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Solution

QP Code: 64062

SOLUTIONS

Statistics – Paper III

S.Y.B.Sc. (CBCS) Semester – III

- Q1. A) i) False - Number of variables necessarily taking value zero in a basic feasible solution of a linear programming problem with m constraints is '(n-m)'.
 ii) True
 iii) False - Transportation problem is a special case of Linear programming.
 iv) False - MODI method is used to test optimality of the solution to a transportation problem.

OR

Vogel's approximation/ Matrix minima/ North-West Corner method is used to find initial basic feasible solution.

- v) False- Sequencing problem deals with the order of processing of jobs so that the total elapsed time is minimum.

Q2.b) $\text{Min } Z = 15Y_1 + 10Y_2$

s.t. $3Y_1 + 5Y_2 \geq 5$

$5Y_1 + 2Y_2 \geq 3$

$Y_1, Y_2 \geq 0$

Q2.c) Net evaluation, $z_j - c_j$ row : 0 0 0 6/8 0

Comment : Optimal solution is reached. Since net evaluation for non-basic variable x_3 is zero, the problem has multiple solutions.

Q3.b)

	D1	D2	D3	D4	Avail.
O1	1 0	2 (600)	3 (0)	4 -3	600
O2	4 -4	3 -2	2 (200)	0 600)	800
O3	0 (400)	2 -1	2 (600)	1 -1	1000
Req.	400	600	800	600	

Figures in the braces are the decision variable values and at the right corner of each cell are the net evaluations.

Since all the net evaluation for non-basic variables are less than or equal to zero, optimal solution is reached. Minimum value of the objective function is 2800.

Q4. Best order of the jobs to be processed:

1	6	2	7	5	4	3
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Job	Machine A		Machine B		Idle time for machine B	Waiting time for jobs
	in	out	in	out		
1	0	3	3	7	3	
6	3	10	10	22		
2	10	18	22	27		
7	18	26	27	31		4
5	26	30	31	34		1
4	30	35	35	37	1	1
3	35	42	42	43	5	
Total elapsed time = 43 units				Total →	9	

Q5.b)

	D1	D2	D3	D4	Avail.
O1	3 (3)	7 -6	6 (2)	4 -1	5
O2	2 (0)	4 -4	3 2	2 (2)	2
O3	4 1	3 (3)	8 0	5 (0)	3
Req.	3	3	2	2	

Figures in the braces are the decision variable values and at the right corner of each cell are the net evaluations.
 Since the net evaluation for cell (2,3) = 2 and cell (3,1) = 1, which are positive, the solution is not optimal and needs improvement.