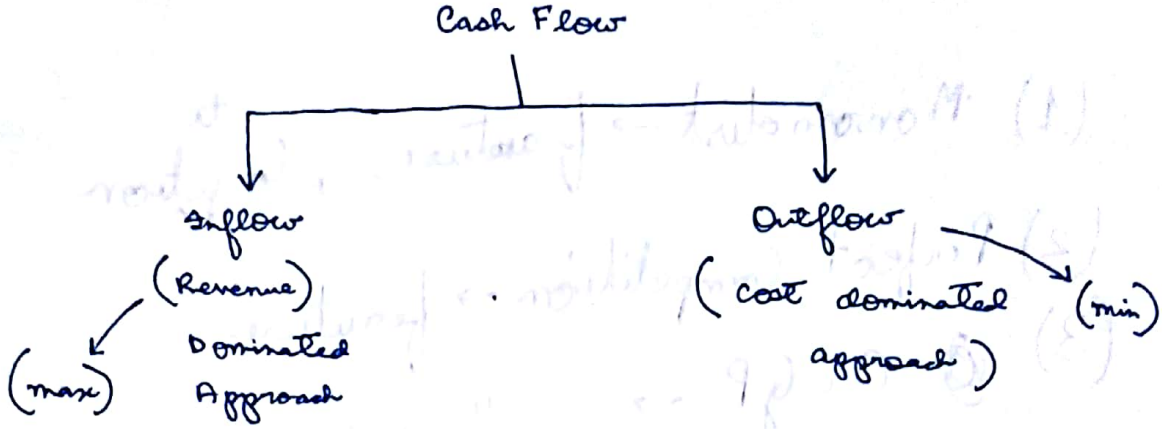
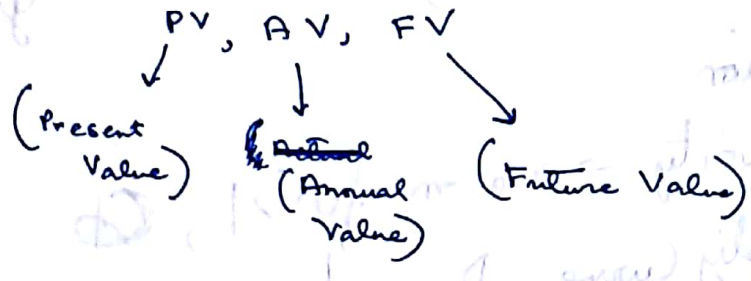
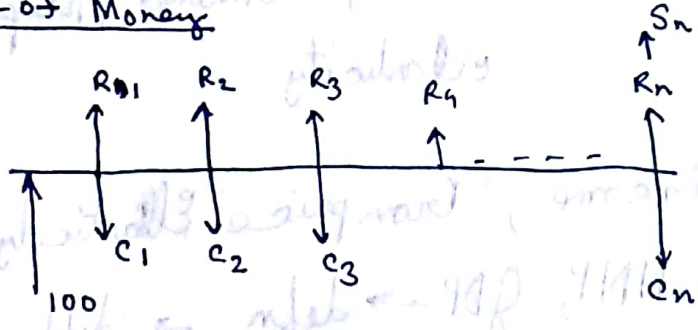




outflow - (expenditure)

inflows - (incomes)

Time Value of Money



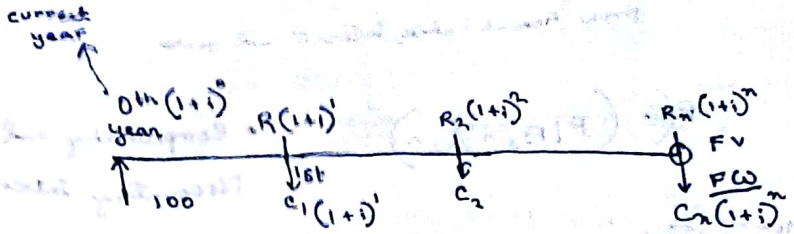
→ initial outlay

outflow

(Objective - max gain and incomes - revenue dominated model)

Revenue max = initial outlay $+ R_1 + R_2 + R_3 + \ldots + S_n$

Cost min = + initial cost $+ C_1 + C_2 + C_3 + C_n - S_n$



- FV → Future Value
- FW → Future Worth

$(n-1)$ years

Example:

0 1 2 3 4 5 6 7 8 9 10

$(11-1) = 10$ years

$$FV = A(1+i)^{n-1} + A(1+i)^{n-2} + \ldots + A(1+i)^{n-1-(n-2)} + A(1+i)^{(n-1)-(n-1)}$$

$A(1+i)^1$

$A(1+i)^0$

$$S_n = \frac{a_1 - r a_n}{1-r}$$

$$= \frac{A(1+i)^{n-1} - (1+i)^{-1} A(1+i)^0}{1-(1+i)^{-1}}$$

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

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

$$= A\left[\frac{(1+i)^n - 1}{i}\right] \rightarrow FV$$

$$P(1+i)^n = A\left[\frac{(1+i)^n - 1}{i}\right]$$

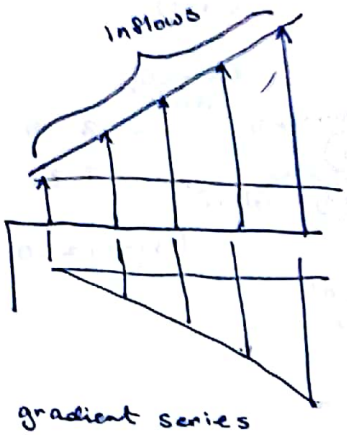
$(F/A, i\%, n)$

↓

Future Worth given Annual value, interest and years

$(P/A, i\%, n)$

- Compounding and Discounting Interest



gradient series
(Not in Syllabus)

1. A person deposits a sum of Rs 20,000 at an interest rate of 18% per annum compounding annually for 10 yrs. Find the maturity value after 10 yrs.

$$\therefore FW = P(1+i)^n$$

$$= Rs\ 20,000\left(1+\frac{18}{100}\right)^{10}$$

$$= Rs\ 104676.71 \text{ (Ans)}$$

~~$= Rs\ 104676.71$~~

2. A person wants to have a sum of Rs 1,00,000 after 10 years from now. Then what has to be the present amount to be invested when $i = 15\%$ per annum compounding annually.

$$P = \frac{Fv}{(1+i)^n} = Rs\ 24718.47$$

3. A person ~~digo~~ deposits Rs 500 and he wants to make it Rs 1000 within next 10 yrs. ~~If the rate of interest~~ Then find the rate of interest.

$$\therefore FV = P(1+i)^n$$

$$\Rightarrow 1000 = 500(1+i)^{10}$$

$$\Rightarrow i = 7.2\% \quad (Ans)$$

4. How long it will take Rs 500 to convert into Rs 1000 when the interest rate is 15% per annum compounding annually.

$$\therefore n = 4.96 \text{ years.} \quad (Ans)$$

5.

	Initial outlay	Annual Revenue (A)	life (yrs)
Tech 1	12 lacs	4 lacs	10
Tech 2	20 lacs	6 lacs	10
Tech 3	18 lacs	5 lacs	10

If the rate of interest is 20% per annum, then find out the ~~best~~ best alternative on the basis of the present worth.

Tech 1

$$P(1+i)^n = A\left[\frac{(1+i)^n - 1}{i}\right]$$

$$= 4\left[\frac{(1+0.2)^{10} - 1}{0.2}\right]$$

$$= 103.83$$

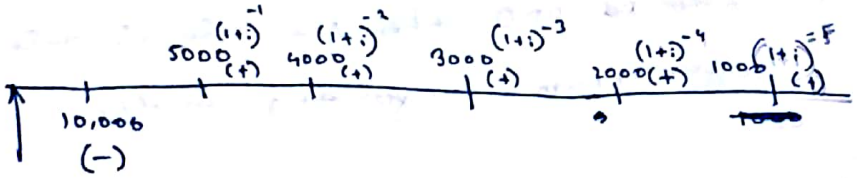
Tech 2

$$P(1+i)^n = 155.75$$

Tech 3

$$P(1+i)^n = 129.79$$

6. A project starts with an initial investment of Rs 40,000 and it is expected to generate a series of cash flows such as 5,000, 4000, 3000, 2000, 1000. for next 5 yrs respectively. If $i = 0.10$ per annum, then find whether the project should be accepted or not.



$$-10,000 + 5000(1+i)^{-1} + 4000(1+i)^{-2} + 3000(1+i)^{-3} + 2000(1+i)^{-4} + 1000(1+i)^{-5}$$

$$= -10,000 + 4545.45 + 3305.78 + 2253.94 + 1366.02 + 620.92$$

$$= -10,000 + 12092.11$$

$$= 2092.11$$

$\because$ result is +ve

$\therefore$ it will be accepted (Ans)