Remaining part chapter 7

Example 3

- A firm has identified three mutually exclusive investment proposals whose details are given below. The life of all the three alternatives is estimated to be five years with negligible salvage value. The minimum attractive rate of return for the firm is 12%.

	Alternative		
	A1	A2	A3
Investment	Rs. 1,50,000	Rs. 2,10,000	Rs. 2,55,000
Annual net income	Rs. 45,570	Rs. 58,260	Rs. 69,000

- Find the best alternative based on the rate of return method of comparison.

Example 7.3

The formula for the net present worth of A1 is given as: [when $i = 10\%$.]

$$PW (10\%) = -1,50,000 + 45570\left[\frac{(1+0.1)^5 - 1}{0.1(1+0.1)^5}\right]$$

$$= -150000 + 45570(3.7908)$$

$$= Rs. ~ 2,2746.76$$

[when $i = 15\%$.]

$$PW (15\%) = -1,50,000 + 45570\left[\frac{(1+0.15)^5 - 1}{0.15(1+0.15)^5}\right]$$

$$= -150000 + 45570(3.3522)$$

$$= Rs. ~ 2759.75$$

$$PW(18\%) = -150000 + 45570 \left[\frac{(1+0.18)^5 - 1}{0.18(1+0.18)^5} \right]$$

$$= -150000 + 45570 \, (3.1272)$$

$$= RS. -7493.50$$

There fore, the rate of return of Alternative A1 is :

$$i = 15\% + \frac{2759.75 - 0}{2,759.75 - (-7493.50)} \times (3\%)$$

$$= 15\% + 0.81\%$$

$$= \boxed{15.81\%}$$

The Formula for the net present worth of Alternative A2 is : when $i = 12\%$

$$PW(12) = -210000 + 58260 \left[\frac{(1+0.12)^5 - 1}{0.12(1+0.12)^5} \right]$$

$$= -210000 + 58260 \, (3.6048)$$

$$= Rs. \ 15.65$$

when $\dot{i} = 13\%$

$$PW(13\%) = -210000 + 58260 \left[\frac{(1+0.13)^5 - 1}{0.13(1+0.13)} \right]$$

$$= -210000 + 58260 (3.5172)$$

$$= Rs. -5087.93$$

Therefore, the rate of return of Alternative A_2 is

$$\dot{i} = 12\% + \frac{15.56 - 0}{15.56 - (-5,087.93)} \times (1\%)$$

$$= 12\% + 0\%$$

$$= 12\%$$

The Formula For the net present worth of Alternative A_3 is $\boxed{\text{when } \dot{i} = 11\%}$

$$PW(11\%) = -255000 + 69000 \left[\frac{(1+0.11)^5 - 1}{0.11(1+0.11)^5} \right]$$

$$= -255000 + 69000 (3.6959)$$

$$= Rs. 17.1$$

When $i = 12\%$

$$PW(12\%) = -255000 + 69000 \left[\frac{(1+0.12)^5 - 1}{0.12(1+0.12)^5} \right]$$

$$= -255000 + 69000 (3.6048)$$

$$= Rs. -6268-80$$
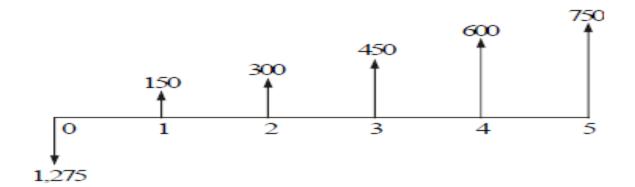
Therefore the rate of return for Alternative A_3 is.

$$i = 11\% + \frac{17.1 - 0}{17.1 - (-6268.80)} \times 1\%$$

$$= 11\%.$$

The rates of return for the three alternatives are now tabulated.

Alternative	A1	A2	A3
Rate of return	15.81%	12%	11%

From the above data, it is clear that the rate of return for alternative $A3$ is less than the minimum attractive rate of return of 12%. So, it should not be considered for comparison. The remaining two alternatives are qualified for consideration. Among the alternatives $A1$ and $A2$, the rate of return of alternative $A1$ is greater than that of alternative $A2$. Hence, alternative $A1$ should be selected.

Example 4

- For the cash flow diagram shown in the Figure, compute the rate of return. The amounts are in rupees.

Example 7.4

Solution for the Positine cash flows of the Problem

$$A1 = 150(Rs.) \qquad G = Rs\ 150$$

The formula for the Present worth of the whole diagram

$$PW(\lambda) = -1275 + \left[150 + 150\left(\frac{[1+i)^n - in - 1]}{i(1+i)^n - i}\right)\right]\left[\frac{(1+\lambda)^n - 1}{i(1+\lambda)^n}\right]$$

$\boxed{\text{when } \lambda = 15\%}$

$$PW(15\%) = -1275 + \left[150 + 150\frac{(1+0.15)^5 - (0.15)(5) - 1}{0.15(1+0.15)^5 - 0.15}\right]\left[\frac{(1+0.15)^5 - 1}{0.15(1+0.15)^5}\right]$$

$$= -1275 + \left[150 + 150(1.7228)\right] \times (3.3522)$$

$$= Rs.\ 94.11$$

when $i = 18\%$

$$PW(18\%) = -1275 + \left[150 + 150 \left(A/G, 18\%, 5 \right) \times \left(P/A, 15, 5 \right) \right.$$

$$= -1275 + \left[150 + 150 \left(1.67285 \right) \right] \times \left(3.1272 \right)$$

$$= Rs -21.24 \qquad \left. \right)$$

Therefore, The rate of return for the cash flow

Diagram is

$$i = 15\% + \frac{94.11 - 0}{94.11 - (-21.24)} \times \left(3\% \right)$$

$$= 15\% + 2.45\%$$

$$= 17.45\%$$

Example 5

- A company is planning to expand its present business activity. It has two alternatives for the expansion programme and the corresponding cash flows are tabulated below. Each alternative has a life of five years and a negligible salvage value. The minimum attractive rate of return for the company is 12%. Suggest the best alternative to the company.

	Initial investment (Rs.)	Yearly revenue (Rs.)
Alternative 1	5,00,000	1,70,000
Alternative 2	8,00,000	2,70,000

The End