Gordon's Model.

$$P = \frac{E(1-b)}{K_e - br}$$

where, P = Price of a share.

E = Earning per share (EPS).

b = Retention ratio i.e percentage of earnings retained.

(1-b) = D/P ratio i.e, percentage of earnings distributed as dividend.

K_e = Cost of equity Capital or the capitalisation rate.

$br = g$ = Growth rate of return on investment.

$$\frac{}{K_e - g} = \frac{}{K_e - br} \quad [\because g = br]$$

Illustration 7.

The following information is collected from the annual reports of J Ltd. :

Profit before tax	₹ 2·50 crore
Tax rate	40 per cent
Retention ratio	40 per cent
Numbers of outstanding shares	50,00,000
Equity capitalisation rate	12 per cent
Rate of return on investment	15 per cent

What should be the market price per share according to Gordon's Model of dividend policy?

[C.A. Inter May, 2015]

Solution :

According to Gordon's Model, the Market Price (P) of a share, is given by,

$$P = \frac{E(1-b)}{K_e - br}$$

Where,

E = Earnings per share, (i.e., 60% of ₹ 2·50 crore/50,00,000 shares) ₹ 3

b = Retention ratio i.e., 40% or 0·40

K_e = Cost of Capital or Equity Capitalisation rate i.e., 12% or 0·12

r = Rate of return on investment i.e., 15% or 0·15

Now, putting the values in the model, we get,

$$P = \frac{₹3(1-0.40)}{0.12-(0.40\times0.15)}$$

$$= \frac{1.80}{0.12-0.06}$$

$= ₹ 30.$

Illustration 8.

From the following information relating to a company, determine the market price of a share using Gordon's Model :

Total investment in assets	₹ 10,00,000
No. of shares	50,000
Total earnings	₹ 2,00,000
Cost of capital	16%
Pay-out ratio	40%

Solution :

According to Gordon's Model, the Market Price of a share, P, is given by,

$$P = \frac{E(1-b)}{K_e - br}$$

where, P = Market Price of a share

E = Earnings per share

$$= \frac{\text{Total earnings}}{\text{No. of shares}}$$

$$= \frac{₹2,00,000}{50,000}$$

$= ₹ 4$

$(1 - b)$ = Pay-out ratio = 0·40

K_e = Cost of capital = 0·16

b = Retention ratio = 1 – 0·40 = 0·60

and r = Rate of return on investments

$$= \frac{\text{Total earnings}}{\text{Total Investments}} \times 100$$

$$= \frac{₹2,00,000}{₹10,00,000} \times 100$$

$= 20\% = 0.20$

Putting the values in the model, we get,

$$P = \frac{₹4\times0.40}{0.16-(0.60\times0.20)} = ₹ 40.$$

Illustration 9.

A company's total investment in asset is ₹ 1,00,00,000. It has 1,00,000 shares of ₹ 100 each. Its expected rate of return on investment is 30% and the cost of capital is 18%. The company has a policy of retaining 25% of its profits. Determine the value of the firm using Gordon's Model.

[C.U. M.Com., 1990]
[Almost similar to C.U. M.Com., 2006]

Solution :

As per Gordon's Model, the Market Price of a share,

$$P = \frac{E(1-b)}{K_e - br}$$

where, P = Market price of a share.

E = Earnings per share.

$$= \frac{\text{Return on Investment}}{\text{Number of Shares}}$$

$$= \frac{30\% \text{ of } ₹1,00,00,000}{1,00,000} = ₹ 30$$

b = Retention ratio or percentage of earnings retained.

= 25% or 0·25

K_e = Capitalisation rate = 18% or 0·18

and r = Rate of return on investment.

= 30% = 0·30

Putting the values in the model, we get,

$$P = \frac{₹30(1-0·25)}{0·18-(0·25\times0·30)}$$

$$= ₹ 214·28571.$$

∴ Market price of a share, P = ₹ 214·28571.

Now, Value of the firm,

$$V = n \times P,$$

where, n = Number of shares,

and P = Market price of a share,

∴ V = 1,00,000 × ₹ 214·28571

= ₹ 2,14,28,571.

Illustration 10.

The following information is available in respect of the rate of return on investment (r), the capitalisation rate (K_e) and earnings per share (E) of ABC Ltd.

r = 12 per cent, E = ₹ 20.

Determine the value of its shares, assuming the following :

Situation	D/P Ratio (1 – b)	Retention Ratio (b)	K_e (%)
(a)	10	90	20
(b)	20	80	19
(c)	30	70	18
(d)	40	60	17
(e)	50	50	16
(f)	60	40	15
(g)	70	30	14

Solution :

According to Gordon's Model, the value of a share, P, is given by,

$$P = \frac{E(1-b)}{K_e - br}$$

where, P = Value of a share,

E = Earnings per share,

b = Retention ratio,

$(1 - b)$ = D/P ratio,

K_e = Capitalisation rate,

r = Rate of return on investment.

The value of shares of ABC Ltd. for different D/P ratios and retention ratios are shown in the following table.

Situation	D/P Ratio (1– b)	Retention Ratio (b)	K_e (%)	Value of Share
(a)	10	90	20	$P = \frac{₹20 \times 0{\cdot}10}{0{\cdot}20 - (0{\cdot}90 \times 0{\cdot}12)} = ₹\ 21{\cdot}74$
(b)	20	80	19	$P = \frac{₹20 \times 0{\cdot}20}{0{\cdot}19 - (0{\cdot}80 \times 0{\cdot}12)} = ₹\ 42{\cdot}55$
(c)	30	70	18	$P = \frac{₹20 \times 0{\cdot}30}{0{\cdot}18 - (0{\cdot}70 \times 0{\cdot}12)} = ₹\ 62{\cdot}50$
(d)	40	60	17	$P = \frac{₹20 \times 0{\cdot}40}{0{\cdot}17 - (0{\cdot}60 \times 0{\cdot}12)} = ₹\ 81{\cdot}63$
(e)	50	50	16	$P = \frac{₹20 \times 0{\cdot}50}{0{\cdot}16 - (0{\cdot}50 \times 0{\cdot}12)} = ₹\ 100{\cdot}00$
(f)	60	40	15	$P = \frac{₹20 \times 0{\cdot}60}{0{\cdot}15 - (0{\cdot}40 \times 0{\cdot}12)} = ₹\ 117{\cdot}65$
(g)	70	30	14	$P = \frac{₹20 \times 0{\cdot}70}{0{\cdot}14 - (0{\cdot}30 \times 0{\cdot}12)} = ₹\ 134{\cdot}62$