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Roll No: 215119041.
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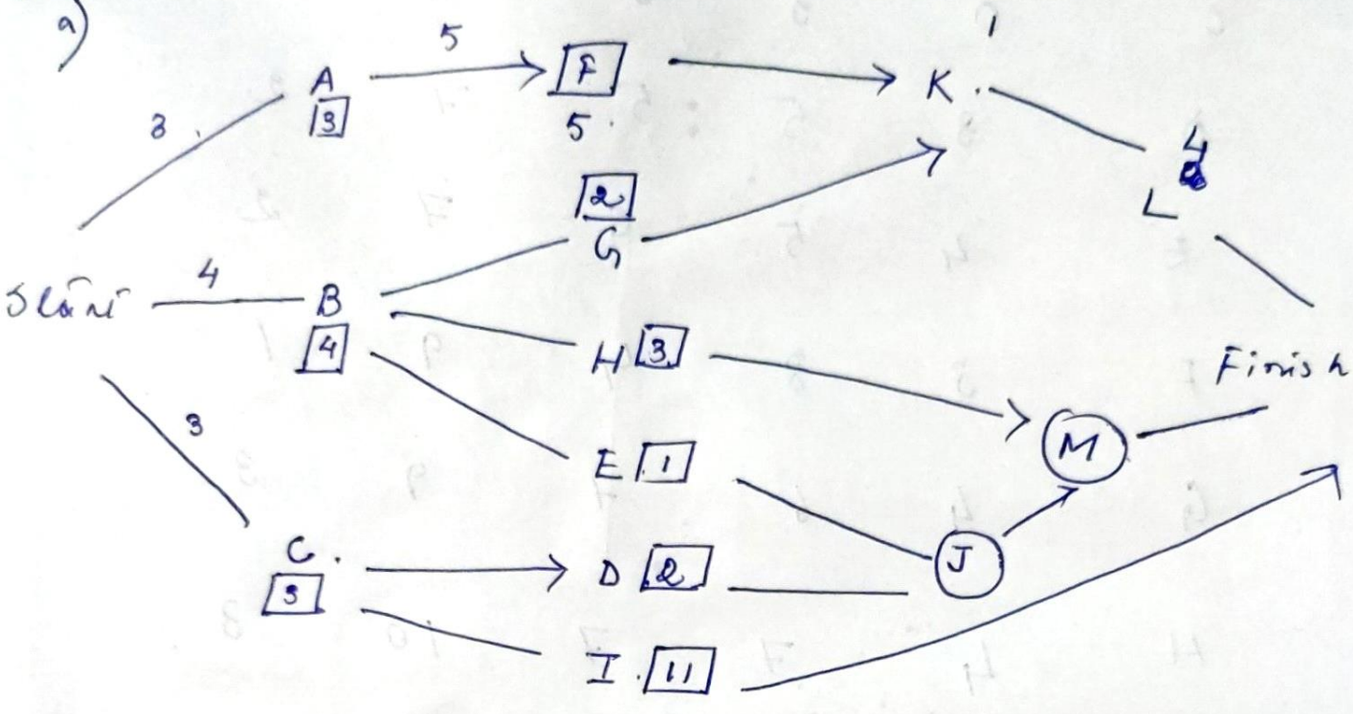
2/

a)



Critical path is CI with duration 14.

Task	ES	EF	LS	LF	Slack

b) Path identification.

A - F - K - L → 3 + 5 + 1 + 4 = 13.

B - G - K - L → 4 + 3 + 1 + 4 = 11.

B - H - M → 4 + 3 + 4 = 11.

B - E - J - M → 4 + 1 + 3 + 4 = 12.

C - D - J - M → 3 + 2 + 3 + 4 = 12.

C - I → 3 + 11 = 14.

∴ Critical path → CI with duration (14)

c

Task	ES	EF	LS	LF	Slack.
A	0	3	1	4	1
B.	0	4	2	6	2
C.	0	3	0	3	0
D	3	5	5	7	2
E	4	5	6	7	2
F	3	8	4	9	1
G	4	6	7	9	3.
H	4	7	7	10	3.
I	3	14	3	14	0.
J	5	8	7	10	2
K	8	9	9	10	1
L	9	13	10	14	1
M.	8.	12	10	14	2.

duration of activity = $2+4\times4+5/6 = 3.83$

Duration of C = $1+3\times4+4/6 = 2.83$

duration of activity I = $8+11\times4+15/6$

$= 11.16$.

The duration is 15.

Variance of A = $(5-2/6)^2 = 0.25$.

Variance of I = $(15-8/6)^2 = 1.36$.

Variance of C = 1

Now there are 2 critical paths which are AFKL and CI with duration 13.88.

Variance of critical path CI is 2.36 while that of AFKL is 0.25.

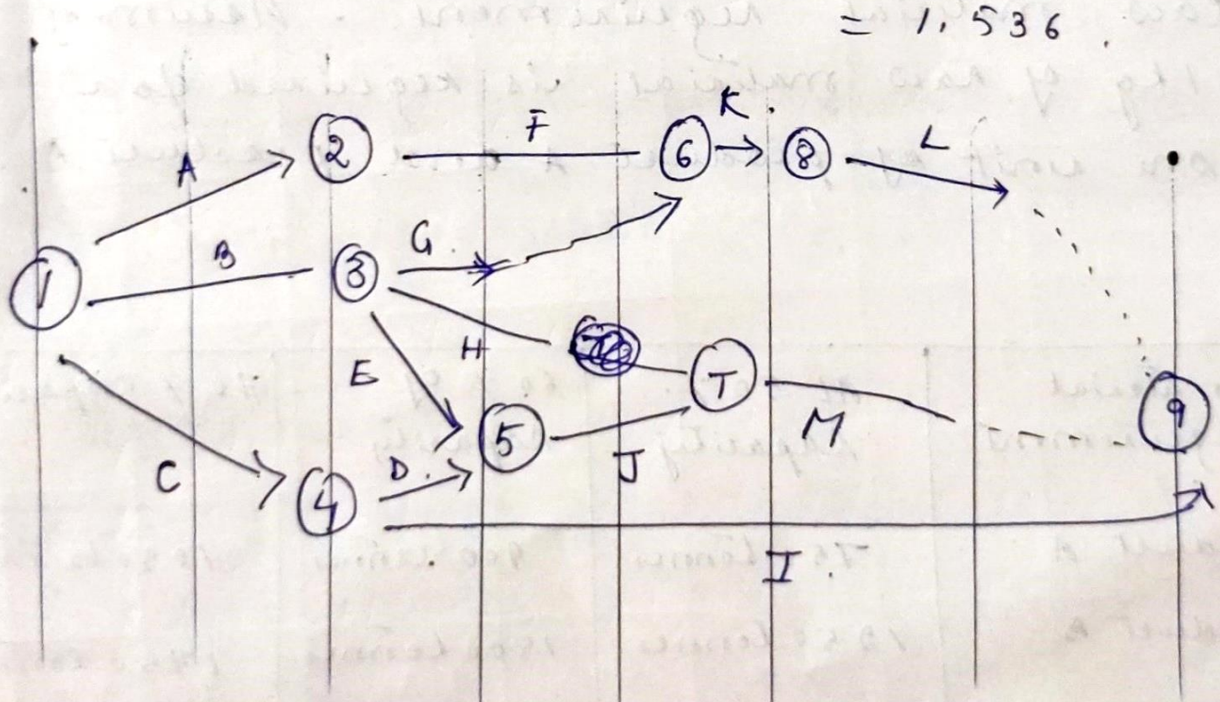
We will consider path with higher variability.

Variance of critical path = (1.36+1)

SO of critical paths = $(2.36)^{1/2}$

= 1.536.

d.



Time schedule graph for the network.

Ans 1.

A. Capacity at 100 %.

product A – 1500 tonnes.

product B – 2500 tonnes.

At 50 %.

product A – 750 tonnes.

product B – 1250 tonnes.

At 60 %.	At 70 %.
product A – 900 tonnes.	1050 tonnes.
product B – 1500 tonnes	1750 tonnes.

B. Raw material requirement. Assuming 1 kg of raw material is required for one unit of product A and product B.

(B)

per material requirement.	At 50 % capacity	60 % of capacity	70 % capacity
product A.	750 tonnes	900 tonnes.	1050 tonnes.
product B.	1250 tonnes.	1500 tonnes	1750 tonnes.

c) Cost of raw material

	At 50 %.	At 60 %.	At 70 %.
product A @ ₹80/kg.	22500000	27000000	31500000
product B @ ₹80/kg.	100000000	120000000	140000000
Total	122500000	147000000	171500000

d. Sales / Total Revenue.

	At 50 %.	At 60 %.	At 70 %.
product A @ 40/kg	80000000	360000000	420000000
product B @ 120/kg.	1500000000	1800000000	2100000000
Total	1800000000	2160000000	2520000000

e. Depreciation.

	₹.
Plant and Machinery @ 10 %. 29000000 (@ 10 %.) × 0.10	2900000
Building @ 5 %. 3400000 × 0.05	170000
Misc. Assets @ 15 %. 12,00,000 × 0.15	180000
Total	3250000.

1. Selling expenses

	At 50 %	At 60 %	At 70 %
Selling Expenses @ 10 % of Sales	18000000	21600000	25200000

Cost and profitability statement for seven years.

	1.	2.	3	4.	5	6	7
Installed capacity	4000	4000	4000	4000	4000	4000	4000
production capacity	2000	2400	2800	2800	2800	2800	2800
Sales realisation	1800	2160	2520	2520	2520	2520	2520
COP	1225	1440	1715	1715	1715	1715	1715
Power	30	33	36	40	44	48	53
Repairs/ Maintain.	50	50	50	50	50	50	50
Admin overheads	40	44	48	53	59	64	71
Wages salaries	100	120	144	173	207	249	299
Selling expenses	180	216	252	252	252	252	252
Gross profit before interest	175	227	274	237	193	141	80

	1.	2	8	4	5	6	7.
Interest on Term loan	0	3780	2940	210	1260	4.2	0
Interest on bank borrowing	67.50	83.70	96.50	96.30	96.30	96.30	96.30
Depreciation	32.50	32.50	32.50	32.50	32.50	32.50	32.50