Unit # 4 :-

Present Worth Method of Comparison :-

0) In this comparison method, we take the cash flows of each option & bring them to time zero (present time) by applying a specific interest rate.

→ Types of Decision Problems :-

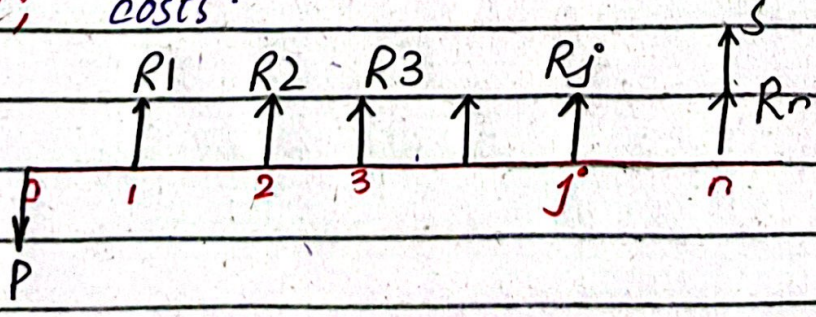
1. Revenue-dominated Cash flow diagram.
2. Cost-dominated Cash flow diagram.

1. Revenue-Dominated Cash flow Diagram:

Each element has a sign based on whether it brings money in or sends money out.

- Inflows (+ive Sign) ↑ cash coming in i.e, profit, revenue or salvage value.

- Outflows (-ive Sign) cash going out i.e; costs.



Formula:-

$$PW(i) = -P + R1\left[1/(1+i)^1\right] + R2\left[1/(1+i)^2\right] + \cdots + Rj\left[1/(1+i)^j\right] + Rn\left[1/(1+i)^n\right] + S\left[1/(1+i)^n\right]$$

↓ Xing with

OR

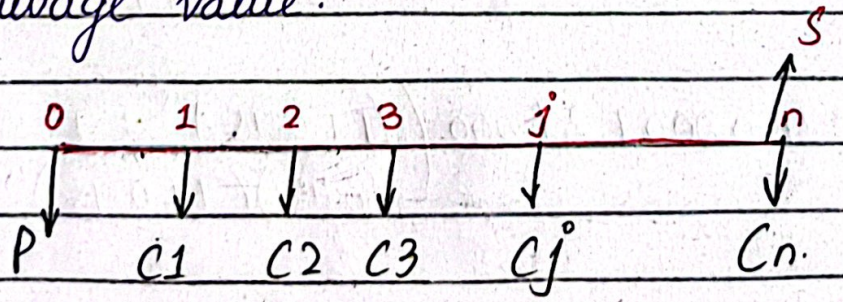
$$PW(i) = A\,\frac{(1+i)^n - 1}{i(1+i)^n}$$

2- Cost - Dominated Cash flow Diagram:-

Opposite to revenue - dominated cash flow diagram.

Outflows (+ive sign) costs

Inflows (-ive sign) profit, revenue salvage value.



Formula:

$$PW(i) = P + C_1\left[1/(1+i)^1\right] + C_2\left[1/(1+i)^2\right] + \cdots + Cj\left[1/(1+i)^j\right] + Cn\left[1/(1+i)^n\right] - S\left[1/(1+i)^n\right]$$

1 e.g:

$P = 12,00,000 \qquad n = 10$

$A = 4,00,000 \qquad i = 20\% = 0.20$

$$PW(20\%) = -12,00,000 + 4,00,000\left(\frac{(1+i)^n - 1}{i(1+i)^n}\right)$$

$$= -12,00,000 + 4,00,000\left(\frac{(1+0.20)^{10} - 1}{(0.20)(1+0.20)^{10}}\right)$$

$$= -12,00,000 + 16,77,000$$

$$= Rs\ 477000.$$

2 e.g:

Bid 1

$P = 4,50,000 \qquad n = 15$

$A = 27,000 \qquad i = 15\% = 0.15$

$$PW(15\%) = 4,50,000 + 27,000 \times \left(\frac{(1+i)^n - 1}{i(1+i)^n}\right)$$

$$= 450000 + 27000\left(\frac{(1+0.15)^{15} - 1}{(0.15)(1+0.15)^{15}}\right)$$

$$= 450000 + 157879.80$$

$$= Rs\ 607879.80.$$

Bid 2

$P = 5,40,000$

$n = 15$ $\quad i = 15\% = 0.15$

$A = 28,500$

$$PW(15\%) = 5,40,000 + 28,500\left(\frac{(1+0.15)^{15}-1}{(0.15)(1+0.15)^{15}}\right)$$

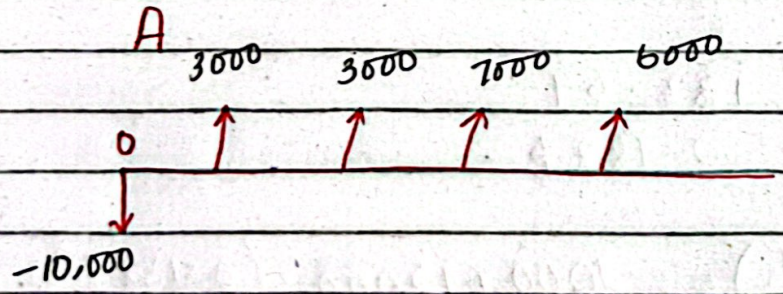
$$= 5,40,000 + 166650.90$$

$$= 706650.90$$

(3) E.g

Proposal — End of year.

	0	1	2	3	4
A (Rs)	-10,000	3000	3000	7000	6000
B (Rs)	-10,000	6000	6000	3000	3000



$$P = \frac{F}{(1+i)^n}$$ for each year value.

$i = 18\%$ $\quad n = 0, 1, 2, 3, 4.$

$PW(18\%) = -10,000 + 3000(P/F, 18\%, 1) + 3000(P/F, 18\%, 2) + 7,000(P/F, 18\%, 3) + 6000(P/F, 18\%, 4)$

= Rs 2052.10

Same working is for person B.

④ e.g

$$A\,\frac{(1+i)^n - 1}{i(1+i)^n}$$

$$P(W)(18\%) = 400,000 + 200,000 \times (P/A, 18\%, 10)$$
$$= 400,000 + 2,00,000 \times 4.4941$$
$$= 12,98,820/-$$

⑤ e.g

Plan 1.

$i = 12\%$

$F = 1,000$

$A = 12,000$

$n = 15$

$$P = \frac{F}{(1+i)^n} = \frac{1,000}{(1+0.12)^{15}}$$

$P = 182.69$

$= 0.1827$

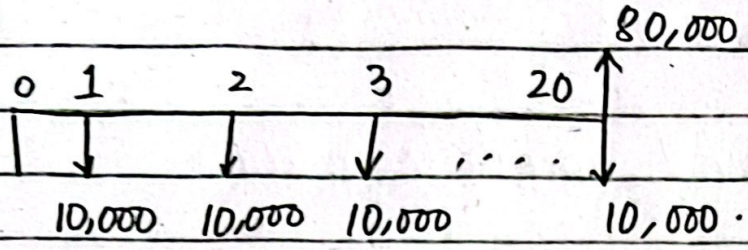
$$PW(12\%) = -1000 + 12000\ (0.1827)$$
$$= 1192.40/-$$

Plan 2

$$PW(12\%) = -1000 + 4000\,(P/F, 12\%, 10) + 4000\,(P/F, 12\%, 15)$$

$$= 1018.80/-$$

(6) e.g



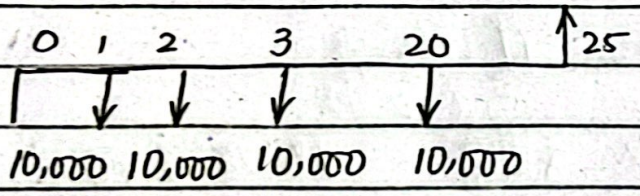
Annual Equivalent $P = A\frac{(1+i)^n - 1}{i(1+i)^n}$.

$P = \frac{F}{(1+i)^n}$.

$PW(12\%) = -10,000(P/F, 12\%, 20) + 800000(P/F, 12\%, 20)$

$= -10,000(7.4694) + 800000(1036.6)$

$= Rs\ 8266$



$PW(12\%) = -10,000(P/F, 12\%, 20) + 1500,000 (P/F, 12\%, 25)$.

$= -10,000(7.4694) + 1500,000(0.0588)$

$= Rs.\ 13506$