(A) Transportation Problem with degenerey

Problem - find the minimum optimum transportation cost for the problem below.

	W,	W2	W3	W4	WS.	Availabl
Fi	7	6	4	5	9	40
f ₂	8	5	6	7	8	30
F3	6	8	9	6	5	20
F4	5	7	7	8	6	10
Demand	30	30	15	20	5	100

As \(\text{Demand} = \text{E Avoilable} \)

Given TP is a balanced T.P.

Initial Basic feasible Solution (VAM)

7	6	4		5		9		40 [1] [1] [2]4-[2]
8 (5)	5	6	(15)	7	(20)	8		30 [i] [2]+
6	8	9		6		5	(5)	36 [1] [1] [1] [1] [1]
5	7	7		8		6		to[1][1][1][1][
30,			15		20		5 [1]	mos canas maca fins
[1]	[0]		4		[1]		[1]	
[1]							[1]	

Total Transportation Cost (TTC) = Rs [(7x5)+(4x15)+(5x20)+(5x30)+(6x15)+(5x5)+(5x10)] = Rs (35+60+100+150+90+25+50) = Rs 510

If m+n-1 = No of allocations Basic cells - TP without degenery m+n-1 & No of allocations Basic cells-TP with degenery.

Check for optimality

	WI	W	2	W3	W	4	M	15	
f. 7	20	6 [3 4	++0	5		9	3	,
"	(5)			(15)	702	(20)		1	
F2 8	1-1	5	6	5 -0	7	0	8	0	
1	10	-	30)	+(e)	6	19	5	-	
3	6	8	6	3 6		1		(5)	-
-	(15)	7 1	6	7 5	8	15	6		
F4 1	(1.0)					-			-
r	(10)					_		-	
	7	3		4		>		6	

i) man-1 = 4+5-1=8 \$\neq\$ No of Basic cells(7)

T.P. With degenery.

In case of degenery, select the minimum cost cell, such Phalit would will not possible to have a close loop passing through the
basic cells. Allocate & (E to but & to) to the cell so Phallit will be a basic cell.

Allocating & to (f2, W3), degenerar can be semoved.

(ii) All allocations are independent of each other i.e. it is not possible to have a closed loop passing through basic cells.

Ass all net evaluations are not positive (7,0), the Obtained solution is not optimum.

Omproving the solution

$$Min = \{ (\epsilon - 0), (s - 0) \} = 0$$

7	6	4	5	8
(5)	5	(15)	7	8
<u>(e)</u>	8 (30)	9	6	5
(15)	7	7	8	6
(10)	solii se	See all	F 100 -	

SBFJ

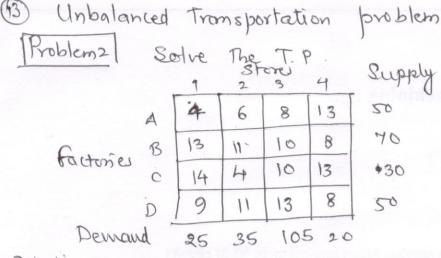
$$TTC = \frac{1}{2} \left[(T+5) + (Y+15) + (5+20) + (8+6) + (5+30) + (6+15) + (5+5) + (5+10) \right]$$

$$= \frac{1}{2} \left[(35+60+100+150+90+25+50) - \frac{1}{2} \left[(35+60+100+150+90+25+50) - \frac{1}{2} \left[(35+60+100+150+90+25+50) \right] \right]$$
Check for contimulity

Check for optimality

7		6	2	4	0	5	70 On	8	[2]	1
	(5)			-	(15)		(20)		-	
8		5		6	1	T	1	8	1	9
	(E)		(30)					-		
6		8	5	9	6	6	2	5		(
	(15)								(5)	
5		7	5	7	5	8	5	6	-	-
	60))							, 6	
	-	-	_2		-2		-2	-	-1	

As all net evaluations are positive (70), the obtained solution is optimum.



Solution
Total Supply = 50+70+1030+50 = 200 unils

Total Demand = 25+35+105+20 = 185 unils

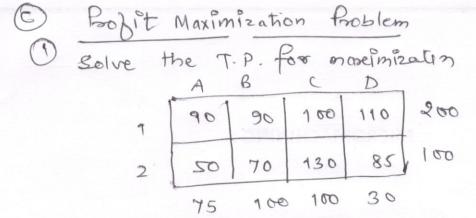
Fiven T.P. is belonded by introducing dunry Colorumn with demand 15 units.

Obtaining IBFS_by VAM we gel-

	1	2	3	4	Dommy
•	4	6	8	13	0
A	(25)	(5)	(20)		
	13	11	10	8	0
8	i mum a	I settere	(7		0
	14	4	10	13	
С	-	(30)	13	8	0
•	9	11	leftle je		(15)
D			(15)	(50)	(13/1

T.P. without degeneray, and the solution is found to be optimum





Soluten

Unbalanced & Noveimization.

If IBF.S. is to obtained by VAM, then instead of obtaining the difference in between two least, Obtain. I the difference in between two highest- and assign to the highest could instead by lowest.

30	90	100	110	200	
(76)	(100)	i jsalim li	(30)		
50	70	130	85	100	ani dell'ino grittana
		(100)			1 B FS
0	0	0	0	05	
(5)			l _l		

Above solution is obtained by VAM and bound to be optimum.

Zmays = Rs 31, 600

Probil	- W	apin	nizati	on	probl	em	
				-			marinizati n
		1	2	3	agen	5	maximizati m Supply
)	15	17	12	11	11	140
factiones	2	5	9	7	15	7	196
	3	14	15	16	20	10	115
Derwand		74	94	69	39	119	+

Let us convert movemization to minimization just by multiplying the matrix by (-1), we get -

-15	-17	-12	<i>→</i> 1\	-11
-5	- 9	->	-15	->
14	-15	-16	-20	40

- Minimization

for more simplicity let us substract - whole matrix from 20 so that all values would be positive

1	5	3	8	9	9	140
1	15	11	13	5	13	190
	6	5	4	0	10	115
4	74	94	69	39	119	

Balance it and solve

while calculating final answer refer to original water.

Restricted Fromsportation Roblem

Assign huge cour as or M to the restricted sale cell and solve.