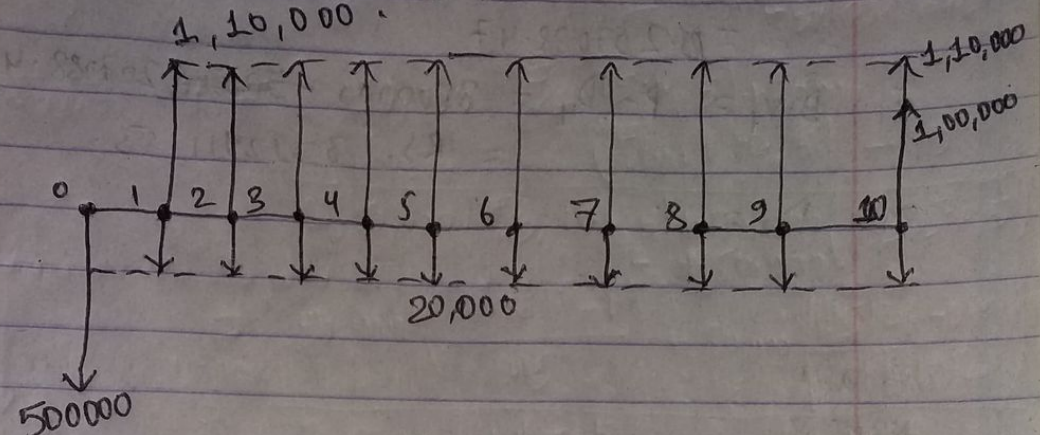
An equipment costing Rs. 5,00,000 is estimated to have
2. (a) life of 10 years and expected annual revenue is Rs. 1,10,000 with annual cost of Rs. 20,000. Determine the investment decision from PW, AW and FW method to this equipment when salvage value is Rs. 1,00,000 and MARR is 12%.

→ Soln



Now using P.W. Method :-

or, P.W. = $-5,00,000 + (1,10,000 - 20,000)(P/A\ 12\%, 10) + 10,00,000\ (P/F\ 12\%, 10)$

$= -5,00,000 + 90,000 \times \frac{(1.12)^{10} - 1}{0.12(1.12)^{10}} + 10,00,000 \left(\frac{1}{(1.12)^{10}}\right)$

$= -5,00,000 + 377325.58 + 32197.32$

$= -5,00,000 + 508842.44 + 32197.32$

$= -5,00,000 + 377325.58 + 16149.871$

$= RS.\ 106524.55$ $= RS.\ 40,700$

Now, Using F.W. method:

$$F.W = -5,00,000\,(F/P, 12\%, 10) + (1,10,000 - 20,000)\,(F/A, 12\%, 10) + 1,00,000$$

$$= -5,00,000\left(\frac{0.12(1.12)^{10}}{(1.12)^{10}-1}\right) + 90,000\left(\frac{(1.12)^{10}-1}{0.12}\right) + 1,00,000$$

$$= -88,485.7 + 15,79,386.2 + 100000$$

$$= Rs.\ 12,82,900.5$$

$$A.W = -500000\,(A/P, 12\%, 10) + 90000 + 100000\,(A/F, 12\%, 10)$$

$$= -500000\left(\frac{0.12\,(1.12)^{10}}{(1.12)^{10}-1}\right) + 90,000 + 1,00,000\left(\frac{0.12}{(1.12)^{10}-1}\right)$$

$$= -119260.4 + 90,000 + 103840$$

$$= Rs.\ 72,000$$

3.(b).

Soln.

L.C.M. of two useful life is 24 years.

MARR = 12 %.

For project A:

or, P.W. = −4,00,000 − 4,00,000 (P/F, 12%, 6) − 4,00,000 (P/F, 12%, 12) − 4,00,000 (P/F, 12%, 18) + (1,75,000 − 25,000) (P/A, 12%, 24) + 40,000 (P/F, 12%, 6) + 40,000 (P/F, 12%, 12) + 40,000 (P/F, 12%, 18) + 40,000 (P/F, 12%, 24)

$= -400000 - 4,00,000\left(\frac{1}{(1.12)^6}\right) - 400,000\left(\frac{1}{(1.12)^{12}}\right) - 4,00,000\left(\frac{1}{(1.12)^{18}}\right) +$ ~~$400000\left(\frac{1}{(1.12)^{24}}\right)$~~

$150000 \times \frac{(1.12)^{24}-1}{0.12\times(1.12)^{24}} + 40,000 \times \frac{1}{(1.12)^6}$

$+ 40,000 \times \frac{1}{(1.12)^{12}} + 40,000\left(\frac{1}{(1.12)^{18}}\right)$

$+ 40,000 \times \frac{1}{(1.12)^{24}}$

~~= 4,48,693.47~~ = Rs. 4,48,693

For project B:-

or, $P.W_2 = -7,00,000 - 700000(P/F, 12\%, 8) - 7,00,000(P/F, 12\%, 16)$
$+ (2,50000 - 35000) \cdot (P/A, 12\%, 24) + 70,000(P/F, 12\%, 8)$
$+ 70,000(P/F, 12\%, 16) + 70,000(P/F, 12\%, 24)$

$= -7,00,000 - 7,00,000\left(\frac{1}{(1.12)^8}\right) - 7,00,000\left(\frac{1}{(1.12)^{16}}\right)$
$+ 215,000\left(\frac{(1.12)^{24} - 1}{0.12(1.12)^{24}}\right) + 70,000\left(\frac{1}{(1.12)^8}\right)$
$+ 70,000\left(\frac{1}{(1.12)^{16}}\right) + 70,000\left(\frac{1}{(1.12)^{24}}\right)$

$= Rs.\ 6,21,027$

Since, $(P.W)_B > (P.W)_A$,

So, Project A is highly recommended.

3. (a) soln

Conventional B/C ratio using F.W method:-

$$(B/C \text{ ratio})_{con} = \frac{\text{F.W. of benifit} - \text{F.W. of disbenifit}}{\text{F.W of initial cost} + \text{F.W of O.C} \pm \text{Salvage value}}$$

$$= \frac{50,000\left(F/A, 15\%, 5\right) + 30,000\left(F/G, 15\%, 5\right) - 0}{2,50,000\left(F/P, 15\%, 5\right) + 30,000\left(F/A, 15\%, 5\right) - 50,000}$$

$$= \frac{50,000\left(\frac{(1.15)^5 - 1}{0.15}\right) + 30,000\left(\frac{(1.15)^5 - 1 - 0.15\times 5}{(0.15)^2}\right)}{2,50,000\left(1.15\right)^5 + 30,000\left(\frac{1.15)^5 - 1}{0.15}\right) - 50,000}$$

$$= \frac{336,666.67 + 346,666.67}{500,000 + 9545 - 50,000}$$

$$= 1.05$$

55454S

2.01

Now,

Modified B/C ratio using F.W. method:

$$(B.C)_{Mod} = \frac{\text{F.W. of benifit} + \text{F.W. of dis benifit} + \text{F.W. of O.C.}}{\text{F.W. of initial cost} \pm \text{Salvage value}}$$

$$= \frac{683333.34 + 4545}{500000 \pm 50,000}$$

$$= 1.05$$