

Dividend Decision

a) Relevance Theory

1. Optimum Dividend Payout:

Situation	Optimum Dividend Payout
a) $r(12\%) > k_e(10\%)$	0%
b) $r(10\%) = k_e(10\%)$	Every payout is Optimum
c) $r(8\%) < k_e(10\%)$	100%

2. Walter's Model:

$$P_0 = \frac{D + (E-D) \times \frac{r}{k_e}}{k_e} \times 100$$

$r = \frac{\text{Earning}}{\text{Capital}} \times 100$
 $k_e = \frac{1}{\text{PE Ratio}} \times 100$

3. Gordon's Growth Model:

$$P_0 = \frac{D_1}{k_e - g}$$

$D_1 = D_0 + g$
 $g = b \times r$

b) Irrelevance Theory

1. M.M. Model:

a) Expected MPS:

$$P_1 = P_0 (1 + k_e) - D$$

c) Value of firm:

$$nP_0 = \frac{(n + \Delta n) \times P_1}{1 + k_e}$$

b) New shares:

$$\Delta n = \frac{1 - [E - (D \times n)]}{P_1}$$

Keep shares in 2 decimals.

c) Traditional Theory

1. Linter's Model

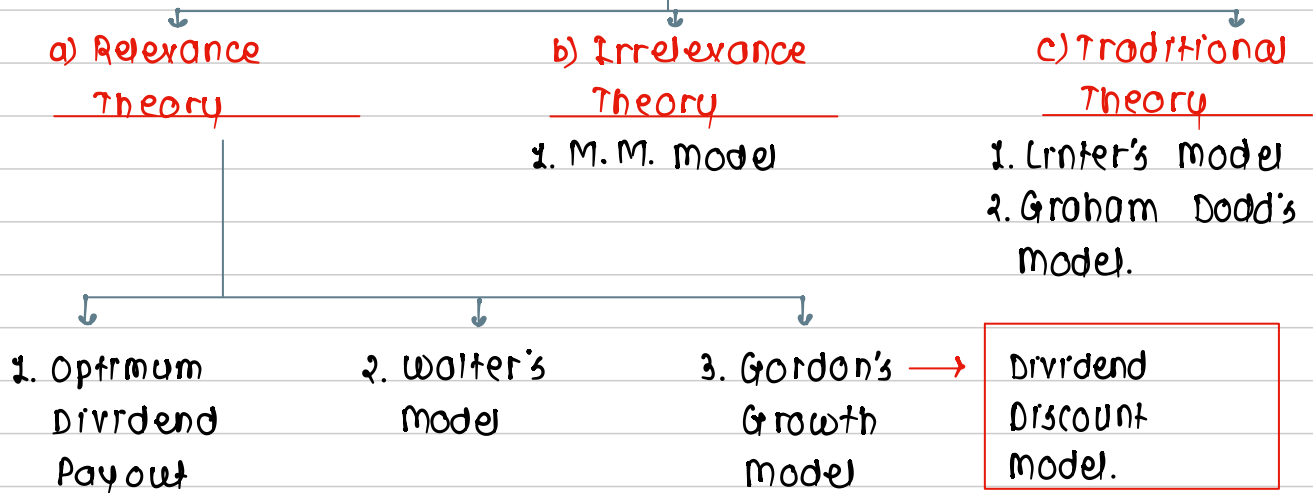
$$D_1 = D_0 + \left\{ (EPS \times \text{Target Payout}) - D_0 \right\} \times \text{Adjustment factor}$$

2. Graham & Dodd's Model

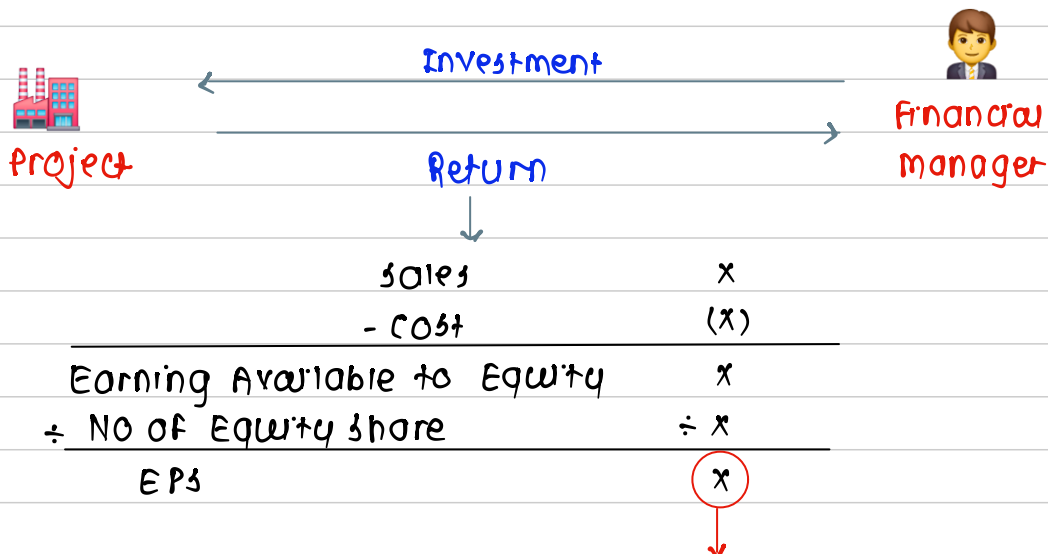
$$MPS = m \times \left(D + \frac{E}{3} \right)$$

Dividend Decision

Learning Objective



Learning Objective (why)



question: How much dividend should be paid to equity shareholder?

Goal: To maximize EPS

a) Relevance Theory

1. Optimum Dividend Payout:

Situation	Optimum Dividend Payout
a) $r(12\%) > k_e(10\%)$	0%
b) $r(10\%) = k_e(10\%)$	Every payout is Optimum
c) $r(8\%) < k_e(10\%)$	100%

Understanding of k_e & r :

Project



Financial manager



Shareholders

 r

- Return on Investment
- Internal rate of return

 k_e

- Cost of Equity
- Capitalisation Rate
- Discount Rate

2. Walter's Model:

$$P_0 = \left\{ \frac{(E-D) \times r}{k_e} \right\} + \frac{D}{k_e} \times 100$$

PAT (Net Profit)
 (= Preference Dividend
 EAE)

where,

E : Earning Per share $\longrightarrow (EAE \div \text{No of Equity shares})$

D : Dividend Per share $\longrightarrow (\text{Total Dividend} \div \text{No of Equity shares})$

$E-D$: Retained Earning

r : Return on Investment $\longrightarrow r = \frac{\text{Earning}}{\text{Capital}} \times 100$

k_e : Cost of Equity

P_0 : Market Price per share

$$k_e = \frac{1}{\text{PE Ratio}} \times 100$$



$$k_e = \frac{EPS}{MPS} \times 100 \longrightarrow k_e = \frac{1}{\left\{ \frac{MPS}{EPS} \right\}} \times 100 \longrightarrow k_e = \frac{1}{\text{PE Ratio}} \times 100$$

Extra:

EPS : 50

FY : 20

Dividend Payout is 10%EPS $\times$ 10%50 $\times$ 10%

5

Dividend is 10%FY $\times$ 10%20 $\times$ 10%

2

3. Gordon's Growth Model:

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

$$K_e = \left(\frac{D_1}{P_0} \times 100 \right) + g$$

$$K_e - g = \frac{D_1}{P_0} \times 100$$

$$P_0 = \frac{D_1}{K_e - g} \times 100$$

where,

E : Earning Per share

D : Dividend Per share $\rightarrow D_1$: Expected Dividend ($D_0 + g$)

E-D : Retained Earning

r : Return on Investment

g : Growth Rate

K_e : Cost of EquityP₀ : Market Price per share(b $\times$ r)

Retention % Return on Equity %

If Dividend Payout = 60%
then Retention % = 40%

D₀

Last year Dividend
Current Dividend
Dividend paid

D₁

Next year Dividend
Dividend at the end of 1st year
Dividend Expected to pay
Pays Dividend

b) Irrelevance Theory

1. M.M. Model:

a) Expected MPS:

$$P_1 = P_0 (1 + K_e) - D$$

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

$$P_0 (1 + K_e) = D_1 + P_1$$

$$P_0 (1 + K_e) - D_1 = P_1$$

b) New shares:

$$\Delta n = \frac{I - [E - (D \times n)]}{P_1} \rightarrow \text{keep shares in 2 decimals.}$$

c) Value of firm:

$$nP_0 = \frac{(n + \Delta n) \times P_1 - I + E}{1 + K_e}$$

where,

 P_0 : Current MPS n : Existing shares P_1 : Expected MPS Δn : New shares D_1 : Expected DPS I : Investment K_e : Cost of Equity E : Earning

c) Traditional Theory

2. Graham & Dodd's Model

$$MPs = m \times \left(D + \frac{E}{3} \right)$$

{given in question}

Multiplier

If company is fundamentally strong higher the multiplier

Dividend

Higher weight is given to dividend as it is received.

Earning

Lower weight is given to earning as it is yet to be received

- 10 Compute EPS according to Graham & Dodd approach from the given information:

Market price	₹ 56
Dividend pay-out ratio	60%
Multiplier	2

- (a) ₹ 30
(b) ₹ 56
(c) ₹ 28
(d) ₹ 84

$$MPs = m \times \left(D + \frac{E}{3} \right)$$

$$56 = 2 \times \left\{ (E \times 60\%) + \frac{E}{3} \right\}$$

$$56 = 2 \left\{ 0.6E + \frac{E}{3} \right\}$$

$$\frac{56}{2} = \frac{1.8E + E}{3}$$

$$28 \times 3 = 2.8E$$

$$84 = 2.8E$$

$$E = 30$$

2. Linter's Model:

$$D_1 = D_0 + \left\{ \left(\frac{EPS \times \text{Target Payout}}{\text{Payout}} \right) - D_0 \right\} \times \text{Adjustment factor}$$

- ↓
- It is decided by management
 - Given in question

Example:

	Y_0		Y_1
	D_0		D_1
EPS	4	EPS	10
x Payout %	x 50%	x Payout (%)	x 50%
D_0	2		5
		D_0	(2)
			3
		x Adjustment x 20%	
		Factor	
			0.6
		D_0	2
		D_1	2.6

5 min

The following information pertains

Question 9. (Illustration 9)

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:

- Market value per share as per Walter's model.
- Optimum dividend payout ratio according to Walter's model and the market value of Company's share at that payout ratio.

(WN-1): Details:

$$\begin{aligned}
 E &: 5 \quad (5L \div 1L) \\
 \times \text{Payout} &: \times 60\% \\
 D &: 3 \\
 r &: 15\% \\
 k_e &: 12\% \\
 P_0 &: ?
 \end{aligned}$$

2. a) Since $r > k_e$,

Optimum dividend payout = 0%

b) mps

$$\begin{aligned}
 E & 5 \\
 \times \text{Payout} & \times 0\% \\
 D & \text{NIL}
 \end{aligned}$$

1. mps (Walter's model)

$$P_0 = \frac{D + (E - D) \times \frac{r}{k_e}}{k_e}$$

$$P_0 = \frac{0 + (5 - 0) \times \frac{15}{12}}{12\%}$$

$$P_0 = 52.08$$

$$P_0 = \frac{3 + (5 - 3) \times \frac{15}{12}}{12\%}$$

$$P_0 = 45.83\%$$

30 min

The following information is supplied

Question 13. (PP2)

The following information is supplied to you:

	₹
Total Earnings	2,00,000
No. of equity shares (of ₹ 100 each)	20,000
Dividend paid	1,50,000
Price/ Earnings ratio	12.5

Applying Walter's Model:

- ANALYSE whether the company is following an optimal dividend policy.
- COMPUTE P/E ratio at which the dividend policy 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? ANALYSE.

$$K_e = \frac{1}{\text{PE Ratio}} \times 100$$

Explanation:

PE Ratio

$$\frac{\text{MPS}}{\text{EPS}}$$

Cost of equityDividend
approachEarning
approachGordon's
approachCAPM
approach

$$K_e = \frac{E_1}{P_0} \times 100$$

$$K_e = \frac{\text{EPS}}{\text{MPS}} \times 100$$

$$K_e = \frac{1}{\frac{\text{MPS}}{\text{EPS}}} \times 100$$

$$K_e = \frac{1}{\text{PE Ratio}} \times 100$$

(WN-1): Details:

$$\begin{aligned}
 E &: 10 \quad (200,000 \div 20,000) \\
 \times \text{Payout} &: \\
 D &: 7.5 \quad (150,000 \div 20,000) \\
 r &: 10\% \quad (\text{WN-3}) \\
 k_e &: 8\% \quad (\text{WN-2}) \\
 P_0 &:
 \end{aligned}$$

(WN-2): Cost of Equity:

$$\begin{aligned}
 k_e &= \frac{1}{\text{PE Ratio}} \times 100 \\
 &= \frac{1}{12.5} \times 100 \\
 &= 8\%
 \end{aligned}$$

(WN-3): Return on Equity

$$\begin{aligned}
 r &= \frac{\text{Earning}}{\text{Esc}} \times 100 \\
 &= \frac{200,000}{(20,000 \times 100)} \times 100 \\
 &= 10\%
 \end{aligned}$$

1. a) MPS

(Before recommendation)

$$P_0 = \frac{D + (E - D) \times r}{k_e}$$

$$P_0 = \frac{7.5 + (10 - 7.5) \times \frac{10}{8}}{8\%}$$

$$P_0 = 132.81$$

b) Recommendation:Since $r > k_e$,

Optimum Dividend Payout = 0%.

c) MPS (After recommendation)

$$\begin{aligned}
 E &: 10 \\
 \times \text{Payout} &: - \\
 D &: -
 \end{aligned}$$

$$P_0 = \frac{0 + (10 - 0) \times \frac{10}{8}}{8\%}$$

$$P_0 = 156.25$$

2. PE Ratio at which dividend payout does not affect MPSFor this, $r = k_e$

$$\therefore k_e = 10\%$$

$$k_e = \frac{1}{\text{PE Ratio}} \times 100$$

$$10 = \frac{1}{\text{PE Ratio}} \times 100$$

$$\therefore \text{PE Ratio} = \frac{1}{10} \times 100 = 10 \text{ times}$$

3) PE Ratio: 8

$$a) k_e = \frac{1}{8} = 12.5$$

$$(10) (12.5)$$

b) Since $r < k_e$ $\therefore$ Dividend payout = 100%.

$$P_0 = \frac{10 + (10 - 10) \times \frac{10}{12.5}}{12.5\%}$$

$$= 80.$$

MPS (Before recommendation)

$$P_0 = \frac{7.5 + (10 - 7.5) \times \frac{10}{12.5}}{12.5\%}$$

$$P_0 = 76$$

12 min

The following figures are collected

Question 4. (Illustration 4)

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. (Ke)	16%

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

(WN-1): Details:

Net Profit	30,00,000
(→) Preference Dividend (100L x 12%)	(12,00,000)
NP for ESH	18,00,000
÷ No of ES	÷ 3,00,000
EPS	6

Payout (%) :	25%	50%	100%
Dividend :	1.5	3	6

Growth:

Retention (%)	75%	50%	-
Return on Equity (%) x 20%	x 20%	x 20%	x 20%
	15%	10%	-

1. MPS as per Gordon's Formula:

$$P_0 = \frac{D_1}{K_e - g} \times 100$$

<u>Payout 25%</u>	<u>Payout 50%</u>	<u>Payout 100%</u>
$\frac{1.5}{16 - 15} \times 100$	$\frac{3}{16 - 10} \times 100$	$\frac{6}{16 - 0} \times 100$
150	50	37.5

AB Engineering Ltd. belongs

Question 1. (Illustration 1)

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.

(WN-1) : Details:

P_0 : Current mps	: 100
P_1 : Expected mps	: ?
D_1 : Expected DPS	: 5
K_e : Cost of Equity	: 10%
n : Existing shares	: 10,000
Δn : New shares	: ?
I : Investment	: 200,000
E : Earning	: 100,000

Particulars	Dividend paid	Dividend not paid
<u>1. Expected mps (P_1):</u>		
$P_0 = \frac{P_1 + D_1}{1 + K_e}$	$100 = \frac{P_1 + 5}{1 + 10\%}$	$100 = \frac{P_1 + 0}{1 + 10\%}$
	$100 \times 1.1 = P_1 + 5$	$100 \times 1.1 = P_1$
	$P_1 = 105$	$P_1 = 110$
<u>2. New shares (Δn)</u>		
a) Investment	a) 200,000	200,000
b) Retained Earning		
Earning	100,000	100,000
- Dividend paid (nD_1)	(50,000) ($5 \times 10,000$)	-
	b) 50,000	100,000
c) Funds Required (a-b)	150,000	100,000
d) Expected mps	$\div 105$	$\div 110$
e) New shares	1428.57	909.09

Extra:

	<u>Dividend paid</u>	<u>Dividend not paid</u>
n	10,000	10,000
$+ \Delta n$	1428.57	909.09
	11428.57	10909.09
$\times P_1$	$\times 105$	$\times 110$
(Closing) value of firm	1200,000	1200,000

Particulars

Dividend paid

Dividend not paid

3. Value of firm

$$n P_0 = \frac{(n + \Delta n) P_1 + E - I}{1 + k_e}$$

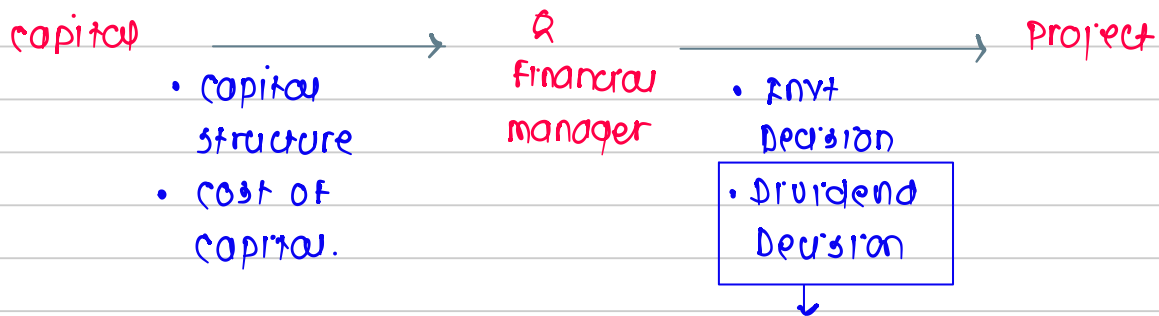
$$\frac{(10,000 + 1428.57) \times 105 + 100,000 - 200,000}{1 + 10\%}$$

$$\frac{(10,000 + 909.09) \times 110 + 100,000 - 200,000}{1 + 10\%}$$

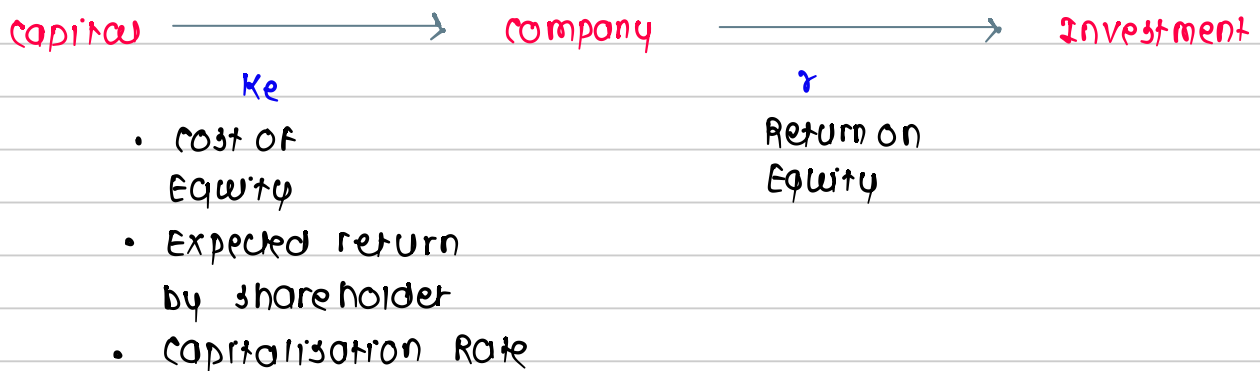
$$= 10,00,000$$

$$10,00,000$$

Dividend Decision



we will learn,
what should dividend payout
to maximize mps?



* Optimum Dividend Payout %.

$r > K_e$: 0% Payout.

(10%) (8%)

$r = K_e$: Payout % does not affect mps.

(10%) (10%)

$r < K_e$: 100% payout.

(8%) (10%)

1. Walter's model: E

$$P_0 = \frac{D + (E - D) \times \frac{r}{K_e}}{K_e}$$

Where,

E	:	EPS
x Payout	:	$x\%$
D	:	DPs
r	:	Return on Equity
K_e	:	Cost of Equity
P_0	:	Current MPS

$$P_0 = \frac{D}{K_e} + \frac{(E-D) \times r / K_e}{K_e}$$

TRP Sir

CA Rahul Panchal

1	2	3
E : 20	E : 20	E : 20
X% : X 50%	X% : X 50%	X% : X 50%
D : 10	D : 10	D : 10
r : 8%	r : 2%	r : 4%
K _e : 4%	K _e : 4%	K _e : 4%
$P_0 = \frac{10}{4\%} + \frac{(20-10) \times \frac{8}{4}}{4\%}$	$P_0 = \frac{10}{4\%} + \frac{(20-10) \times \frac{2}{4}}{4\%}$	$P_0 = \frac{10}{4\%} + \frac{(20-10) \times \frac{4}{4}}{4\%}$
250 + 500 = 750	250 + 125 = 375	250 + 250 500
↓	↓	↓
r > K _e → Payout = 0%	r < K _e → Payout = 100%	r = K _e - Payout doesn't affect mps say = 60%
E : 20	E : 20	E : 20
X% : -	X% : X 100%	X% : X 60%
D : -	D : 20	D : 12
r : 8%	r : 2%	r : 4%
K _e : 4%	K _e : 4%	K _e : 4%
$P_0 = 0 + \frac{(20-0) \times \frac{8}{4}}{4\%}$	$P_0 = \frac{20}{4\%} + \frac{(20-20) \times \frac{2}{4}}{4\%}$	$P_0 = \frac{12}{4\%} + \frac{(20-12) \times \frac{4}{4}}{4\%}$
= 1000	= 500	300 + 200 500

4 min

XYZ Ltd. earns ₹ 10/ share. Capitalization rate

Question 2. (Illustration 2)

XYZ Ltd. earns ₹ 10/ share. Capitalization rate and return on investment are 10% and 12% respectively.

DETERMINE the optimum dividend payout ratio and the price of the share at the payout.

(WN-1): Details:

E	:	10
x Payout	:	0%
D	:	-
r	:	12%
Ke	:	10%

1. Optimum Dividend Payout:

Since $r > K_e$, the optimum dividend payout = 0%.

2. MPS:

$$\begin{aligned}
 P_0 &= \frac{D + (E - D) \times \frac{r}{K_e}}{K_e} \\
 &= \frac{0 + (10 - 0) \times \frac{12}{10}}{10\%} \\
 &= 120.
 \end{aligned}$$

7 min

The following figures are collected

Question 3. (Illustration 3)

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. (Ke)	16%

COMPUTE the approximate dividend pay-out ratio so as to keep the share price at ₹ 42 by using Walter's model?

(WN-1): Details:

$E : 6$
 $\times \text{Payout} : ?$
 $D : ?$
 $r : 20\%$
 $k_e : 16\%$
 $P_0 : 42$

(WN-2): EPS

Net Profit	30,00,000
- Preference Dividend	(12,00,000)
	<u>(100L x 12%)</u>
NP for ESH	1800,000
÷ NO OF ES	÷ 300,000
EPS	6

1. Payout ratio:

$$P_0 = \frac{D + (E - D) \times \frac{r}{k_e}}{k_e}$$

$$42 = \frac{D + (6 - D) \times \frac{20}{16}}{16\%}$$

$$42 \times 16\% = D + 7.5 - 1.25D$$

$$1.25D - D = 7.5 - 6.72$$

$$0.25D = 0.78$$

$$D = 3.12$$

$$\therefore \text{Payout Ratio} = \frac{DPS}{EPS} \times 100 = \frac{3.12}{6} \times 100 = 52\%$$

5 min

The following information pertains

Question 9. (Illustration 9)

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:

- Market value per share as per Walter's model.
- Optimum dividend payout ratio according to Walter's model and the market value of Company's share at that payout ratio.

(WN-1): Details:

$$\begin{aligned}
 E &: 5 \quad (50 \div 10) \\
 \times \text{Payout} &: \times 60\% \\
 D &: 3 \\
 r &: 15\% \\
 k_e &: 12\% \\
 P_0 &: ?
 \end{aligned}$$

2. a) Since $r > k_e$,

Optimum dividend payout = 0%

b) mps

$$\begin{aligned}
 E & 5 \\
 \times \text{Payout} & \times 0\% \\
 D & \text{NIL}
 \end{aligned}$$

1. mps (Walter's model)

$$P_0 = \frac{D + (E - D) \times \frac{r}{k_e}}{k_e}$$

$$P_0 = \frac{0 + (5 - 0) \times \frac{15}{12}}{12\%}$$

$$P_0 = 52.08$$

$$P_0 = \frac{3 + (5 - 3) \times \frac{15}{12}}{12\%}$$

$$P_0 = 45.83\%$$

2. Gordon's growth model:

$$P_0 = \frac{D_1}{K_e - g} \times 100 \leftarrow$$

D_1 = Expected Dividend

K_e = Cost of Equity

g = Growth

$\downarrow$
 $\frac{b}{\%} \times \frac{r}{\%}$
 Retention % x Return on equity %

$$K_e = \left(\frac{D_1}{P_0} \times 100 \right) + g$$

$$K_e - g = \frac{D_1}{P_0} \times 100$$

$$P_0 = \frac{D_1}{K_e - g} \times 100$$

(4 min)

The following information is

Question 11. (Illustration 11)

The following information is given below in case of Aditya Ltd.:

Earnings per share = ₹ 60

Capitalisation rate = 15%

Return on investment = 25%

Dividend payout ratio = 30%

(i) COMPUTE price per share using Walter's Model.

(ii) WHAT would be optimum dividend payout ratio per share under Gordon's Model.

(WNT): Details:

E : 60
 $\times$ Payout : $\times 30\%$
 D : 18
 r : 25%
 K_e : 15%
 P_0 : ?

1. MPS (Walter's Model):

$$P_0 = \frac{D + (E - D) \times \frac{r}{K_e}}{K_e}$$

$$P_0 = \frac{18 + (60 - 18) \times \frac{25}{15}}{15\%}$$

$$P_0 = 586.67$$

2. Since $r > K_e$

optimum dividend payout = 0%

30 min

The following information is supplied

Question 13. (PP2)

The following information is supplied to you:

	₹
Total Earnings	2,00,000
No. of equity shares (of ₹ 100 each)	20,000
Dividend paid	1,50,000
Price/ Earnings ratio	12.5

Applying Walter's Model:

- ANALYSE whether the company is following an optimal dividend policy.
- COMPUTE P/E ratio at which the dividend policy 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? ANALYSE.

$$K_e = \frac{1}{\text{PE Ratio}} \times 100$$

Explanation:

PE Ratio

$$\frac{\text{MPS}}{\text{EPS}}$$

Cost of equityDividend
approachEarning
approachGordon's
approachCAPM
approach

$$K_e = \frac{E_1}{P_0} \times 100$$

$$K_e = \frac{\text{EPS}}{\text{MPS}} \times 100$$

$$K_e = \frac{1}{\frac{\text{MPS}}{\text{EPS}}} \times 100$$

$$K_e = \frac{1}{\text{PE Ratio}} \times 100$$

(WN-1): Details:

$$\begin{aligned}
 E &: 10 \quad (200,000 \div 20,000) \\
 \text{x Payout} &: \\
 D &: 7.5 \quad (150,000 \div 20,000) \\
 r &: 10\% \quad (\text{WN-3}) \\
 k_e &: 8\% \quad (\text{WN-2}) \\
 P_0 &:
 \end{aligned}$$

(WN-2): Cost of Equity:

$$\begin{aligned}
 k_e &= \frac{1}{\text{PE Ratio}} \times 100 \\
 &= \frac{1}{12.5} \times 100 \\
 &= 8\%
 \end{aligned}$$

(WN-3): Return on Equity

$$\begin{aligned}
 r &= \frac{\text{Earning}}{\text{Esc}} \times 100 \\
 &= \frac{200,000}{(20,000 \times 100)} \times 100 \\
 &= 10\%
 \end{aligned}$$

1. a) MPS

(Before recommendation)

$$P_0 = \frac{D + (E - D) \times r}{k_e}$$

$$P_0 = \frac{7.5 + (10 - 7.5) \times \frac{10}{8}}{8\%}$$

$$P_0 = 132.81$$

b) Recommendation:Since $r > k_e$,

Optimum Dividend Payout = 0%.

c) MPS (After recommendation)

$$\begin{aligned}
 E &: 10 \\
 \text{x Payout} &: - \\
 D &: -
 \end{aligned}$$

$$P_0 = \frac{0 + (10 - 0) \times \frac{10}{8}}{8\%}$$

$$P_0 = 156.25$$

2. PE Ratio at which dividend payout does not affect MPSFor this, $r = k_e$

$$\therefore k_e = 10\%$$

$$k_e = \frac{1}{\text{PE Ratio}} \times 100$$

$$10 = \frac{1}{\text{PE Ratio}} \times 100$$

$$\therefore \text{PE Ratio} = \frac{1}{10} \times 100 = 10 \text{ times}$$

3) PE Ratio: 8

$$a) k_e = \frac{1}{8} = 12.5$$

$$(10) (12.5)$$

b) Since $r < k_e$ $\therefore$ Dividend payout = 100%.

$$P_0 = \frac{10 + (10 - 10) \times \frac{10}{12.5}}{12.5\%}$$

$$= 80.$$

MPS (Before recommendation)

$$P_0 = \frac{7.5 + (10 - 7.5) \times \frac{10}{12.5}}{12.5\%}$$

$$P_0 = 76 .$$

12 min

The following figures are collected

Question 4. (Illustration 4)

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. (Ke)	16%

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

(WN-1): Details:

Net Profit	30,00,000
(-) Preference Dividend (100L x 12%)	(12,00,000)
NP for ESH	18,00,000
÷ No of ES	÷ 3,00,000
EPS	6

Payout (%) :	25%	50%	100%
Dividend :	1.5	3	6

Growth:

Retention (%)	75%	50%	-
Return on Equity (%) x 20%	x 20%	x 20%	x 20%
	15%	10%	-

1. MPS as per Gordon's Formula:

$$P_0 = \frac{D_1}{K_e - g} \times 100$$

<u>Payout 25%</u>	<u>Payout 50%</u>	<u>Payout 100%</u>
$\frac{1.5}{16 - 15} \times 100$	$\frac{3}{16 - 10} \times 100$	$\frac{6}{16 - 0} \times 100$
150	50	37.5

1 min

X Ltd. is a no growth company, pays

Question 5. (Illustration 5)

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?

$$\text{current mps} = \frac{D}{k_e} = \frac{5}{10\%} = 50.$$

XYZ is a company having share capital

Question 6. (Illustration 6)

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.

$$MPS = \frac{D_1}{K_e - g} \times 100$$

$$\frac{(10 \times 20\%) + 2\%}{15 - 2} \times 100$$

$$= \frac{2.04}{13} \times 100$$

$$= 15.69$$

S m id

A firm had paid dividend at ₹ 2 per share

Question 7. (Illustration 7)

A firm had paid dividend at ₹ 2 per share last year. The estimated growth of the dividends from the company is estimated to be 5% p.a. DETERMINE the estimated market price of the equity share if the estimated growth rate of dividends (i) rises to 8%, and (ii) falls to 3%. Also FIND OUT the present market price of the share, given that the required rate of return of the equity investors is 15%.

2. M P3 (Gordon's Growth):

$$P_0 = \frac{D_1}{K_e - g} \times 100$$

Growth: 5%

$$\frac{2 + 5\%}{15 - 5} \times 100$$

21

Growth: 8%

$$\frac{2 + 8\%}{15 - 8} \times 100$$

30.86

Growth: 3%

$$\frac{2 + 3\%}{15 - 3} \times 100$$

17.17

With the help of following figures

Question 14. (PP3)

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 (Ke)	20%
Internal rate of return on investment	25%
Retention Ratio	40%

(WN-1) : Details:

$$\begin{aligned}
 E &: 10 \\
 \times \text{Payout} &: \\
 D &: 6 \\
 r &: 25\% \\
 K_e &: 20\%
 \end{aligned}$$

1) MPS (Walter's model):

$$P_0 = \frac{D + (E-D) \times \frac{r}{K_e}}{K_e}$$

$$P_0 = \frac{6 + (10-6) \times \frac{25}{20}}{20\%}$$

$$\therefore P_0 = 55$$

(WN-2) : Growth:

$$\begin{aligned}
 &\text{Retention}(\%) \times \text{Reten on equity}(\%) \\
 &40\% \times 25\% \\
 &10\%
 \end{aligned}$$

2) MPS (Gordon's Growth Model)

$$P_0 = \frac{D_1}{K_e - g} \times 100$$

$$= \frac{6}{20-10} \times 100$$

$$P_0 = 60$$

8min

The annual report of XYZ Ltd

Question 15. (PP4)

The annual report of XYZ Ltd. provides the following information:

Particulars	Amount (₹)
Net Profit	50 lakhs
Outstanding 15% preference shares	100 lakhs
No. of equity shares	5 lakhs
Return on Investment	20%
Cost of capital i.e. (Ke)	16%

CALCULATE price per share using Gordon's Model when dividend pay-out is:

- (i) 25%;
 (ii) 50%;
 (iii) 100%.

(W.N-1) : Details:

Net Profit	50,00,000
(-) Preference Dividend (100L x 15%)	(15,00,000)
NP for ESH	35,00,000
÷ No of ES	÷ 500,000
EPS	7

	↓	↓	↓	↓
Payout (%) :	25%	50%	100%	
Dividend :	1.75	3.5	7	

Growth:

Retention (%)	75%	50%	-
Return (%)	x 20%	x 10%	x 20%
	15%	10%	-

1. M.Ps (Gordon's Growth Model)

$$P_0 = \frac{D_1}{K_e - g} \times 100$$

↓	↓	↓
Growth: 15%	Growth = 10%	Growth = Nil
$\frac{1.75}{16 - 15} \times 100$	$\frac{3.5}{16 - 10} \times 100$	$\frac{7}{16 - 0} \times 100$
175	58.33	43.75

6 min

Taking an example of three different

Question 10. (Illustration 10)

Taking an example of three different firms i.e. growth, normal and declining, CALCULATE the share price using Gordon's model.

Sources	Firm $r > K_e$	Firm $r = K_e$	Firm $r < K_e$
r (rate of return on retained earnings)	15%	10%	8%
K_e (Cost of Capital)	10%	10%	10%
E (Earning Per Share)	₹ 10	₹ 10	₹ 10
b (Retained Earnings)	0.6	0.6	0.6
1 - b (Dividend Payout)	0.4	0.4	0.4

(WN-1): Details:

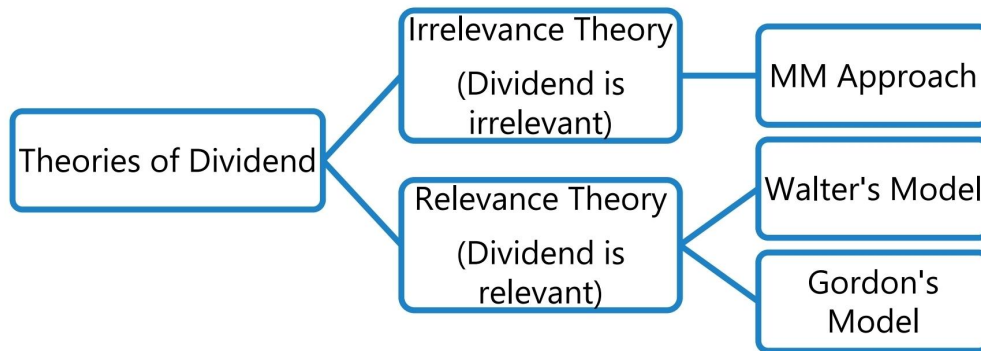
	$EPS = 10$		
	↓	↓ ↓	↓
Payout (%)	40%	40%	40%
Dividend	4	4	4
<u>Growth:</u>			
Retention (%)	60%	60%	60%
Return (%)	$\times 15\%$	$\times 10\%$	$\times 8\%$
	9%	6%	4.8%

1. MPS (Gordon's Growth Model):

$$P_0 = \frac{D_1}{K_e - g} \times 100$$

↓	↓	↓	↓
<u>Growth: 9%</u>	<u>Growth: 6%</u>	<u>Growth: 4.8%</u>	
$\frac{4}{10-9} \times 100$	$\frac{4}{10-6} \times 100$	$\frac{4}{10-4.8} \times 100$	
400	100	76.92	

MODIGLIANI and MILLER (MM) Approach

MM Approach:mps

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

value of firm

$$nP_0 = \frac{(n + \Delta n)P_1 + E - I}{1 + K_e}$$

 P_0 : Current mps P_1 : Expected mps D_1 : Expected DPS K_e : Cost of Equity n : Existing shares Δn : New shares I : Investment E : EarningExplanation:

$$\begin{array}{ccc}
 1 & + 10\% & 1.1 \\
 \bullet & \xrightarrow{K_e = 10\%} & \bullet \\
 P_0 & & P_1 : 108 \\
 & & \underline{D_1 : 2} \\
 & & 110
 \end{array}$$

$$\begin{aligned}
 & \frac{D_1 + P_1}{1 + K_e} \\
 &= \frac{2 + 108}{1 + 10\%} \\
 &= 100
 \end{aligned}$$

AB Engineering Ltd. belongs

Question 1. (Illustration 1)

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.

(WN-1) : Details:

P_0 : Current mps	: 100
P_1 : Expected mps	: ?
D_1 : Expected DPS	: 5
K_e : Cost of Equity	: 10%
n : Existing shares	: 10,000
Δn : New shares	: ?
I : Investment	: 200,000
E : Earning	: 100,000

Particulars	Dividend paid	Dividend not paid
<u>1. Expected mps (P_1):</u>		
$P_0 = \frac{P_1 + D_1}{1 + K_e}$	$100 = \frac{P_1 + 5}{1 + 10\%}$	$100 = \frac{P_1 + 0}{1 + 10\%}$
	$100 \times 1.1 = P_1 + 5$	$100 \times 1.1 = P_1$
	$P_1 = 105$	$P_1 = 110$
<u>2. New shares (Δn)</u>		
a) Investment	a) 200,000	200,000
b) Retained Earning		
Earning	100,000	100,000
- Dividend paid (nD_1)	(50,000) ($5 \times 10,000$)	-
	b) 50,000	100,000
c) Funds Required (a-b)	150,000	100,000
d) Expected mps	$\div 105$	$\div 110$
e) New shares	1428.57	909.09

Extra:

	<u>Dividend paid</u>	<u>Dividend not paid</u>
n	10,000	10,000
$+ \Delta n$	1428.57	909.09
	11428.57	10909.09
$\times P_1$	$\times 105$	$\times 110$
(Closing) value of firm	1200,000	1200,000

Particulars

Dividend paid

Dividend not paid

3. Value of firm

$$n P_0 = \frac{(n + \Delta n) P_1 + E - I}{1 + k_e}$$

$$\frac{(10,000 + 1428.57) \times 105 + 100,000 - 200,000}{1 + 10\%}$$

$$\frac{(10,000 + 909.09) \times 110 + 100,000 - 200,000}{1 + 10\%}$$

$$= 10,00,000$$

$$10,00,000$$

Derivation

* Value of firm

$$nP_0 = \frac{(n + \Delta n) P_1 + E - I}{1 + k_e}$$

a) Funds required:

Investment - Retained Earnings
(Earning - Dividend)

$$I - (E - nD_1)$$

b) New shares:

$$\Delta n = \frac{I - (E - nD_1)}{P_1}$$

$$\Delta n P_1 = I - E + nD_1 \longrightarrow \Delta n P_1 = I - E + nD_1$$

c) Current mps:

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

(multiply n)

$$nP_0 = \frac{nD_1 + nP_1}{1 + k_e}$$

(+ $\Delta n P_1$, - $\Delta n P_1$)

$$nP_0 = \frac{nD_1 + nP_1 + \Delta n P_1 - \Delta n P_1}{1 + k_e}$$

$$\Delta n P_1 = I - E + nD_1$$

$$nP_0 = \frac{nD_1 + P_1 (n + \Delta n) - \Delta n P_1}{1 + k_e}$$

$$nP_0 = \frac{nD_1 + P_1 (n + \Delta n) - I + E - nD_1}{1 + k_e}$$

$$nP_0 = \frac{P_1 (n + \Delta n) - I + E}{1 + k_e}$$

11 min

M Ltd. belongs to a risk class for

Question 12. (PP1)

M Ltd. belongs to a risk class for which the capitalization rate is 10%. It has 25,000 outstanding shares and the current market price is ₹ 100. It expects a net profit of ₹ 2,50,000 for the year and the Board is considering dividend of ₹ 5 per share.

M Ltd. requires to raise ₹ 5,00,000 for an approved investment expenditure. ILLUSTRATE, how the MM approach affects the value of M Ltd. if dividends are paid or not paid.

(WN-1) : Details:

P_0 :	Current mps	:	100
P_1 :	Expected mps	:	?
D_1 :	Expected DPS	:	5
K_e :	Cost of Equity	:	10%
n :	Existing shares	:	25000
Δn :	New shares	:	?
I :	Investment	:	500,000
E :	Earning	:	250,000

Particulars	Dividend paid	Dividend not paid
<u>1. Expected mps (P_1):</u>		
$P_0 = \frac{P_1 + D_1}{1 + K_e}$	$100 = \frac{P_1 + 5}{1 + 10\%}$	$100 = \frac{P_1 - 0}{1 + 10\%}$
	$100 \times 1.1 = P_1 + 5$	$100 \times 1.1 = P_1$
	$P_1 = 105$	$P_1 = 110$
<u>2. New shares (Δn)</u>		
a) Investment	a) 500,000	500,000
b) Retained Earning		
Earning	250,000	250,000
- Dividend paid (nD_1)	(125000)	-
	(450000 x 5)	
	b) 125000	250,000
c) Funds Required (a-b)	375000	250,000
d) Expected mps	÷ 105	÷ 110
e) New shares	3571.42	2272.73

Particulars	Dividend paid	Dividend not paid
3. Value of firm		
$nP_0 = \frac{(n+\Delta n) P_1 + E - I}{1 + K_e}$	$\frac{(25000 + 3571.43) \times 105 + 250,000 - 500,000}{1 + 10\%}$	$\frac{(25000 + 2272.73) \times 110 + 250,000 - 500,000}{1 + 10\%}$
	= 250000.	250000.

RST Ltd. has a capital of ₹ 10,00,000

Question 8. (Illustration 8)

RST Ltd. has a capital of ₹ 10,00,000 in equity shares of ₹ 100 each. The shares are currently quoted at par. The company proposes to declare a dividend of ₹ 10 per share at the end of the current financial year. The capitalization rate for the risk class of which the company belongs is 12%. COMPUTE market price of the share at the end of the year, if

- (i) dividend is not declared
- (ii) dividend is declared

Assuming that the company pays the dividend and has net profits of ₹ 5,00,000 and makes new investments of ₹ 10,00,000 during the period, CALCULATE number of new shares to be issued? Use the MM model.

(WN-1) : Details:

P_0 : Current mps	:	100
P_1 : Expected mps	:	
D_1 : Expected DPS	:	10
K_e : Cost of Equity	:	12%
n : Existing shares	:	10,000 (10L ÷ 100)
Δn : New shares	:	
I : Investment	:	10,00,000
E : Earning	:	5,00,000

<u>Particulars</u>	<u>Dividend paid</u>	<u>Dividend not paid</u>
1. <u>Expected mps (P_1):</u>		
$P_0 = \frac{P_1 + D_1}{1 + K_e}$	$100 = \frac{P_1 + 10}{1 + 12\%}$	$100 = \frac{P_1 + 0}{1 + 12\%}$
	$100 \times 1.12 = P_1 + 10$	$100 \times 1.12 = P_1$
	102	112

2. New shares (Δn)

a) Investment a) 10,00,000

b) Retained Earning

Earning 5,00,000
 - Dividend paid (nD_1) (10,00,000)
(10,000 × 10)

b) 4,00,000

c) Funds Required (a-b) 6,00,000

d) Expected mps ÷ 102

e) New shares 5882.35 or 5883 shares.

12 min

Aakash Ltd. has 10 lakh equity shares

Question 18. (PP7)

Aakash Ltd. has 10 lakh equity shares outstanding at the start of the accounting year. The existing market price per share is 150. Expected dividend is 8 per share. The rate of capitalization appropriate to the risk class to which the company belongs is 10%.

- CALCULATE the market price per share when expected dividends are: (a) declared, and (b) not declared, based on the Miller – Modigliani approach.
- CALCULATE number of shares to be issued by the company at the end of the accounting year on the assumption that the net income for the year is 3 crore, investment budget is 6 crores, when (a) Dividends are declared, and (b) Dividends are not declared.
- PROOF that the market value of the shares at the end of the accounting year will remain unchanged irrespective of whether (a) Dividends are declared, or (ii) Dividends are not declared.

(WN-1) : Details:

P_0 : Current mps	: 150	n : Existing shares	: 10,00,000
P_1 : Expected mps	: ?	Δn : New shares	: ?
D_1 : Expected DPS	: 8	I : Investment	: 6 cr.
K_e : Cost of Equity	: 10%	E : Earning	: 3 cr.

Particulars	Dividend paid	Dividend not paid
<u>1. Expected mps (P_1):</u>		
$P_0 = \frac{P_1 + D_1}{1 + K_e}$	$150 = \frac{P_1 + 8}{1 + 10\%}$	$150 = \frac{P_1 + 0}{1 + 10\%}$
	$150 \times 1.1 = P_1 + 8$	$150 \times 1.1 = P_1$
	$P_1 = 157$	$P_1 = 165$
<u>2. New shares (Δn)</u>		
a) Investment	a) 600,00,000	600,00,000
b) Retained Earning		
Earning	300,00,000	300,00,000
- Dividend paid (nD_1)	(80,00,000)	-
	(10,00,000 x 8)	
	b) 220,00,000	300,00,000
c) Funds Required (a-b)	380,00,000	300,00,000
d) Expected mps	$\div 157$	$\div 165$
e) New shares	242038.22	181818.18

Particulars	Dividend paid	Dividend not paid
3. Value of firm (END)		
$n P_0 = (n + \Delta n) P_1$	$(10,00,000 + 242038.22)$	$(10,00,000 + 181818.18)$
	$\times 157$	$\times 165$
	$= 1950,00,000$	$= 19,50,00,000$
<u>Extra:</u> Question is asking value of firm at the end & not beginning.		

Hence, it is proved that the total market value of shares remains unchanged irrespective of whether dividends are declared, or not declared.

4 min

Mr H is currently holding 1,00,000

Question 19. (PP8)

Mr H is currently holding 1,00,000 shares of HM Ltd, and currently the share of HM Ltd is trading on Bombay Stock Exchange at ₹ 50 per share. Mr A have a policy to re-invest the amount of any dividend received into the share back again of HM Ltd. If HM Ltd has declared a dividend of ₹ 10 per share, please determine the no of shares that Mr A would hold after he re-invests dividend in shares of HM Ltd.

Dividend received $(100,000 \text{ shares} \times 10)$	10,00,000
Market value ex-dividend $(50 - 10)$	÷ 40
New shares	25,000
Existing shares	1,00,000
	1,25,000

Following information is given

Question 20. (PP9)

Following information is given pertaining to DG Ltd,

No of shares outstanding	1 lakh shares
Earnings Per share	25 per share
P/E Ratio	20
Book Value per share	400 per share

If company decides to repurchase ~~5,000~~ ^{25,000} shares, at the prevailing market price, what is the resulting book value per share after repurchasing.

(WN-1): MPS:

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

$$20 = \frac{MPS}{25}$$

$$MPS = 20 \times 25 = 500$$

Book Value before re-purchase	400,00,000
(100,000 × 400)	
- Re-purchase (25,000 × 500)	(1,25,00,000)
	275,00,000
÷ NO of shares (100,000 - 25,000)	÷ 75,000
Book value per share after re-purchase	366.67

In the month of May of the current

Question 17. (PP6)

In the month of May of the current Financial Year, shares of RT Ltd. was sold for ₹ 1,460 per share. A long term earnings growth rate of 7.5% is anticipated. RT Ltd. is expected to pay dividend of ₹ 20 per share.

- (i) CALCULATE 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?
- (ii) It is expected that RT Ltd. will earn about 10% on retained earnings and shall retain 60% of earnings. In this case, STATE whether, there would be any change in growth rate and cost of Equity?

1. Return expected by investor / K_e :

$$K_e = \left(\frac{D_1}{P_0} \times 100 \right) + g$$

$$= \left(\frac{20}{1460} \times 100 \right) + 7.5$$

$$= 8.87\%$$

2. a) Revised Growth Rate:

$$\text{Retention (\%)} \times \text{Return (\%)} \\ 60\% \times 10\% \\ 6\%$$

b) Old Retention %

$$\begin{aligned} \text{Old growth rate} &= \text{Old Retention (\%)} \times \text{Old Return (\%)} \\ 7.5 &= \text{Old Retention} \times 10\% \\ \frac{7.5}{10\%} &= \text{Old Retention} \end{aligned}$$

$$\therefore \text{Old retention} = 75\%$$

c) EPS:

	%	Rs.
EPS	100	(?) 80
- Payout (%)	25	20
Retention (%)	75	

d) Revised Dividend:

$$\begin{array}{rcl} \text{EPS} & 80 & \\ \times \text{Payout} & \times 40\% & (100 - 60) \\ \hline & 32 & \end{array}$$

e) Revised Ke:

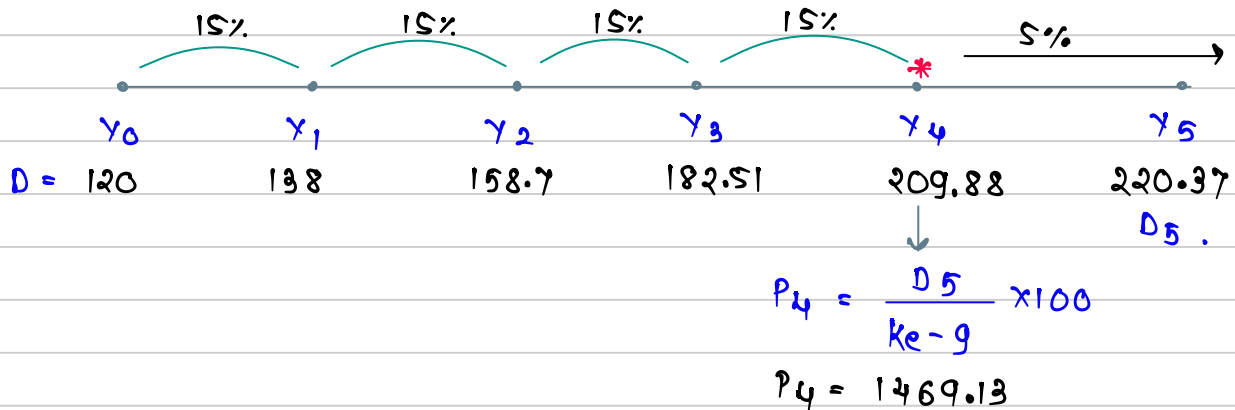
$$\begin{aligned} K_e &= \left(\frac{32}{1460} \times 100 \right) + 6 \\ &= 8.19\% \end{aligned}$$

13 min

A&R Ltd. is a large-cap multinational

Question 16. (PP5)

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 current Financial Year. The shares of the company traded at an average price of ₹ 3,122 on last day. FIND out the intrinsic value per share and state whether shares are overpriced or underpriced.



(WNT): mps at Year 4 (end):

$$P_4 = \frac{220.37}{20-5} \times 100$$

$$P_4 = 1469.13$$

Calculation of Intrinsic value / Present Value:

Year	Cash Flow	PVF @ 20%	PV
1	138	0.833	115
2	158.7	0.694	110
3	182.51	0.579	106
4	1679.01	0.482	809

$$(209.88 + 1469.13)$$

Intrinsic value	1140
-----------------	------

Current mps	3122
-------------	------

∴ share are overvalued by	1982
---------------------------	------

Lex. Ratio

- WC : Rec mgt : factor
• Pay mgt
- 2D : Q 19, 29, 31
- CS : Theories (14 question)
- COC : Q 10, 11

DD . Chapter 1 & 2 : Theory . + MCQ

Costing : Theory . + MCQ .

01