9. DIVIDEND DECISIONS

ASSIGNMENT SOLUTIONS

PROBLEM NO: 1

Value per share (P_0) under Walter's model = $\frac{DPS}{K_e} + \frac{(EPS - DPS) \times \frac{R}{K_e}}{K_e}$

Payout ratio is	50% (DPS Rs.5)	75% (DPS Rs.7.50)	100% (Rs.10.00)
Return is 15%	$\frac{5}{0.10} + \frac{(10-.5)\times\frac{0.15}{0.10}}{0.10}$ = Rs.50+ Rs.75 = **Rs.125**	$\frac{7.5}{0.10} + \frac{(10-.7.5)\times\frac{0.15}{0.10}}{0.10}$ =Rs.75+ Rs.37.5 = **Rs.112.50**	$\frac{10}{0.10} + \frac{(10-10)\times\frac{0.15}{0.10}}{0.10}$ =Rs.100+ Rs.0 = **Rs.100.00**
10%	$\frac{5}{0.10} + \frac{(Rs.10-Rs.5)\times\frac{0.10}{0.10}}{0.10}$ =Rs.50+ Rs.50= **Rs.100**	$\frac{7.5}{0.10} + \frac{(Rs.10-Rs.7.5)\times\frac{0.10}{0.10}}{0.10}$ = Rs.75+ Rs.25= **Rs.100.00**	$\frac{10}{0.10} + \frac{(Rs.10-Rs.10)\times\frac{0.10}{0.10}}{0.10}$ = Rs.100+ Rs.0 = **Rs.100.00**
5%	$\frac{5}{0.10} + \frac{(Rs.10-Rs.5)\times\frac{0.5}{0.10}}{0.10}$ = Rs.50 + Rs.25 = **Rs.75**	$\frac{7.5}{0.10} + \frac{(Rs.10-Rs.7.5)\times\frac{0.05}{0.10}}{0.10}$ = Rs.75 + Rs.12.5 = **Rs.87.50**	$\frac{10}{0.10} + \frac{(Rs.10-Rs.10)\times\frac{0.05}{0.10}}{0.10}$ = Rs.100 + Rs.0 = **Rs.100.00**

PROBLEM NO: 2

i) As per Walter's model:

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

$$\frac{8}{0.08} + \frac{\frac{0.10}{0.08}(10-8)}{0.08} = Rs.131.25$$

Working notes:

1. DPS= $\frac{\text{Total dividend paid}}{\text{Total no of equity share}} = \frac{3,20,000}{40,000} = Rs.8$

2. EPS= $\frac{\text{Earnings for Equity}}{\text{Total no of Equity share}} = \frac{4,00,000}{40,000} = Rs.10$

3. ROE= $\frac{\text{Earnings for Equity}}{\text{Equity shareholders fund}} = \frac{4,00,000}{40,00,000} = 10\%$

4. $K_e = \frac{1}{\text{PE ratio}} = \frac{1}{12.5} = 8\%$

ii) Existing payout ratio = $\frac{DPS}{EPS} = \frac{8}{10} = 80\%$

r = 10%, > K_e = 8%

The given co.'s optimum dividend payout ratio as per Walter should be 0%. Hence company's DP ratio is not optimum.

Proof: $P_0 = \frac{8}{0.08} + \frac{\frac{0.10}{0.08}(10-0)}{0.08} = Rs.156.25$

iii) When r = K_e, price of companies share will not be affected by any D/P Ratio. In the given case r=10%

Therefore, K_e must also be 10%

$$K_e = \frac{1}{\text{PE ratio}}$$

$$\text{PE ratio} = \frac{1}{K_e} = \frac{1}{r} = \frac{1}{0.1} = 10\text{times.}$$

Tutor's note not received by exam:

Therefore, K_e = 8%, r = 8%

$$K_e = \frac{1}{\text{PE ratio}} = 0.08 = \frac{1}{PE} = \text{PE} = 12.5$$

PROBLEM NO: 3

M/s XY ltd

i) Walter model given by

$$P = \frac{D}{K_e} + \frac{(E-D)\times\frac{r}{K_e}}{K_e}$$

Where

P=Market price per share.

E=Earnings per share = Rs.5

D=Dividend per share = Rs.3

r = Return earned on investment = 15%

K_e = cost of capital = 12%

$$= \frac{Rs.3}{0.12} + \frac{(Rs.5-Rs.3)\times\frac{0.15}{0.12}}{0.12} = Rs.25 + Rs.20.83 = Rs.45.83$$

ii) According to Walter's model when the return on investment is more than the Cost of capital, the price per share increases as the dividend payout ratio decreases. Hence, the optimum dividend payout ratio in this case is nil.

So, at a payout ratio of zero, the market value of the company's share will be;

$$= \frac{Rs.0}{0.12} + \frac{(Rs.5-Rs.0)\times\frac{0.15}{0.12}}{0.12} = Rs.0 + Rs.52.08 = Rs.52.08$$

PROBLEM NO: 4

Part (i): Pay-out ratio 30%

Particulars	A	B	C
K_e	10%	10%	10%
r	15%	10%	12%
EPS	Rs.10	Rs.10	Rs.10
DPS (EPS x payout ratio)	Rs.3 (10 x 30%)	Rs.3 (10 x 30%)	Rs.3 (10 x 30%)
Retention ratio (b)	70%	70%	70%
g (b x r)	(15%x 70%) 10.5%	(10%x 70%) 7%	(12%x70%) 8.4%
$P_0 = \frac{D_1}{K_e - g}$	$\frac{3}{10\% - 10.5\%}$ (Rs.60)	$\frac{3}{10\% - 7\%}$ Rs.100	$\frac{3}{10\% - 8.4\%}$ Rs.187.5

Part (ii): Pay-out ratio = 60%

Particulars	A	B	C
DPS	Rs.6 (10 x 60%)	Rs.6 (10 x 60%)	Rs.6 (10 x 60%)
Retention ratio (b)	40%	40%	40%
g = (b x r)	(15%x 40%) = 6%	(10%x 40%) = 4%	(12% x40%)=4.8%
P_0	$\frac{D_1}{K_e - g}$	$\frac{D_1}{K_e - g}$	$\frac{D_1}{K_e - g}$
Nearest 0.25	$\frac{6}{10\% - 6\%} = Rs.150$	$\frac{6}{10\% - 4\%} = Rs.100$	$\frac{6}{10\% - 4.8\%} = Rs.115.38$

Part (iii): Pay-out ratio = 80%

Particulars	A	B	C
DPS	Rs.8 (10 x 80%)	Rs.8 (10 x 80%)	Rs.8 (10 x 80%)
Retention ratio(b)	20%	20%	20%
g = (b x r)	(15%x 20%) = 3%	(10%x 20%) = 2%	(12%x 20%) = 2.4%
P_0	$\frac{8}{10\% - 3\%} = Rs.114.29$	$\frac{8}{10\% - 2\%} = Rs.100$	$\frac{8}{10\% - 2.4\%} = Rs.105.26$

PROBLEM NO: 5

In the present situation, the current MPS is as follows:

$$P = \frac{D_0(1+g)}{K_e - g} = \frac{10(1+0.1)}{0.2 - 0.1} = \frac{11}{0.1} = 110$$

i) The impact of changes in growth rate to 12% on MPS will be as follows:

$$P = \frac{D_0(1+g)}{K_e - g} = \frac{10(1+0.12)}{0.2 - 0.12} = \frac{11.2}{0.08} = 140$$

ii) The impact of changes in growth rate to 8% on MPS will be as follows:

$$P = \frac{D_0(1+g)}{K_e - g} = \frac{10(1+0.08)}{0.2 - 0.08} = \frac{10.8}{0.12} = 90$$

So, the market price of the share is expected to vary in response to change in expected growth rate is dividends.

PROBLEM NO: 6

i) According to Dividend Discount Model approach the firm's expected or required return on equity is computed as follows:

$$K_e = \frac{D_1}{P_0} + g$$

Where,

K_e = Cost of equity share capital

D_1 = Expected dividend at the end of year 1

P_0 = Current market price of the share.

g = Expected growth rate of dividend.

Therefore, $K_e = \frac{50}{500} + 10\%$

= 0.1 +0.1 = 0.2

Or, K_e = 20%

ii) With rate of return on retained earnings (r) 20% and retention ratio (b) 30%, new growth rate will be as follows:

g= br i.e.

= 0.3 x 0.2 = 0.06

Accordingly, dividend will also get changed and to calculate this, first we shall calculate previous retention ratio (b_1) and then EPS assuming that rate of return on retained earnings (r) is same.

With previous Growth Rate of 10% and r = 20% the retention ratio comes out to be:

$0.1 = b_1 \times 0.2$

$b_1 = 0.5$ and payout ratio = 0.5

With 0.25 payout ratio the EPS will be as follows:

$\frac{50}{0.5} = 100$

With new 0.70 (1 - 0.30) payout ratio the new dividend will be

$D_1 = 100 \text{ X } 0.70 = 70$

Accordingly, new K_e will be

$K_e = \frac{70}{500} + 10.0\%$

or, $K_e = 24\%$

PROBLEM NO: 7

i) Gordon's formula

$$P_0 = \frac{E(1-b)}{K-br}$$

P_0 = Present value of Market price per share

E = Earnings per share

K = Cost of Capital

b = Retention Ratio (%)

r = IRR

br = Growth Rate

$$P_0 = \frac{12(1-0.40)}{0.18-(0.40\times 0.22)} = \frac{7.20}{0.18-0.088} = \frac{7.20}{0.92} = 78.26$$

ii) Walter's Formula:

$$V_C = \frac{D + \frac{R_a}{R_C}(E-D)}{R_C}$$

V_c = Market Price

D = Dividend per share

R_a = IRR

R_c = Cost of Capital

E = Earnings per share

$$= 3 + \frac{\frac{0.22}{0.18}(12-3)}{0.18}$$

$$= \frac{3+11}{0.18} = \text{RS.77.77}$$

PROBLEM NO: 8

$P = m (D + \frac{E}{3})$

$116.66 = 7 (10 + \frac{E}{3})$

$349.98 = 70 + 7E$

$E = 39.99 \cong 40$

PROBLEM NO: 9

D_t = Dividend per share for the current year

C = weightage given to the current earnings of the firm

r = target payout ratio

EPS_t = Earnings per share for the current year

D_{t-1} = Dividend per share for the previous year

$D_t - D_{t-1}$ = Target change

D_t = Target ratio × ($EPS_t - D_{t-1}$)

$28 = 0.6 \times 0.4 \times EPS_t + (1 - 0.6)\ 24$

$28 = 0.6 \times 0.4 \times EPS_t + 0.4 \times 24$

$0.24\ EPS_t = 28 - 9.6$

$EPS_t = 76.67$

P.E. multiple = 9

Market capitalization = 76.67 × 9 × 5,00,000 = Rs.34,50,00,000.

PROBLEM NO: 10

Modigliani and Miller (M-M) - Dividend irrelevancy model:

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

Where,

P_0 = Existing market price per share i.e. Rs.120

P_1 = Market price of share at the year-end (to be determined)

D_1 = Contemplated dividend per share i.e. Rs. 6.4

K_e = Capitalization rate i.e. 9.6%.

i)

a) Calculation of share price when dividend is declared:

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

$$120 = \frac{P_1 + 6.4}{1 + 0.096}$$

$$120 \times 1.096 = P_1 + 6.4$$

$P_1 = 120 \times 1.096 - 6.4$

$= 125.12$

b) Calculation of share price when dividend is not declared:

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

$$120 = \frac{P_1 + 0}{1 + 0.096}$$

$$120 \times 1.096 = P_1 + 0$$

$$P_1 = 131.52$$

ii) Calculation of No. of shares to be issued:

Particulars	If dividend declared	If dividend not declared
Net Income	160	160
Less: Dividend paid	51.20	------
Retained earnings	108.80	160
Investment budget	320	320
Amount to be raised by issue of new shares (i)	211.20	160
Market price per share (ii)	125.12	131.52
No. of new shares to be issued (ii)	1,68,797.95	1,21,654.50
Or say	1,68,798	1,21,655

PROBLEM NO: 11

CASE 1: Value of the Firm When Dividends are not Paid.

Step 1: Calculate price at the end of the period

K_e = 10%, P_0 = 100, D_1 = 0

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

$$100 = \frac{P_1 + 0}{1 + 0.10} \text{ » } P_1 = 110$$

Step 2: Calculation of funds required for investment

Earning	Rs.1,00,000
Dividend distributed	nil
Fund available for investment	Rs.1,00,000
Total Investment	Rs.2,00,000
Balance Funds required	Rs.2,00,000 -Rs.1,00,000 = Rs.1,00,000

Step 3: No. of shares required to be issued for balance fund

$$\text{No of shares} = \frac{\text{Funds required}}{\text{Price at the end}(P_1)}$$

$$\Delta n = \frac{1,00,000}{100}$$

Step 4: Calculation of value of firm

$$nP_o = \frac{(n + \Delta n)P - I + E}{1 + K_e}$$

$$nP_o = \frac{(10,000 + 1,00,000/110)110 - 2,00,000 + 1,00,000}{1 + 0.10}$$

$$= \text{Rs.}10,00,000$$

Case 2: Value of the firm when dividends are paid.

Step 1: Calculate price at the end of the period

K_e = 10%, P_0 = 100, D_1 = 5

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

$$100 = \frac{P_1 + 5}{1 + 0.10} \text{ » } P_1 = 105$$

Step 2: Calculation of funds required for investment

Earning	Rs.1,00,000
Dividend distributed	Rs.50,000
Fund available for investment	Rs.50,000
Total Investment	Rs.2,00,000
Balance Funds required	Rs.2,00,000- Rs.50,000 = Rs.1,50,000

Step 3: No. of shares required to be issued for balance fund

$$\text{No of shares} = \frac{\text{Funds required}}{\text{Price at the end}(P_1)}$$

$$\Delta n = \frac{1,50,000}{105}$$

Step 4: Calculation of value of firm

$$nP_o = \frac{(n + \Delta n)P - I + E}{1 + K_e}$$

$$nP_o = \frac{\left(10,000 + \frac{1,50,000}{105}\right)105 - 2,00,000 + 1,00,000}{1 + 0.10}$$

= Rs.10,00,000

Thus, it can be seen from the example that the value of the firm remains the same in either case.

PROBLEM NO: 12

a) $$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e} = \frac{\text{Rs. } 1.25 + \frac{0.18}{0.10}(\text{Rs. } 5.0 - \text{Rs. } 1.25)}{0.10} = \text{Rs.}80$$

This is not optimum dividend payout ratio because Walter suggests a zero percent dividend payout ratio in situations where r > K_e to maximise the value of the firm. At this ratio the value of the share would be maximum, that is Rs.90

b) Value of the firm, when dividends are paid (MM assumptions)

i) Market price of the share at the end of the year (P_o) $= \frac{1}{(1 + K_e)}(P_1 + D_1)$

$$\text{Rs. } 20 = \frac{(P_1 + \text{Re.}1)}{1.10} = \text{Rs. } 21 = P_1$$

ii) Amount required for new financing = I - (Y - nD_1) = Rs. 6,80,000 - (Rs.1,50,000 - Rs.1,00,000) = Rs. 6,30,000

iii) Number of shares to be issued = $\frac{\text{Rs.6,30,000}}{\text{Rs.21}}$ = 30,000 shares

iv) Value of the firm $= \frac{1}{(1 + K_e)}(nD_1 + (n + \Delta n)P_1 - I + Y - nD_1)$

$$= \frac{\text{Rs. } 1,00,000 + \{(1,00,000 + 30,000) \text{x Rs.} 21\} - \text{Rs.} 6,80,000 + \text{Rs.} 1,50,000 - \text{Rs.} 1,00,000}{1.10} = \text{Rs.20 lakhs}$$

c) Value of the firm, when dividends are not paid:

i) Market price of the share at the end of the year (P_o) $= \frac{1}{(1+K_e)}(P_1 + D_1)$

$$\text{Rs. } 20 = \frac{(P_1 + 0)}{1.10} = \text{Rs. } 22 = P_1$$

ii) Amount required for new financing = I - (Y - nD_1) = Rs. 6,80,000 - Rs.1,50,000 = Rs. 5,30,000

iii) Number of shares to be issued = $\frac{\text{Rs.5,30,000}}{\text{Rs.22}}$ shares

iv) Value of the firm $= \frac{1}{(1+K_e)}((n + \Delta n)P_1 - I + Y)$

$$= \frac{\left(1{,}00{,}000 + \frac{5{,}30{,}000}{\text{Rs.22}}\right)\text{Rs.22} - \text{Rs.6,80,000} + \text{Rs.1,50,000}}{1.10} = \text{Rs.20 lakhs}$$

Since the value of the firm is Rs. 20 lakhs, in both the scenarios when dividends are paid and dividends are not paid, dividend does not effect the value of the firm.

PROBLEM NO: 13

1. Computation of factors

Particulars	Value
Money available for buyback	Rs.50 lakhs × 27% = Rs.13.5 lakhs
Buy back price	P_B
Price after buyback = buy back price + 10%	$P_A = 1.10P_B$
No of shares bought back = X = money available ÷ P_B	Rs.13.5 lakhs ÷ P_B
Shares after buy back	5,00,000 **less X**
Market capitalization after buyback	Rs.105 lakhs

2. Computation of buyback price and shares bought back

a) Price after buyback = 1.10 P_B

b) Market capitalization after buyback-

→ Rs.105 lakhs = shares after buyback (5 lakhs - X) × 1.10P_B

→ Rs.105 lakhs = (5 - X) × 1.10 P_B

$$\rightarrow P_B = \frac{105}{(5 - X) \times 1.1}$$

c) Total money for buy back = Rs.13.5 lakhs = shares bought back × price P_B

→ Rs.13.5 lakhs = X × P_B → $P_B = \frac{27}{X}$

Therefore, from (b) and (c), we have $\frac{105}{(5 - X) \times 1.1} = \frac{13.5}{X}$

→ 105 X = 13.5 × 1.10 × (5 - X)

→ 105 X = 74.25 - 14.85 X

→ 105 X + 14.85 X = 74.25

→ X = 74.25 ÷ 119.85 **= 61,952 shares is the number of shares to be bought back.**

Therefore, **Buyback price** = Rs.13,50,000 ÷ 61,952 shares = **Rs. 21.79**

3. Impact on EPS

Current net income = EPS Rs.1.5 × 5 lakhs shares = Rs.7.5 lakhs

Therefore, post buyback = $\frac{\text{Post buyback net income Rs.7.5 lakhs}}{5{,}00{,}000 - 61{,}952 \text{ shares}} = \frac{7{,}50{,}000}{4{,}38{,}048} = \text{Rs. } 1.712$

Therefore, the EPS will increase post buy back.

PROBLEM NO: 14

Part (i): Bonus issue

WN 1: Current number of shares= $\frac{20,00,000}{8} = 250,000 \text{shares}$

WN 2: Bonus issue=1:5. Therefore, number of shares to be issued = 50,000 shares

WN 3: Equity account

Rs.4,00,000(50,000×8) will be transferred from retained earnings to equity share capital.

WN 4: no of shares outstanding = current no of shares + bonus shares

= 2,50,000 + 50,000 = 3,00,000.

WN 5: New $P_0 = \frac{S \times P_0}{N + S} = \frac{2,50,000 \times 60}{30,000} = \text{Rs.50 per share}$

Part (ii): Stock split

A 2:1 stock split means 2 shares will be issued for every one share held.

WN 1: New nos. of shares= $\frac{\text{Old number of shares} \times \text{old facevalue}}{\text{New facevalue}} = \frac{2,50,000 \times 8}{4} = 5,00,000$

WN 2: Equity account

There will be no change in the equity account. Face value will drop to Rs.8 ×1/2 = Rs.4

WN 3: New $P_0 = \frac{\text{Old number of shares} \times \text{old } P_0}{\text{New number of shares}} = \frac{2,50,000 \times 60}{5,00,000} = \text{Rs.30 per share}$

Part (iii): Reverse split

A 1:2 reverse split means one share will be issued for every two shares held.

WN 1: Number of shares

$\frac{2,50,000 \times 8}{16} = 1,25,000$ shares Shares outstanding = 1,25,000.

WN 2: Equity account

There will be no change in the equity account. Face value will rise to 8×2=Rs.16 per share.

WN 3: New price

New $P_0 = \frac{2,50,000 \times 60}{1,25,000} = 120$ per share

Summary:

Particulars	Shares(Nos)	Equity A/C impact	Market price (Rs.)
a) Existing	2,50,000	Not applicable	60
b) Bonus issue	3,00,000	24,00,000	50
c) Stock split	5,00,000	FV at Rs.4	30
d) Reverse split	1,25,000	FV at Rs.16	120

THE END