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Project Management

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Year	Cash flows
1	20000
2	30000
3	40000
4	50000
5	30000

The cash outflow is Rs. 100000

The cost of capital is 10%

Calculate:

- i) NPV ii) Profitability Index
iii) Pay-back Period iv) Discounted Pay-back Period.

$$\rightarrow PV\text{-factor} = \frac{1}{(1+r)^n} \quad \begin{array}{l} r = \text{cost of capital} \\ n = \text{year.} \end{array}$$

$$PV = \text{Cash flow} \times PV \text{ factor}$$

Year	Cash flow	PV factor @ 10%	PV cash flow
1	20000	0.909	18,180
2	30000	0.826	24,780
3	40000	0.751	30,040
4	50000	0.683	34,150
5	30000	0.621	18,630
Total cash Inflow			125,780
Total cash outflow			100,000
NPV			25,780
PI			1.2578

$$NPV = \text{Total cash Inflow} - \text{Total cash outflow}$$

$$PI = \frac{\text{Total cash inflow}}{\text{Total cash outflow}}$$

iii) Pay-back Period

Year	Cash flow	Cumulative Cashflow
1	20000	20000
2	30000	20000 + 30000 = 50000
3	40000	50000 + 40000 = 90000
4	50000	90000 + 50000 = 140000
5	30000	140000 + 30000 = 170000

Payback Period = 3 + $\frac{100000 - 90000}{50000}$

= 3.2 years = 3.2 × 12 = 38.4 Months

iv) Discounted Payback Period

Year	Cashflow	PV factor @ 10%	PV of cashflow	Cumulative PV cash flow
1	20000	0.909	18180	18180
2	30000	0.826	24780	18180 + 24780 = 42960
3	40000	0.751	30040	42960 + 30040 = 73000
4	50000	0.683	34150	73000 + 34150 = 107150
5	30000	0.621	18630	107150 + 18630 = 125780

Discounted Payback Period = 3 + $\frac{100000 - 73000}{34150}$

= 3.79

≈ 3.8 years = 45.6 months

2 Investment = 100000

1st year cashflow = 20000

2nd " " = 40000

3rd " " = 45000

4th " " = 75000

R = 10%

Calculate NPV, PI, Payback Period, Discounted PP
& decision ROI

Year	Cash flows	PV factor @ 10%	PV of cash flows	Cumulative PV cash flows (DPP)	Cumulative cash flows (PP)
0	(100000)	1	(100000)	(100000)	(100000)
1	20000	0.909	18180	(81820)	(80000)
2	40000	0.826	33040	(48780)	(40000)
3	45000	0.751	33795	(14985)	5000
4	75000	0.683	51225	36240	80000

Total cashflow ⁱⁿ = ~~(20000 + 40000 + 45000 + 75000)~~
 $= (18180 + 33040 + 33795 + 51225)$
 $= 136240$

PI ~~PI~~ = $\frac{136240}{100000} = 1.3624$

~~NPV~~ NPV = $136240 - 100000 = 36240$

Discounted Payback Period (DPP) = $3 + \frac{14985}{51225}$ [cumulative PV cash flow (4th year Positive value)]
 $= 3.29 \approx 3.3$

Payback Period (PP) = $2 + \frac{40000}{45000}$ [cumulative cash flow Positive value]
 $= 2.88 \approx 2.9$

ROI = $\frac{\text{Profit Per Year}}{\text{Investment}}$

Total cashflow = 180000 (20000 + 40000 + 45000 + 75000)

Investment = 100000

Profit = $180000 - 100000 = 80000$

Years = 4

Profit per Year = 200000

$$ROI = \frac{200000}{1000000} \times 100 = 20\%$$

CPM & Network diagram

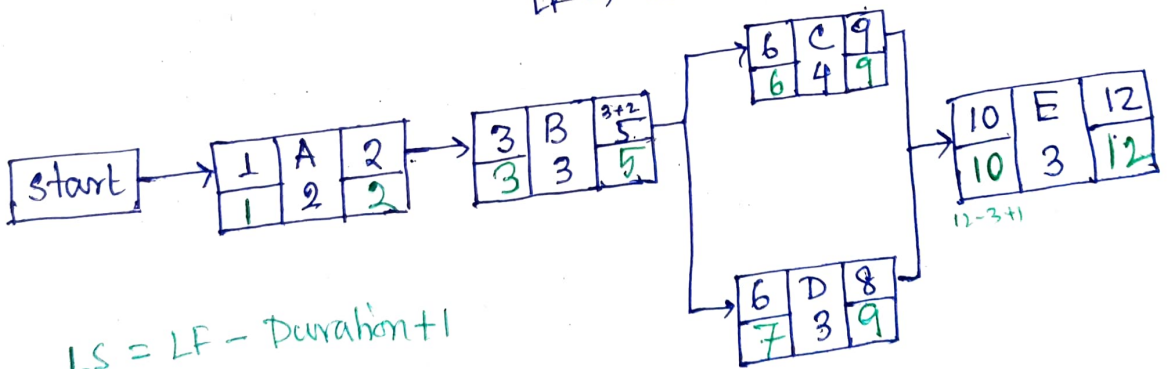
Activity	Preceding Activity	Duration (in Days)
Start		0
A	start	2
B	A	3
C	B	4
D	B	3
E	C, D	3
Finish	E	0

→

ES	N	EF
LS	AD	LF

ES → early start ; N - Activity
LS → late " ; AD - " Duration

EF → early finish = $\text{prev EF} + \text{Duration}$
LF → late finish



There exists two paths:-

- I) start → A → B → C → E → finish = 12 (Duration)
- II) start → A → B → D → E → finish = 11

critical path is the largest path.

∴ Path is →

start → A → B → C → E → finish

All the critical Path activities have no slack,
All the top numbers equal the bottom numbers
Only, D has a slack of 1.

* Slack - Amount of time you can delay an activity without delaying the project end date.