

Assignment - 02

2006027

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Ans 1)

	A	B	C	D	E
1	11	17	8	16	20
2	9	7	12	6	15
3	13	16	15	12	16
4	21	24	17	28	26
5	14	10	12	11	15

row reduction :-

3 9 0 8 12

3 1 6 0 9

1 4 3 0 4

4 7 0 11 9

4 0 2 1 5

column reduction :-

2	9	<u>0</u>	8	8	✓
<u>2</u>	1	6	<u>0</u>	5	
<u>0</u>	4	3	0	0	
3	7	0	11	5	✓
<u>3</u>	<u>0</u>	2	1	1	

✓

<u>0</u>	7	0	6	6	
2	1	8	<u>0</u>	5	
0	4	5	0	<u>0</u>	
1	5	<u>0</u>	9	3	
3	<u>0</u>	4	1	1	

=> Optimal solⁿ :-

1 → A

2 → D

3 → E

4 → C

5 → B

Ans 2)

Mac. A

(3)
(12)
(15)
(6)
(10)
(11)
(9)

Mac. B

(8)
(10)
(10)
(6)
(12)
(1)
(3)

Optimal sequence:

[1 | 4 | 5 | 3 | 2 | 7 | 6]

Job	M1		M2		M1	M2
	in	out	in	out	idle	idle
1	0	3	3	11	0	3
4	3	9	11	17	0	0
5	9	19	19	31	0	2
3	19	34	31	44	0	3
2	34	46	44	56	0	2
7	46	55	56	59	0	0
6	55	66	66	67	0	7

Makespan = 67

M2 idle time = 17

Ans 3)

	A	B	C	Supply
1	2	7	4	5
2	3	3	1	8
3	5	4	7	7
4	1	6	2	14
Demand	7	9	18	

NWCR :-

2(5)	7	4	5
3(2)	3(6)		8/6/0
5	4(3)	7(4)	7/4/0
1	6	2(14)	14/0
7/2/0	9/3/0	18/14/0	

$$\text{feasible sol}^n = 2(5) + 3(2) + 3(6) + 7(4) + 2(14) + 4(3)$$

$$= 10 + 6 + 18 + 28 + 28 + 12$$

$$= 34 + 56 + 12$$

$$= 90 + 12$$

Total cost

$$= 102$$

Least cost method :-

2	7(2)	4(3)	5
3	3	1(8)	8
5	4(7)	7	7
1(7)	6	2(7)	14/7
7/0	9/20	18/10	13/0

$$\begin{aligned}
 \text{Total cost} &= 7(2) + 4(3) + 1(8) + 4(7) + 1(7) \\
 &\quad + 2(7) \\
 &= 14 + 12 + 8 + 28 + 7 + 14 \\
 &= 26 + 36 + 21 \\
 &= 83
 \end{aligned}$$

VAM (Vogel's Approximation) :-

Supply			
2(3)	7(2)	4	5/2/5 2.3 [5] [5]
3	3	1(8)	8 [2] ←
5	4(7)	7	7/0 [1] [1] [1]
1(4)	6	2(10)	14/4 [1] [5] ←

Demand 7/3/0 9 18/10/0

[1] [1] [1]
 [1] [2] [2]
 [3] [3] ↑

$$\text{Total cost } 2 \cdot 2(3) + 7(2) + 1(8) + 4(7) + 1(4) \\ + 2(10)$$

$$= 6 + 14 + 8 + 28 + 4 + 20$$

$$= 20 + 8 + 32 + 20$$

$$= 80$$