

NWM and Least cost method

using NWM:-

Factory	A	B	C	D	Supply
1	4 80	7 20	7 X	1 X	100 20 0
2	12 X	3 70	8 120	8 10	200 130 10 0
3	8 X	10 X	16 X	5 150	150 0
Demand	80 X 0	90 X 70 0	120 X 0	160 X 150 0	450 X 450

using North-west method, we can find out the factory total cost

$$\begin{aligned} \text{So, total cost is} &= (80 \times 4) + (20 \times 7) + (70 \times 3) + (120 \times 8) + (10 \times 8) \\ &\quad + (150 \times 5) \\ &= 2460 \text{ ₹} \end{aligned}$$

Least cost method:

Factory	A	B	C	D	Supply
1	4 X	7 X	7 X	1 100	100 0
2	12 X	3 90	8 110	8 X	200 110 0
3	8 80	10 X	16 10	5 60	150 90 10 0
Demand	80 X 0	90 X 0	120 X 10 0	160 X 60 0	450 X 450

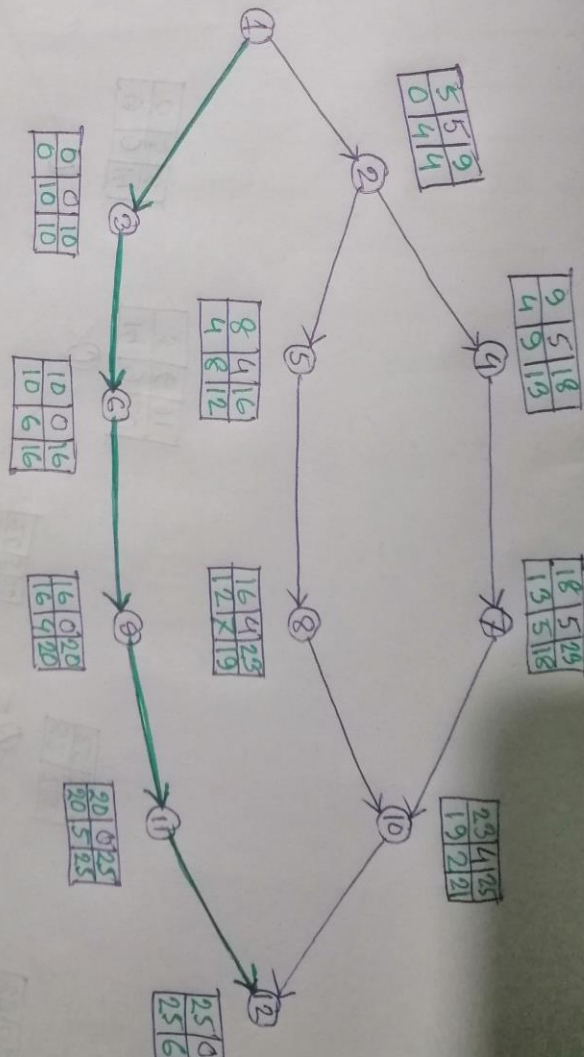
$$\begin{aligned} \text{Total cost is} &= (80 \times 8) + (90 \times 3) + (110 \times 8) + (10 \times 16) + (60 \times 5) \\ &= 2350 \text{ ₹} \end{aligned}$$

Answer to the question no → 01

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a AOA Diagram:-

LS	slack	LF
Es	+	EF



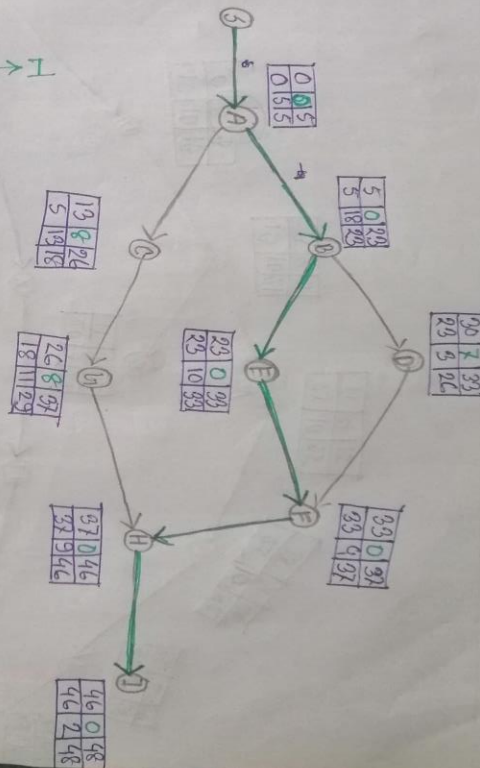
The expected path of the project diagram is 31 weeks.

Critical path : 1 - 3 - 6 - 9 - ~~10~~ - 11 - 12

b AON diagram :- The expected project duration is 48 week.

The critical path is →

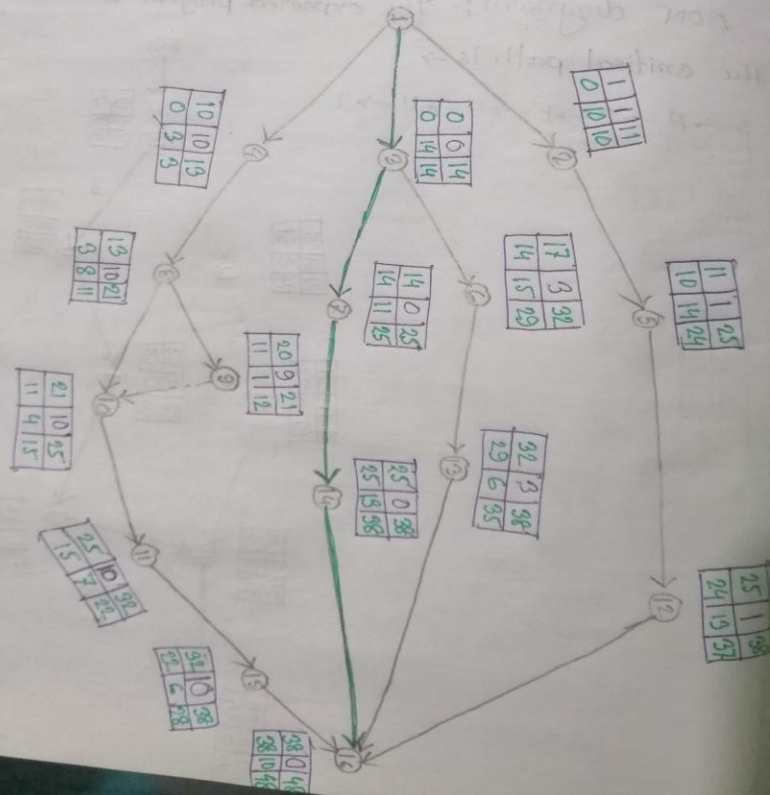
S → A → B → E → F → H → I



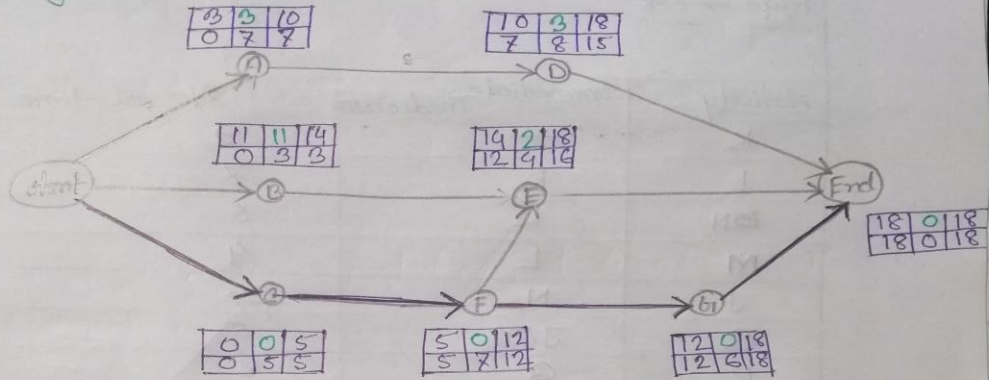
c AOA diagram:-

The expected project duration is 48 weeks

The critical path: 1-3-7-14-16



d AON diagram:



The expected project duration is 18 week.

The critical path = start - C - F - G - End

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Answer to the question no → 16

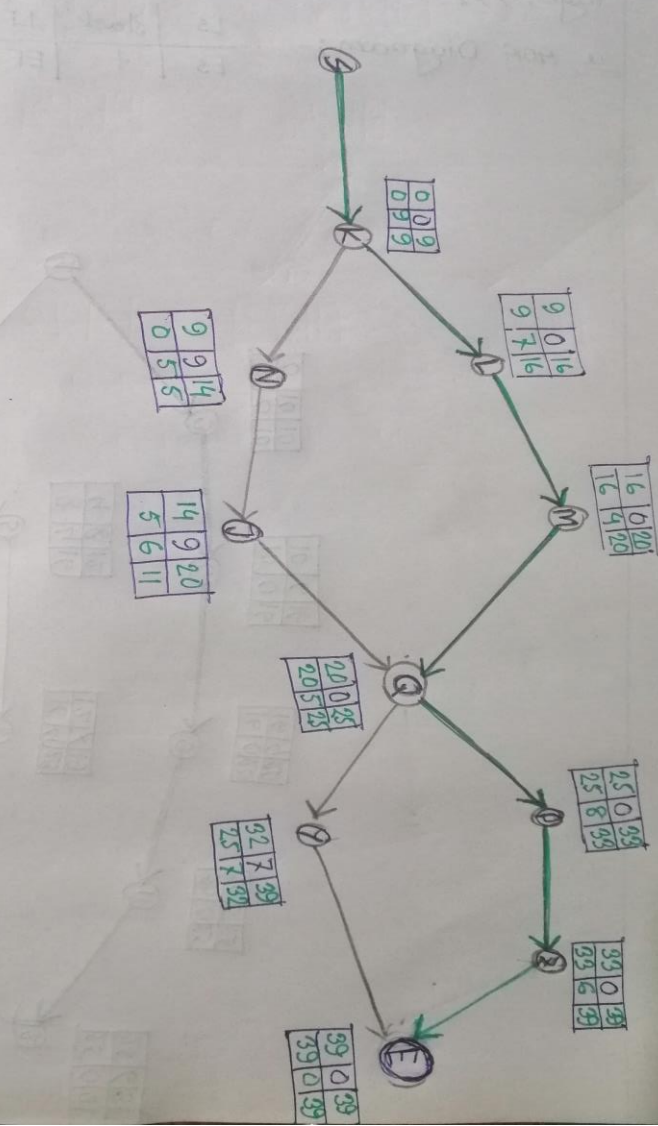
Activity	Immediate Predecessor	Normal time (weeks)
K	—	9
L	K	7
M N	K	5
M	L	4
J	N	6
Q	J, M	5
P	Q	8
Y	Q	7
Z	P	6
End	Y, Z	0

— using AOA diagram, found project duration = 39 weeks

Critical path = S - K - L - M - Q - P - Z - End

slack time Y = 7 weeks.

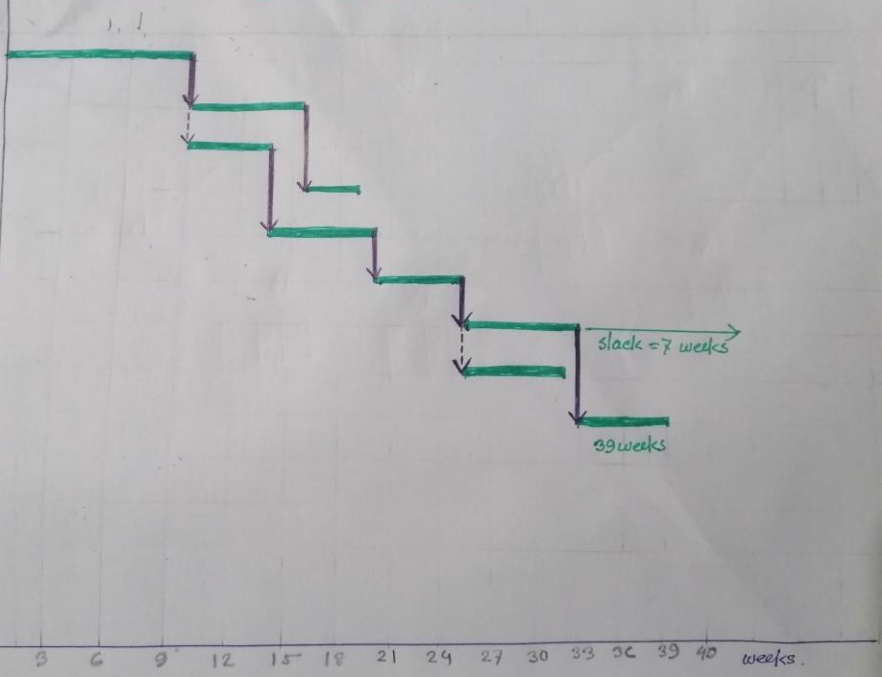
* AOM Diagram :-



Gantt Chart

Activity

K
L
M
M
J
Q
P
Y
Z
End



* Gantt chart

CPM - costest slide - 05

Activity	Predecessors	Duration (weeks)	Planned Resources
A	—	4	3W, 2ME, 1 Anchit, 10P, 1comp
B	—	5	10W, 1ME, 1Excavator, 10-truck Earth
C	B	6	4W, 3ME, 2 Comp, 20P
D	A	4	5W, 1ME, 100 m ² S, 500M Iron wire
E	C	2	4W, 1ME, 50 pole, 200m Brn, 50m CIS
F	C	4	4W, 2ME, 50 pole Brn, 50 bags cem, 50 cft Sand
G	D	5	2W, 1ME, 180 cft Aggregate, 5-ton Rod, 30 bags Cem
H	D	3	6W, 2ME, 5000 Brn, 250 bags cem, 150 cft Sand
I	F, G	8	8W, 2ME, 8000 Brn, 400 bags cem, 250 cft Sand, 5-ton Rod, 150 cft Aggregate.
J	E	4	4W, 1ME, 2 Ele, 2 PF, 500m wire, 400m pipe
K	H	2	8W, 50 bags cem.

a Total cost of activities and the project is given below.

$$\begin{aligned}
 A &= (3 \times 4 \times 6 \times 8 \times 1.5) + (4 \times 2 \times \frac{1100}{4}) + (1 \times 2000) + (4 \times 1 \times 6 \times 8 \times 2) \\
 &\quad + (1 \times 4 \times 6 \times 8 \times 3) \\
 &= \$ 6024
 \end{aligned}$$

$$\begin{aligned}
 B &= (10 \times 5 \times 6 \times 8 \times 1.5) + (1 \times 5 \times \frac{1100}{4}) + (1 \times 5 \times 6 \times 8 \times 10) + (10 \times 125) \\
 &= \$ 8625
 \end{aligned}$$

$$C = (4 \times 6 \times 6 \times 8 \times 1.5) + (3 \times 6 \times \frac{1100}{4}) + (2 \times 6 \times 6 \times 8 \times 3) \\ + (2 \times 6 \times 6 \times 8 \times 2) \\ = \$ 9558$$

$$D = (5 \times 4 \times 6 \times 8 \times 1.5) + (1 \times 4 \times \frac{1100}{4}) + (100 \times 1.5) + (5000 \times 0.3) \\ = \$ 2840$$

$$E = (4 \times 2 \times 6 \times 8 \times 1.5) + (1 \times 2 \times \frac{1100}{4}) + (50 \times 7.5) + (200 \times 3) \\ + (50 \times 1.5) \\ = \$ 5551$$

$$F = (4 \times 4 \times 6 \times 8 \times 1.5) + (2 \times 4 \times \frac{1100}{4}) + (2000 \times 0.1) + (50 \times 5) \\ + (50 \times 0.2) \\ = \$ 3812$$

$$G = (2 \times 5 \times 6 \times 8 \times 1.5) + (1 \times 5 \times \frac{1100}{4}) + (180 \times 2) + (800 \times 5) \\ + (30 \times 5)$$

$$H = (6 \times 3 \times 6 \times 8 \times 1.5) + (2 \times 3 \times \frac{1100}{4}) + (5000 \times 0.1) + (250 \times 5) \\ + (150 \times 0.2) \\ = \$ 4726$$

$$I = (3 \times 8 \times 6 \times 8 \times 1.5) + (2 \times 8 \times \frac{1100}{4}) + (8000 \times 0.1) + (400 \times 5) \\ + (250 \times 0.2) + (50 \times 800) + (150 \times 2) \\ = \$ 49278$$

$$J = (4 \times 4 \times 6 \times 8 \times 1.5) + (1 \times 4 \times \frac{1100}{4}) + (2 \times 4 \times 6 \times 8 \times 3) \\ + (2 \times 6 \times 8 \times 3) + (500 \times 0.4) + (400 \times 0.5) \\ = \$ 4092$$

$$K = (8 \times 2 \times 6 \times 8 \times 1.5) + (50 \times 5) \\ = \$ 1402$$

The total project cost estimation = \$ 102513

C

$$\text{Cost of } \overset{\text{first}}{10} \text{ weeks} = \text{cost of A} + \text{cost of B} + \overset{(5/6)}{\text{cost of C}} + \text{cost of D} \\ + (2/5) \text{ cost of G} + (2/3) \text{ cost of H}$$

$$= 6024 + 8625 + 5/6 \times 9558 + 2840 + 2/5 \times 6605 + (2/3) \times 4725 \\ = \$ 3125 \times 10^3$$

$$\text{Cost of last 10 weeks} = (2/4) \text{ of cost F} + \text{cost of I} + \text{cost of J}$$

$$= 2/4 \times 3812 + 49278 + 4092$$

$$= \$ 55276$$

