	3.08	63.75
2013	8.40	3.36	68.75
2014	9.60	3.84	93.00

You may assume that the tax rate is 30% (not expected to change in future) and post-tax cost of capital is 15%.

By using the Dividend Valuation Model, calculate

- Expected Market Price per share
- P/E Ratio.

Solution :

(a)

Timeline diagram showing dividends and growth rates:

- 2015: $DPR = 40\%$, $g = 25\%$
- 2016: $DPR = 40\%$, $g = 25\%$
- 2017: $g_c = 10\%$, $DPR = 50\%$

Handwritten calculations for the expected market price per share (P_0):

$$P_0 \Rightarrow \frac{D_1}{(1+K_e)^1} + \frac{D_2 + P_2}{(1+K_e)^2}$$

Where:

$$P_2 \Rightarrow \frac{D_2(1+g_c)}{K_e - g_c}$$

Using data from 2014:

- $EPS_0 = 9.60$
- $DPS_0 = 3.84$
- $DPR = 40\%$

Using data from 2015:

- $g = 25\%$

$$EPS_1 \Rightarrow 9.60 (1+25) \quad | \quad DPS_1 \Rightarrow 12 \times 40\%$$

$$\checkmark \Rightarrow 12/80 \quad | \quad \checkmark \Rightarrow 4.80/80$$

$$EPS_2 \Rightarrow 12 (1+25) \quad | \quad DPS_2 = 15 \times 40\%$$

$$\checkmark \Rightarrow 15/80 \quad | \quad \checkmark \Rightarrow 6/80$$

$$D/P = 40\%$$

$$P_2 = \frac{D_2 \times (1+g_c)}{k_e - g_c}$$

$$\textcircled{10} D_2 \Rightarrow [15 \times 50\%] (1+10)$$

$$\Rightarrow \underline{\underline{8.25}}$$

$$\textcircled{11} D_2 = [9.60 (1+25)^2 \times 50\%] (1+10)$$

$$\Rightarrow 8.25$$

$$P_2 = \frac{8.25}{.15 - .10} \Rightarrow ₹ 165/\text{Share}$$

$$\frac{D_1}{(1+k_e)^1} + \frac{D_2 + P_2}{(1+k_e)^2}$$

$$\Rightarrow \frac{4.80}{(1+15)^1} + \frac{6 + 165}{(1+15)^2}$$

$$P_0 \Rightarrow ₹ 4.80 \times 0.870 + (6 + 165) \times 0.676$$

NFC@15%, 1st yr
x PVF@15%, 2nd yr.

$$\begin{aligned}
 &0.756 \checkmark \\
 &P_0 \Rightarrow 133.45 / \text{Share} \checkmark \\
 &\textcircled{b} \text{ P/E Ratio} \Rightarrow \frac{\text{MPS}_0}{\text{EPS}_0} \\
 &\Rightarrow \frac{133.45}{9.60} \\
 &\Rightarrow 13.90 \text{ times} \checkmark
 \end{aligned}$$

QUESTION NO. 7F

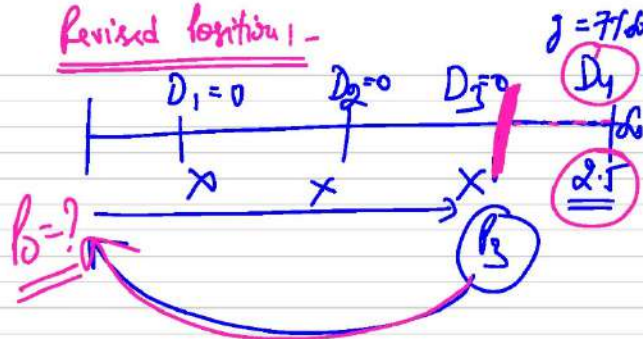
SAM Ltd. has just paid a dividend of ₹ 2 per share and it is expected to grow @ 6% p.a. After paying dividend, the Board declared to take up a project by retaining the next three annual dividends. It is expected that this project is of same risk as the existing projects.

The results of this project will start coming from the 4th year onward from now. The dividends will then be ₹ 2.50 per share and will grow @ 7% p.a.

An investor has 1,000 shares in SAM Ltd. and wants a receipt of at least ₹ 2,000 p.a. from this investment. Show that the market value of the share is affected by the decision of the Board. Also show as to how the investor can maintain his target receipt from the investment for first 3 years and improved income thereafter, given that the cost of capital of the firm is 8%.

Solution :

$$\begin{aligned}
 &\textcircled{0.756} \text{ V. Imp.} \\
 &\textcircled{1} \quad D_0 = 2 \quad g = 6\% \quad K_e = 8\% \\
 &\text{Value of share at present policy:-} \\
 &P_0 = \frac{D_0(1+g)}{K_e - g} \\
 &\Rightarrow \frac{2(1+0.06)}{0.08 - 0.06} \Rightarrow \underline{\underline{₹ 106/\text{share}}} \\
 &\text{If Board takes up the Decision:-}
 \end{aligned}$$

Revised position 1 -

$$P_3 \Rightarrow \frac{D_3(1+g) = D_4}{K_e - g}$$

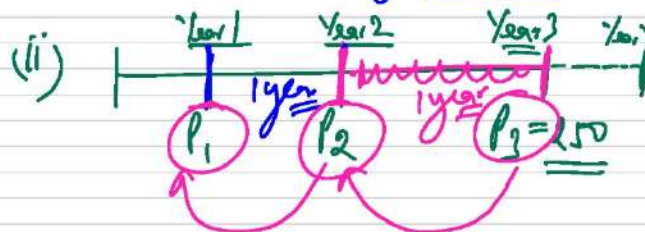
$$\Rightarrow \frac{2.5}{.08 - .07} \Rightarrow ₹ 250 / \text{Share}$$

$$P_3 = 250 / \text{Share}$$

$$P_0 = \frac{P_3}{(1+K_e)^3} \Rightarrow \frac{250}{(1+.08)^3}$$

$$106 \rightarrow ₹ 198.46 / \text{Share}$$

So, the Mkt. Price per share will increase from 106 to 198.46 due to the decision taken by board.



One year DDM:-

$$P_3 = 250 / \text{Share}$$

$$\frac{P_2 + D_3}{(1+K_e)^1}$$

$$P_2 = \frac{250 + 0}{(1 + 0.08)^1} \Rightarrow \underline{\underline{₹ 231.48/\text{share}}}$$

$$P_1 = \frac{P_2 + D_2}{(1 + K_e)^1}$$

$$\Rightarrow \frac{231.48 + 0}{(1 + 0.08)^1} \Rightarrow \underline{\underline{₹ 214.33/\text{share}}}$$

In order to maintain his receipt of ₹2000,
investor should sell shares:-

$$\begin{aligned} \underline{\text{Year 1}} \quad \frac{2000}{214.33} &\Rightarrow 9.33 \\ &\text{or } 10 \text{ shares} \\ &\quad @ 214.33/\text{share} \\ &\Rightarrow \underline{\underline{₹ 2143.30}} \end{aligned}$$

$$\begin{aligned} \underline{\text{Year 2}} \quad \frac{2000}{231.48} &\Rightarrow 8.64 \text{ or } 9 \text{ shares} \\ &\quad @ 231.48/\text{share} \\ &\Rightarrow \underline{\underline{₹ 2083.32}} \end{aligned}$$

$$\begin{aligned} \underline{\text{Year 3}} \quad \frac{2000}{250} &\Rightarrow 8 \text{ shares} @ 250/\text{share} \\ &\Rightarrow \underline{\underline{₹ 2000}} \end{aligned}$$

Balance shares at the end of 3rd year:-

$$\Rightarrow 1000 - 10 - 9 - 8$$

$$\Rightarrow \underline{\underline{973 \text{ shares}}}$$

Dividend at the end of 4th year:-

$$\Rightarrow 2.5/\text{share}$$

$$\begin{aligned} \text{Total Dividend} &\Rightarrow 973 \times 2.5 \\ &\Rightarrow \underline{\underline{2432.50}} \end{aligned}$$

Due to the decision, investor also get
the improved income from 4th year.

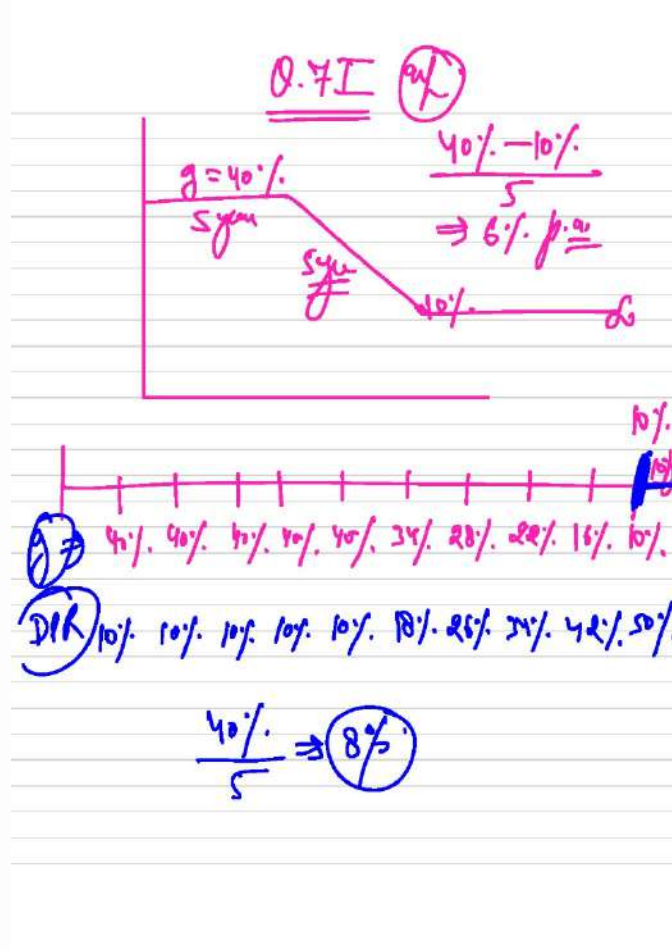
QUESTION NO. 71

The current EPS of M/s VEE Ltd. is ₹ 4. The company has shown an extraordinary growth of 40% in its earnings in the last few year This high growth rate is likely to continue for the next 5 years after which growth rate in earnings will decline from 40% to 10% during the next 5 years and remain stable at 10% thereafter. The decline in the growth rate during the five year transition period will be equal and linear. Currently, the company's pay-out ratio is 10%. It is likely to remain the same for the next five years and from the beginning of the sixth year till the end of the 10th year, the pay-out will linearly increase and stabilize at 50% at the end of the 10th year. The post tax cost of capital is 17% and the PV factors are given below:

Years	1	2	3	4	5	6	7	8	9	10
PVIF 17%	0.855	0.731	0.625	0.534	0.456	0.390	0.333	0.285	0.244	0.209

You are required to calculate the intrinsic value of the company's stock based on expected dividend. If the current market price of the stock is ₹ 125, suggest if it is advisable for the investor to invest in the company's stock or not.

Solution :



W.No.1 Cal. of EPS & DPS $\text{EPS} = 4/\text{Sh.}$

<u>Year</u>	<u>(g)</u>	<u>EPS</u>	<u>DR</u>	<u>DPS</u>	
1	40%	5.60	10%	0.56	D_1
2	40%	7.84	10%	0.78	D_2
3	40%	10.98	10%	1.10	D_3
4	40%	15.37	10%	1.54	D_4
5	40%	21.52	10%	2.15	D_5
6	34%	28.84	10%	5.19	D_6
7	28%	36.92	26%	9.60	D_7
8	22%	45.04	34%	15.31	D_8
9	16%	52.25	42%	21.95	D_9
10	10%	57.48	50%	28.74	D_{10}

$$P_{10} \Rightarrow \frac{D_{10}(1+g)}{K_e - g_c}$$

$$\Rightarrow \frac{28.74(1+0.10)}{0.17 - 0.10}$$

$$\Rightarrow ₹ 451.63 / \text{Share}$$

Cal. of $P_0 = ?$

<u>Year</u>	<u>CF's</u>	<u>PVF @ 17%</u>	<u>PV</u>
1	0.56	0.855	0.48
2	0.78	0.731	0.57
3	1.10	0.625	0.69
4	1.54	0.534	0.82
5	2.15	0.456	0.98
6	5.19	0.390	2.02
7	9.60	0.333	3.20
8	15.31	0.285	4.36
9	21.95	0.244	5.36
10	28.74	0.209	6.01

$$10 \quad 451.63 \quad 0.209 \quad 94.39$$

$$P_0 \Rightarrow \frac{118.88}{r_{\text{M}}}$$

$$P_0 = 118.88/r \Rightarrow \text{CML} \Rightarrow 12.5\%$$

over-valued

The stock is over-valued, we should not invest at CML is @ 12.5% / sharp

LOS 14 : IRR Technique & Growth Model

IRR is the discount rate that makes the present values of a project's estimated cash inflows equal to the Present value of the project's estimated cash outflows.

- ✚ At IRR Discount Rate $\Rightarrow$ PV (inflows) = PV (outflows)
- ✚ The IRR is also the discount rate for which NPV of a project is equal to Zero.
- ✚ IRR technique is used when, K_e is missing in the Question.
- ✚
$$\text{IRR} = \text{Lower Rate} + \frac{\text{Lower Rate}_{\text{NPV}}}{\text{Lower Rate}_{\text{NPV}} - \text{Higher Rate}_{\text{NPV}}} \times \text{Difference in Rate}$$

LOS 15 : Price at the end of each year

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

$$P_1 = \frac{P_2 + D_2}{(1 + K_e)^1}$$

$$P_2 = \frac{P_3 + D_3}{(1 + K_e)^1}$$

$$P_3 = \frac{P_4 + D_4}{(1 + K_e)^1}$$

.

So on

Los 16 : Negative Growth

If Positive Growth, then $P_0 = \frac{D_0(1+g)}{K_e - g}$

If Negative Growth, then $P_0 = \frac{D_0(1-g)}{K_e + g}$

Note: We Know $g = \text{RR} \times \text{ROE}$

Case I	EPS > DPS	Retention is Positive	$g = \text{Positive}$
Case II	EPS < DPS	Retention is Negative	$g = \text{Negative}$
Case III	EPS = DPS	No Retention	$g = 0$

LOS 17 : Preference Dividend Coverage Ratio & Equity Dividend Coverage Ratio

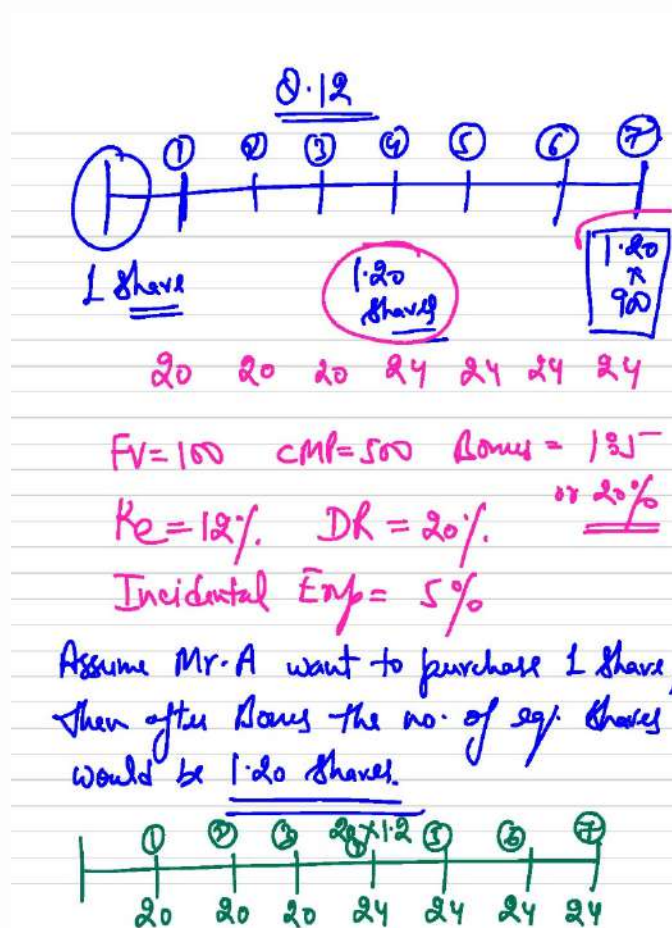
Interest Coverage Ratio	$= \frac{\text{Earning Before Interest and Tax}}{\text{Interest}}$
Preference Dividend Coverage Ratio	$= \frac{\text{Profit After Tax}}{\text{Preference Dividend}}$
Equity Dividend Coverage Ratio	$= \frac{\text{Profit After Tax} - \text{Preference Dividend}}{\text{Dividend payable to equity share holders}}$

Note:

The Higher the Better. These Ratios indicates the surplus profit left after meeting all the fixed obligation.

LOS 18 : Calculation of Maximum price of a share**QUESTION NO. 12**

Mr. A is thinking of buying shares at ₹ 500 each having face value of ₹ 100. He is expecting a bonus at the ratio of 1:5 during the fourth year. Annual expected dividend is 20% and the same rate is expected to be maintained on the expanded capital base. He intends to sell the shares at the end of seventh year at an expected price of ₹ 900 each. Incidental expenses for purchase and sale of shares are estimated to be 5% of the market price. He expects a minimum return of 12% per annum. Should Mr. A buy the share? If so, what maximum price should he pay for each share? Assume no tax on dividend income and capital gain.

Solution :

$$\begin{array}{r} + \\ 900 \times 1.20 \\ \times 95\% \end{array}$$

$$(1+12)^1 (1+12)^2 (1+12)^3 (1+12)^4 (1+12)^5 (1+12)^6 (1+12)^7$$

<u>Year</u>	<u>CF's</u>	<u>PVF @ 12%</u>	<u>PV</u>
1	20	0.893	17.86
2	20	0.797	15.94
3	20	0.712	14.24
4	24	0.636	15.26
5	24	0.567	13.61
6	24	0.507	12.17
7	24	0.452	10.85
7	$(900 \times 1.20 \times 95\%) / 0.452$		463.75
	$\Rightarrow 1026$		

$$P_0 \Rightarrow \underline{\underline{563.68}}$$

$$P_0 = \underline{\underline{₹ 563.68}} \Rightarrow \text{CMP} = 500 + 5\% \Rightarrow \underline{\underline{₹ 525}}$$

Under-valued
Buy

Mr. A should buy the share at CMP i.e. $500 + 5\%$ i.e. ₹ 525/share including incidental expenses, because stock is under-valued.

b) $X(1+0.05) = \underline{\underline{₹ 563.68}}$

$$X \Rightarrow \underline{\underline{₹ 536.84/\text{share}}}$$

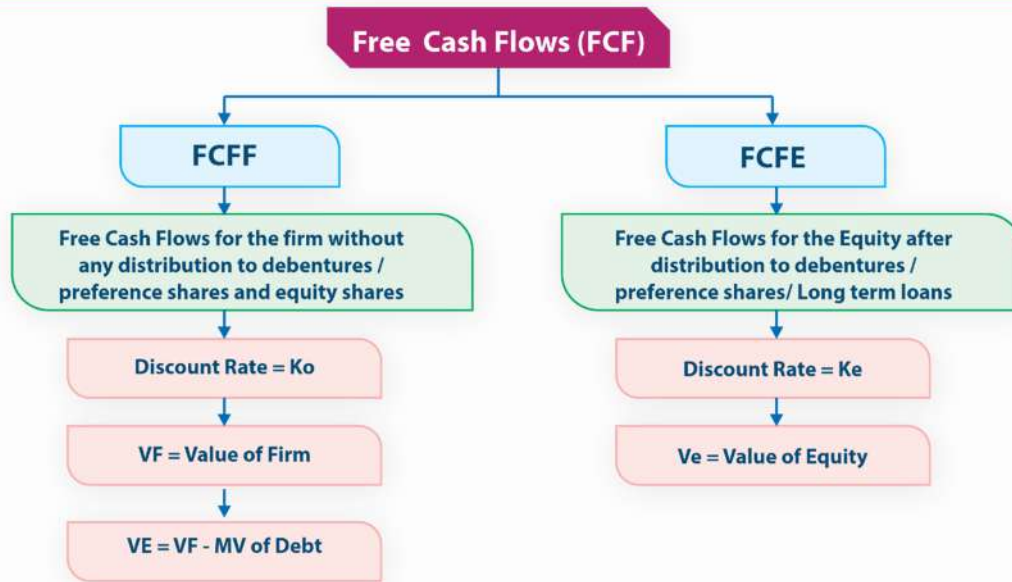
Maximum price Mr. A should be ready

to pay is ₹ 563.68 which will include incidental expenses.

So, the maximum price should be

$$\frac{₹ 563.68}{1.05} \Rightarrow ₹ 536.84 \text{ / Share}$$

LOS 19 : Cash Flow Base Models



Calculation of FCFF

EBITDA	xxx
Less : Depreciation & Amortisation (NCC)	xxx
EBIT	xxx
Less : Tax	xxx
NOPAT	xxx
Add : Depreciation (NCC)	xxx
Less : Increase in Working Capital (WCInv)	xxx
Less : Capital Expenditure (FCInv)	xxx
Free Cash Flow For Firm (FCFF)	xxx

a) Based on its Net Income:

FCFF = Net Income + Interest expense $\times$ (1-tax) + Depreciation $\pm$ Capital Expenditure $\pm$ Change in Non-Cash Working Capital

b) Based on Operating Income or Earnings Before Interest and Tax (EBIT):

FCFF = EBIT $\times$ (1 - tax rate) + Depreciation $\pm$ Capital Expenditure $\pm$ Change in Non-Cash Working Capital

c) Based on Earnings before Interest, Tax, Depreciation and Amortisation (EBITDA):

$FCFF = EBITDA \times (1 - \text{Tax}) + \text{Depreciation} \times (\text{Tax Rate}) - / + \text{Capital Expenditure} - / + \text{Change in Non-Cash Working Capital}$

d) Based on Free Cash Flow to Equity (FCFE):

$FCFF = FCFE + \text{Interest} \times (1 - t) + \text{Principal Prepaid} - \text{New Debt Issued} + \text{Preferred Dividend}$

e) Based on Cash Flows:

$FCFF = \text{Cash Flow from Operations (CFO)} + \text{Interest} (1 - t) - / + \text{Capital Expenditure}$

Calculation of FCFE

Method 1: If Debt financing ratio is given:

EBITDA	xxx
Less : Depreciation & Amortisation	xxx
EBIT	xxx
Less : Interest	xxx
EBT	xxx
Less : Tax	xxx
PAT	xxx
Add : Depreciation $\times$ % Equity Invested	xxx
Less: Increase in Working Capital $\times$ % Equity Invested	xxx
Less: Capital Expenditure $\times$ % Equity Invested	xxx
Free Cash Flow for Equity (FCFE)	xxx

Method 2: If Debt financing ratio is not given:

EBITDA	xxx
Less : Depreciation & Amortisation	xxx
EBIT	xxx
Less : Interest	xxx
EBT	xxx
Less : Tax	xxx
PAT	xxx
Add : Depreciation (NCC)	xxx
Less: Increase in Working Capital (WCInv)	xxx
Less: Capital Expenditure (FCInv)	xxx
Add : Net Borrowings	xxx
Free Cash Flow for Equity (FCFE)	xxx

a) Calculating FCFE from FCFF

$FCFE = FCFF - [\text{Interest} (1 - \text{tax rate})] + \text{Net borrowing}$

b) Calculating FCFE from net income

$FCFE = NI + NCC - FCInv - WCInv + \text{net borrowing}$

c) Calculating FCFE from CFO

$FCFE = CFO - FCInv + \text{net borrowing}$

QUESTION NO. 13C : Calculating FCFF and FCFE

Anson Ford, CFA, is analysing the financial statements of Sting's Delicatessen. He has a 2009 income statement and balance sheet, as well as 2010 income statement & balance sheet (as shown in the tables below). Assume there will be no sales of long-term assets in 2010. Calculate forecasted free cash flow to the firm (FCFF) and free cash flow to equity (FCFE) for 2010.

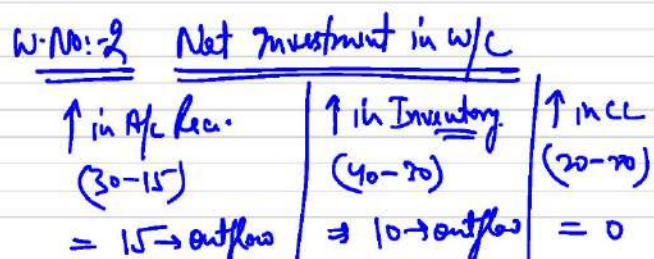
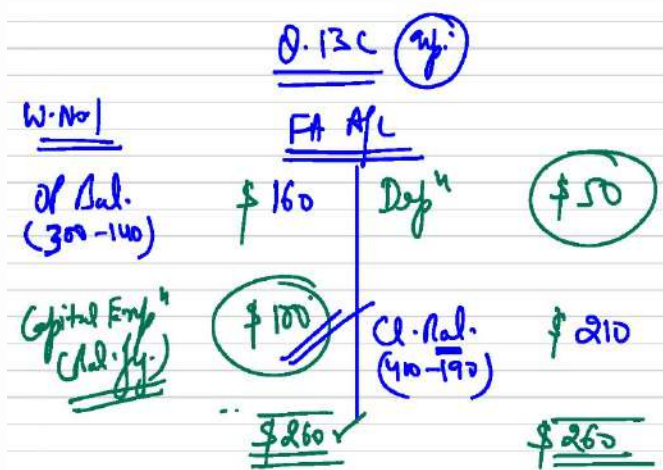
Sting's Income Statement

Income Statement	2010 Forecast	2009 Actual
Sales	\$300	\$250
Cost of goods sold	120	100
Gross profit	180	150
SG&A	35	30
Depreciation	50	40
EBIT	95	80
Interest expense	15	10
Pre-tax earnings	80	70
Taxes (at 30%)	24	21
Net income	56	49

Sting's Balance Sheet

Balance Sheet	2010 Forecast	2009 Actual
Cash	\$10	\$5
Account Receivable	30	15
Inventory	40	30
Current Assets	\$80	\$50
Gross property, plant and equipment	400	300
Accumulated depreciation	190	140
Total Assets	\$290	\$210
Account Payable	\$20	\$20
Short Term Debt	20	10
Current Liabilities	\$40	\$30
Long Term Debt	114	100
Common Stock	50	50
Retained earnings	86	30
Total liabilities and owners' equity	\$290	\$210

Solution :



$$\uparrow \text{in CF} = 25 \quad \uparrow \text{in CL} = 0$$

$$\uparrow \text{in W/C} = 25 \rightarrow \text{outflow}$$

Ignore Cash & Short-term Borrowing

W.No: 3 Cal. of Net Borrowing:-

$$[114 + 20]_{2010} - [100 + 10]_{2009}$$

$$\Rightarrow \$24$$

It includes long-term & Short-term

Cal. of FCF & FCFE

Cal. of FCF :-

$$\begin{array}{r} \text{EDITDA} \\ [300 - 120 - 35] \end{array} \quad \$145$$

$$\begin{array}{r} (-) \text{Dep}^n \\ \hline \end{array} \quad \$50$$

$$\text{EAT} \quad \$95$$

$$\begin{array}{r} (-) \text{Tax @ 30\%} \\ \hline \end{array} \quad \$28.50$$

$$\text{NOPAT} \quad \$66.50$$

$$\begin{array}{r} + \text{Dep}^n \\ \hline \end{array} \quad \$50.00$$

$$\begin{array}{r} (-) \text{Capital Exp.} \\ \hline \end{array} \quad \$100.00$$

$$\begin{array}{r} (-) \uparrow \text{in W/C} \\ \hline \end{array} \quad \$25.00$$

$$\text{FCFF} \Rightarrow \$8.50$$

Cal. of FCFE:-

EBITDA	\$ 145
(-) Dep ⁿ	\$ 50
EBIT	\$ 95
(-) Intt.	\$ 15
EBT	\$ 80
(-) Tax @ 30%	\$ 24
PAT	\$ 56
(+) Dep ⁿ	\$ 50
(-) Cap Exp ⁿ	\$ 100
(-) ↑ m w/c	\$ 25
(+) Net Borrowings	\$ 24
FCFE	\$ 5 ✓

Puzzle:- (MCA)

$$\begin{aligned}
 \textcircled{1} \text{ CFO} &\Rightarrow \text{NI} + \text{Dep}^n - \uparrow \text{m w/c} \\
 &\Rightarrow \$56 + \$50 - \$25 \\
 &\Rightarrow \$81 \checkmark
 \end{aligned}$$

② Cal. of FCFE from CFO:-

$$\begin{aligned}
 \text{FCFE} &\Rightarrow \text{CFO} + \text{Intt} (1 - \text{tax}) \\
 &\quad (-) \text{Intt in FA}
 \end{aligned}$$

$$\Rightarrow \$81 + 15(1 - 30) - 100$$

$$\text{FCFE} \Rightarrow \underline{\underline{(-) 8.50}} \checkmark$$

③ Cal. FCFE from CFO:-

$$\Rightarrow CFO - \text{Capital Exp}^n + \text{Net Borrowings}$$

$$\Rightarrow \$81 - \$100 + \$24$$

$$\Rightarrow \underline{\underline{\$5}} \checkmark$$

④ Cal. FCF from FCFE:-

$$\Rightarrow FCFE + \text{Int}(1 - \text{tax}) - \text{Net Borrowings}$$

$$\Rightarrow \$5 + \$15(1 - .30) - \$24$$

$$\Rightarrow \underline{\underline{\$18.50}} \checkmark$$

⑤ Cal. change in G&A Bal:-

$$\Rightarrow FCFE - \text{Eq. Div.} \pm \text{Transf./Repurch. of Eq.}$$

$$\Rightarrow \$5 - 0 - 0$$

$$\Rightarrow \underline{\underline{\$5}} \checkmark$$

LOS 20 : Valuation Based on Multiples

1. P/E Multiple Approach $MPS = EPS \times P/E \text{ Ratio}$

2. Enterprise Value to Sales $= \frac{EV}{Sales}$

3. Enterprise Value to EBITDA $= \frac{EV}{EBITDA}$

EV = market value of common stock + market value of preferred equity + market value of debt + minority interest – cash & cash equivalents and Equity investments, investment in any co. & also Long term investments.

EBITDA = EBIT + depreciation + amortization

QUESTION NO. 14

An analyst gathered the following data for Boulevard Industries

Recent share price	₹ 22.50
Shares outstanding	40 Lakhs
Market value of debt	₹ 137 Lakhs
Cash and marketable securities	₹ 62.30 Lakhs
Investments	₹ 327 Lakhs
Net income	₹ 137.50 Lakhs

Interest expense	₹ 6.90 Lakhs
Depreciation and amortization	₹ 10.40 Lakhs
Taxes	₹ 95.90 Lakhs

Based on this information, calculate the EV/EBITDA ratio for Boulevard Industries.

Solution :

Q.14
W.No:1 Cal. of Enterprise Value [EV]

$$\begin{aligned} &\Rightarrow \text{MV of equity} \quad (22.50 \times 40) \\ &\quad \quad \quad = 900 \text{ l.} \\ &\quad + \\ &\quad \text{MV of Debt} \quad = 137 \text{ l.} \\ &\quad (-) \text{ Cash \& Marketable Sec.} = 62.30 \text{ l.} \\ &\quad (-) \text{ Investments} \quad \Rightarrow 327 \text{ l.} \\ &\quad \quad \quad \text{EV} \quad \underline{\underline{₹ 647.70 \text{ lakh}}} \end{aligned}$$

W.No:2 Cal. of EBITDA

$$\begin{aligned} &\Rightarrow \text{NI} + \text{Tax} + \text{Intt.} + \text{Dep}^n \\ &\Rightarrow 137.50 + 95.90 + 6.90 + 10.40 \\ &\Rightarrow \underline{\underline{250.70 \text{ Lakhs}}} \end{aligned}$$

$$\frac{\text{EV}}{\text{EBITDA}} \Rightarrow \frac{647.70}{250.70} \Rightarrow \boxed{2.58 \text{ times}}$$