

Transportation Sums (Dec-2021)

24) Find Matrix minima, & VAM.

(a) Matrix minima (LCM):

~~1~~	2	7	6	70
10	~~0~~	4	2	18
B	10	1	5	11
~~10~~	~~10~~	~~10~~	30	
0	0	8		

→ Bal. Transportation Problem.

No. of allocations = 5, $m+n-1 = 3+3-1 = 5$.

So, It is - Basic Feasible Solution (BFS) or
Non degeneracy transportation solution.

$$\begin{aligned}\text{Initial transportation cost} &= 7(6) + 10(0) + 2(2) \\ &\quad + 10(1) + 1(5) \\ &= 42 + 0 + 4 + 10 + 5 = 61.\end{aligned}$$

(ii) VAM Method :-

	Supply			P ₁	P ₂	P ₃
7	1	2	6	10	1	1
2	0	4	10	2	4	-
3	10	1	5	1	2	2
demand	10	10	10	30		

P₁ 1 1 3P₂ 1 1 -P₃ 2 1 -

No. of allocations = 5.

$$m+n-1 = 3+3-1 = 5.$$

So, it is Basic feasible solution (or) Non-degeneracy.

$$\text{Initial Transportation Cost} = 7(1) + 2(0) + 10(2) + 1(3) + 10(1)$$

$$= 7 + 0 + 20 + 3 + 10$$

$$= 40.$$

(15) Determine BFS using LCM for following transportation

	Supply		
6	5	8	8
35	5	5	11
8	12	9	32
35	28	32	25
30	50	18	0
120	Bal. type		

May 2022

No. of allocations = 6.

$$m+n-1 = 3+4-1 = 6.$$

∴ It is BFS.

$$\text{Initial transportation cost} = 5(8) + 25(5) + 35(5) + 5(11) + 18(9) + 32(7)$$

$$= 40 + 125 + 175 + 55 + 162 + 224$$

$$= \boxed{781}$$

22) Find Initial using VAM:- (May - 2024)

	Demand				Supply			
	P1	P2	P3	P4	P1	P2	P3	P4
45	3	3	30	4	25	1		
40	2	45	4	2	25	2	2	0
75	1	5	3	2	75	0	1	—
Demand	120	80	15	25	300			

P1	2	1	1	1
P2	1	1	0	1
P3	1	1	0	—
P4	1	—	0	—

No. of allocations = 6.

$$m+n-1 = 3+4-1 = 6.$$

So, It is BFS.

Total Initial Transportation Cost is $45(3) + 30(4) + 25(1) + 80(2) + 45(4) + 75(1)$

$$= 135 + 120 + 25 + 160 + 180 + 75$$

$$= 695$$

23) Find Minimum Cost method for the following transportation

Sol. Using VAM Method.

	Supply	P ₁	P ₂	P ₃	
9	16	19	5	12	14
1	22	15	13	19	16
14	28	12	8	10	6
demand	10	15	17	50	42
P ₁	2	6	4		
P ₂	2	-	4		
P ₃	6	-	7		

No. of allocations = 5

$$m+n-1 = 6-1 = 5$$

So, It is Basic feasible Solution.

$$\text{Total Initial Cost (Transportation)} = 9(16) + 5(12)$$

$$+ 1(22) + 15(13) + 12(8)$$

$$= 144 + 60 + 22 + 195 + 96$$

$$= \text{₹ } 517$$

21) Solve transportation using Minimum Cost. (May 2022)

Sol Using VAM method.

	1	2	3	4	Supply	P ₁	P ₂	P ₃	P ₄
70	6	1	9	3	70	0	2	—	—
11	35	5	20	2	55	0	3	3	6
15	10	12	30	4	45	0	3	3	3
demand	85	35	50	45	215	Bal. t.p.			

P₁ 4 4 2 4 No. of allocations = 6.

P₂ 1 7 2 1 $m+n-1=6$

P₃ 1 — 2 — So, It is BFS.

P₄ 10 — 4 7

$$\text{Total Initial transportation Cost} = 70(6) + 35(5) + 20(2)$$

$$+ 15(10) + 30(4) + 45(7)$$

$$= 420 + 175 + 40 + 120 + 315 = \text{₹ } 1220$$

15) Solve transportation problem.

					P ₁	P ₂	P ₂	P ₃
1	6	2	3	4	6	0	1	1
4	3	2	2	6	8	2	1	1
6	0	2	4	2	10	10	2	0
	6	6	6	6	24			
	0	0	2	0				
P ₁	1	1	1	1				
P ₂	1	1	1	1				
P ₃	1	1	1	1				

No. of allocations = 5,

$$m+n-1 = 3+4-1 = 7-1 = 6.$$

∴ It is degeneracy solution.

Total Initial Cost is $6(2) + 2(2) + 6(0) + 6(0) + 4(2)$

$$= 12 + 4 + 0 + 0 + 8$$

$$= \boxed{24}$$