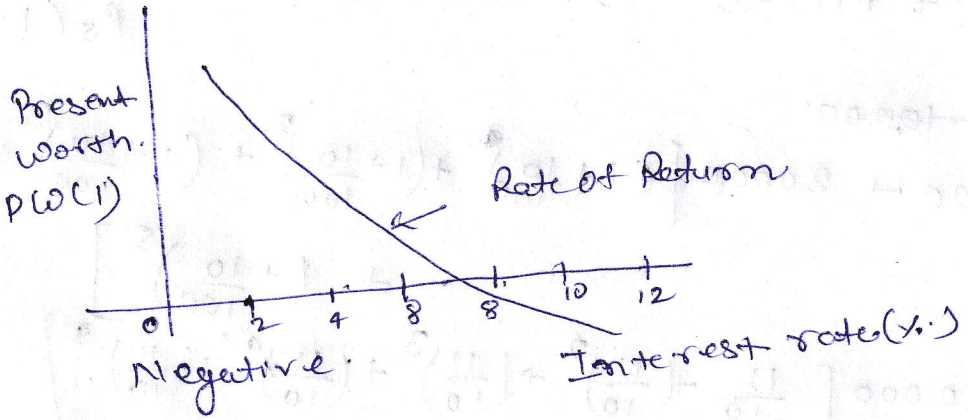
→ The first step to find the net present worth of the cash flow diagram using the following express at a given interest rate i

$$PW(i) = -P + R_1(1+i)^{-1} + R_2(1+i)^{-2} + \cdots R_j(1+i)^{-j} + \cdots + R_n(1+i)^{-n} + S_n(1+i)^{-n}$$

→ Now the above function is to be evaluated for different value of i until the present worth function reduce to zero. as shown in fig




→ In the figure the present worth goes on decreasing when the rate is increased

→ The value of i at which the present worth curve cut the x-axis in the rate of return of the given proposal project.

→ It will be very difficult to find the exact value of i at which the present worth function reduced to zero.

→ so one has to start with an intuitive value of i and check whether the present worth function is positive. if so increase the value of i until PW(i) become negative.

→ Then the rate of return is determined by interpolation method in the range of value of i for which the sign of the Present worth.

Example :— A person is planning a new business. The initial outlay and cash flow pattern for the new business are as listed below. The expected life of the business is five year. find the rate of return for the new business.

| Periods | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| Cashflow rate | 100,000 | 80,000 | 30000 | 30,000 | 30,000 | 30,000 |

let the intuitive value(i) be 10%.

$$PW(i) = -P + R_1(1+i)^1 + R_2(1+i)^2 + R_3(1+i)^3 + R_4(1+i)^4 + R_5(1+i)^5$$

$$PW(i) = -1,00,000 + 30,000\left[\left(1+\frac{10}{100}\right)^1 + \left(1+\frac{10}{100}\right)^2 + \left(1+\frac{10}{100}\right)^3 + \left(1+\frac{10}{100}\right)^4 + \left(1+\frac{10}{100}\right)^5\right]$$

$$PW(i) = -1,00,000 + 30,000\left[\frac{11}{10} + \left(\frac{11}{10}\right)^2 + \left(\frac{11}{10}\right)^3 + \left(\frac{11}{10}\right)^4 + \left(\frac{11}{10}\right)^5\right]$$

$$PW(i) = -100,000 + 30,000\,[6.71561]$$

$$= -10.0,000 + 201468.3$$

$$PW(i) = 101468.3$$

Now let intuitive value(i) be 5%.

$$PW(i) = -100,000 + 30,000\left[1+\frac{5}{100} + \left(1+\frac{5}{100}\right)^2 + \left(1+\frac{5}{100}\right)^3 + \left(1+\frac{5}{100}\right)^4 + \left(1+\frac{5}{100}\right)^5\right]$$

$$PW(i) = -100000 + 30,000\left[\left(\frac{21}{20}\right) + \left(\frac{21}{20}\right)^2 + \left(\frac{21}{20}\right)^3 + \left(\frac{21}{20}\right)^4 + \left(\frac{21}{20}\right)^5\right]$$

$$PW(i) = -100,000 + 30,000\,(1.05 + \ldots + (1.05)^5)$$

$$PW(i) = 74057.38$$