I. Compound value of a lumpsum

Illustration: 1

Raj makes an initial deposit of Rs. 2,00,000 in Laxmi Bank Ltd. Interest is compounded at 10% p.a. for 6 years. Compute the amount of maturity.

Solution :

Computation of amount of maturity

Amount of maturity / Future value (FV) = $P(1+R)^n$

Calculate the maturity amount if Rs. 2,00,000 is invested for 2 years at 12% compounded – (a) annually, (b) semi-annually, (c) quarterly and (d) monthly.

Solution :

Computation of maturity amount

(a) If interest is compounded annually

$$FV = P(1+R)^{nm}$$

FV = Future value / Maturity amount = ?

Illustration: 5

Calculate the rate of interest if the period of doubling of an investment i
(a) 4 years (b) 6 years

Solution :

Computation of rate of interest

$$\text{Doubling period} = \frac{72}{\text{Rate of interest}}$$

$$\text{Rate of interest} = \frac{72}{\text{Doubling period}}$$

Illustration: 8

Calculate the maturity value of an annuity if Rs. 20,000 is paid annually for 7 years at 12% compounded annually?

Solution :

Computation of maturity value of an annuity

Maturity value of an annuity : Annuity amount $\times \frac{\left((1+R)^n - 1\right)}{R}$

Annuity amount = Rs. 20,000

VIII. Present value of annuity

Illustration: 16

Shajita has entered into an agreement that will fetch her Rs. 60,000 p.a. for the next 4 years. She wants to know the present value of the future cash inflows at 20% discount rate.

Solution :

Computation of present value of annuity

$$\text{P.V of annuity} = \text{Cash inflow} \times \frac{1}{(1+R)^n}$$

Illustration: 22

Rane Ltd. has issued debentures of Rs. 20 lakh to be repaid after 5 years. How much should the company invest in a sinking fund earning 10% in order to be able to repay debentures?

Solution :

This situation is an annual cash outflow, earning return at 10%, in order to earn a lumpsum amount of Rs. 20 lakh, after 5 years. Future value of this annuity payment to sinking fund should be Rs. 20 lakh.

So, sinking fund investment $\frac{(1+R)^n - 1}{R}$

1. Payback Period Method

Illustration: 1

A project has an initial investment of Rs. 2,00,000. It will produce cash flows after tax of Rs. 50,000 per annum for six years. Compute the payback period for the project.

Solution :

Computation of Payback period (Uniform CFAT)

$$\text{Payback period} = \frac{\text{Initial investment}}{\text{CFATp.a}}$$

Illustration: 4

A company has to choose one of the following two mutually exclusive projects. Investment required for each project is Rs. 1,50,000. Both the projects have to be depreciated on straight line basis. The tax rate is 50%.

Year	Profit before depreciation	
	Project X	Project Y
	Rs.	Rs.
1	42,000	42,000
2	48,000	45,000
3	70,000	40,000
4	70,000	50,000
5	20,000	1,00,000

Calculate pay back period.

Solution :

Illustration: 1 (Growth firm) – Walter Model

The cost of capital and the rate of return on investment of Rafael Ltd. are 10% and 18% respectively. The company has 5 lakh equity shares of Rs. 10 each outstanding and earnings per share are Rs. 20. Compute the market price per share and value of firm in the following situations. Use Walter Model and comment on the results.

(i) No retention, (ii) 40% retention, (iii) 80% retention.

Solution:

(i) 0% retention : 100 % payout

$$\text{Market price per share under Walter Model} = \frac{D + \frac{r}{k}(E - D)}{k}$$

Illustration :

Details regarding three companies are given below :

Nel Ltd.	*Mel Ltd.*	*Gel Ltd.*
$r = 18\%$	$r = 20\%$	$r = 8\%$
$k = 15\%$	$k = 20\%$	$k = 10\%$
$E =$ Rs. 30	$E =$ Rs. 40	$E = 20$

By using Walter's model, you are required to

(i) Calculate the value of an equity share of each of these companies whe dividend payout is (a) 30%, (b) 60%, (c) 100%;

(ii) Comment on the results drawn.

Solution :

Illustration: 9 (Normal firm) – Gordon Model

Du Preez Ltd. gives you the following information :

Earnings per share : Rs. 45

Cost of capital : 18%

Return on investment : 18%

Ascertain the market value per share using Gordon's Model, if the payout is (a) 30%, (b) 60%, (c) 90%.

Solution:

Illustration: 13 (MM Model)

Stewart Ltd. has 40,000 shares outstanding. The current market price of these shares is Rs. 15 each. The Board of directors of the company has recommended Rs. 2 per share as dividend. The rate of capitalisation appropriate to the risk-class to which the company belongs is 20%.

(i) Based on MM approach, calculate the market price of the share of the company when the recommended dividend is (a) distributed and (b) not declared.

(ii) How many new 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 Rs. 1,20,000 and the investment budget is Rs. 2,80,000 when (a) the above dividends are distributed and (b) dividends are not declared.

(iii) Show that market value of the shares at the end of the accounting year will remain the same whether dividends are distributed or not declared.

(iv) Is the MM approach realistic? What factors might mar its validity?

Solution :

Computation of market price of the share under MM model

(a) If dividends are distributed

Market price of share $(P_1) = P_0 \times (1 + k_e) - D_1$

Ans: 1. Compound value of a Lumpsum

Amt. of Maturity / future Value (FV) = $P(1+R)^n$

P = Principal = Rs. 2,00,000

R = Rate of Interest = 10% pa

n = No. of yrs. = 6

$FV = 2,00,000 \left(1 + \frac{10}{100}\right)^6$

$= 2,00,000 (1.10)^6$

$= 2,00,000 \times 1.7716$

Ans = 3,54,320.

Ans: 2. If Interest Compound Annually

(A) $FV = P(1+R)^{nm}$

P = 2,00,000 R = 12% n = 2 yrs

$FV = 2,00,000 (1+0.12)^{2\times1}$

$= 2,00,000 (1.12)^2$

$= 2,00,000 \times 1.2544$

$= 250880$

01

(b) If Interest compounded Semi-annually

R = 6 months = 6 %. m = 12/6 = 2 times

$FV = 2,00,000\ (1 - 0.06)^{2 \times 2}$

$= 2,00,000\ (1.06)^4$

$= 2,00,000 \times 1.2625 = 2,52,500$

(c) If interest compounded quarterly

R = 3 %. m = 12/4 = 4 times

$FV = 2,00,000\ (1 - 0.03)^{2 \times 4}$

$= 2,00,000\ (1.03)^8$

$= 2,00,000 \times 1.2668$

$= 2,53,260$

(d) If Interest compound monthly

R = 1 %. m = 12/1 = 12 times

Good fences make good neighbors.

FV : 2.00.000 $(1-0.01)^{2\times12}$

: 2.00.000 x 12.697

: 2,53,940

NO : 3 Doubling period

Doubling period : $\frac{72}{\text{Rate of Interest}}$

Rate of Intrest = $\frac{72}{\text{Doubling period}}$

(a) $R = \frac{72}{4} \times 100 = 18\%$

(b) $R = \frac{72}{6} \times 100 = 12\%$

NO : 4 Compound value of annuity

Maturity Value of an annuity : Annuity an

$$\frac{\left((1+R)^n - 1\right)}{R}$$

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Annuity amount = Rs 20.000

R = 12 %. No. of. yrs: 7

Maturity value of an = $20.000 \left[\frac{(1+0.12)^7 - 1}{0.12}\right]$

$= 20000 \times \frac{1.2107}{0.12}$

$= 20000 \times 10.09$

$= 2,01.800$

NO: 5 Computation of present value money

PV. of annuity: Cashinflow $\times \frac{1}{(1+R)^n}$

(i) Rs. 60.000 receivable after 1 yr

$PV = 60000 \times \frac{1}{1+0.2)^1} = 60.000 \times 0.8333$

(2 yrs)

ii) Rs 60.000 receivable after 2 yrs

$PV = 60000 \times \frac{1}{(1+0.2)^2} = 60000 \times \frac{1}{144}$

$= 41664$

Fine words butter no parsnips.

(iii) 3 yrs

Rs 60000 × $\frac{1}{(1+0.2)^3}$ = 60000 × $\frac{1}{1.728}$

= 34722

(iv) 4 yrs

PV = 60000 × $\frac{1}{(1.02)^4}$ = 60000 × $\frac{1}{2.0736}$

= 28,938

No:6. Sinking fund (S.F)

Sinking fund instalment = $\frac{(1+R)^n - 1}{R}$

= $\frac{(1+0.1)^5 - 1}{0.1}$ = 2.00000

S.F 6.1051 = $\frac{2.00.000}{6.1051}$ = 327,595

05 Friday

Ans: 1. Capital Budgeting.

Pay back period

$$= \frac{\text{Intial Cost}}{\text{CFAT}}$$

$$= \frac{2,00,000}{50000} = 4 \text{ yrs.}$$

No: 2.

Statement Showing CFAT & Cumulative

Yrs	(tax) profit before	Dep 150000/5	PBT	PAT	CFAT	Cum CFAT
1	42000	30,000	12000	6000	36000	36000
2	48000	30,000	18000	9000	39000	75000
3	70000	30000	40000	20000	50000	125000
4	70000	30000	4000	20000	50000	175000
5	20000	30000	10000	(-)10000	20000	195000

Hindsight is always twenty-twenty.

$= 3 \text{ yrs} \cdot \frac{25000}{50000} \times 12$

3 yrs 6 months.

Dividend policy.

NO: 1. Growth firm – Walter Model

(1) 0% retention / 100% payout

Market price per share under

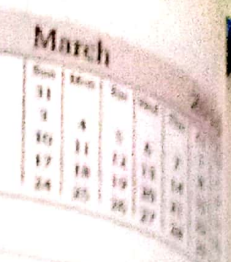
Walter model : $\frac{D + \frac{r}{K}(E - D)}{k}$

D : EPS x payout

$= 20 \times 100\% = 20$ Rs

R = 18% K = 10% E = Rs : 20

$= 20 \left[\frac{0.18}{0.10}\right] \frac{(20 - 20)}{0.10}$



$$\frac{20}{0.10} = \text{Rs } 200$$

Value of firm : No. of Eq. Sh × market price per share

$= 5,00,000 \times 200$

$= 10,00,000$

(ii) 40% retention 60% payout

$D : 20 \times \frac{60}{100} = 12$

Market price per share : $\frac{12 + \left[\frac{0.18}{0.10}\right) \times 20}{0.10}$

$= \frac{26.4}{0.10} = 264$

Value of firm : $5,00,000 \times 264$

$= 13,20,00,000$

$$4 * \left[\frac{0.18}{0.10} \times (20-4)\right]$$

$$= \frac{32.8}{0.10} = Rs\ 328$$

$$328 \times 100,000 = 16.40.000$$

NO: 2 Declining firm

(i). Market price per share: $\frac{D + \frac{R}{K} \times (E-D)}{K}$

D = Eps x pay out ratio = $12 \times \frac{25}{100} = 3\%$

R = 9%. K = 15%. E = 12 Rs.

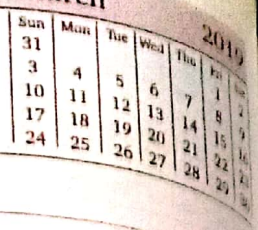
(ii) : pay out 50%.

D = 12 x 50%. = 6

$$= \frac{6 + \left[\frac{0.09}{0.15}\right) \times (12-6)}{0.15}$$

= 64 Rs

First deserve, then desire.



(iii) pay out 100%

$12 \times 100\% = Rs\ 12$

$$= \frac{12 + \left[\frac{0.09}{0.15}\right) \times (12 - 12)}{0.15}$$

$$= \frac{12}{0.15} = Rs\ 80$$

NO: 3 Gordon Model

(a) payout Ratio = 30% Retention Ratio = 70%

Market Value per share = $\frac{D_1}{k - g}$

D = Eps x payout ratio = $4.5 \times 30\% = 13.50$

K = 18%

G = Growth rate = Retention rate x Rate of return

= 70% x 18%

= $0.7 \times 0.18 = 0.126 \times 100 = 12.6\%$

Market value per share = $\frac{1350}{18\% - 12.6\%}$

$= \frac{1350}{5.40\%} = Rs\ 250$

(b) pay out ratio = 60%. Retention ratio = 40%

$D = 45 \times 60\% = 27$ $G = b \times r = 40\% \times 18\%$

$= 0.4 \times 0.18$

$= 0.072 \times 100 = 7.2\%$.

Market value per share = $\frac{27}{18\% - 7.2\%}$

$= \frac{27}{10.8\%} = Rs\ 250$

(c) pay out ratio = 90%. Retention = 10%.

$D = 45 \times 90 = 40.50\ Rs$

$G = b \times r = 10\% \times 18\% = 0.1 \times 0.18 = 1.8\%$.

Market value = $\frac{40.50}{18\% - 18\%} = \frac{40.50}{16.2\%}$

$Rs\ 250$

No: 4 Change in the cost of capital

1. pay out ratio : 25%. Retention ratio = 75%
cost of capital = 20%.

Market price per share = $\frac{D}{K-g}$

D : Eps × pay out ratio
60 × 25% = Rs 15

K = cost of capital = 20%.

G = Growth rate = Retention ratio × Return

= 75% × 12%

= 0.75 × 0.12 × 100 = 9%

$M = \frac{15}{20\% - 9\%} = \frac{15}{11\%} = 136.36$.

NO:5 M.M. Model

(a) If dividend are distributed

$$M = (P_1) = P_0 \times (1+K_e) - D_1$$

P_0 = Current market price = Rs 15

K_e = Cost of equity = 20%. D_1 = Dividend = 2

$$(P_1) = 15 \times (1+0.20) - 2$$
$$= 15 \times (1.20) - 2$$
$$18 - 2 = 16.$$

If dividend are not declared

$$M1 = 15 \times (1+0.20) - 0$$

$$= 15 \times (1.20) - 0 \quad = \text{Rs. } 18.$$

Computation of no. of Shares to be issued to finance the invt. proposal

		Rs	Rs
Invt. proposed			2,80,000
(-) Retained earnings available for invt.	Net income	1,20,000	
(-) Distributed (40000×2)		80000	40000
			2,40,000

Haste makes waste.

April

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Market price = 240,000

No

= 15000 shares

If dividends are not declared,

Invt proposed 2.80.000

(-) Net come 1.20.000

1.60.000

No. of share to be issued 18

= 8.889 shares

(iii) Computation of market value of shares

No. of existing shares = 40.000

(+) New shares 15000

55000

Total No. of shares

Tuesday 16

Market Value of Shares = Total no of shares × Market price per share

50000 × Rs = Rs