

B.N.Bandodkar College of Science, Thane.

S. Y. B. Sc. First Term End Examination.

Statistics.

Paper III

Duration : 2 hours.

Max. Marks : 60

N.B. 1) All questions are compulsory.

2) Figures to right indicate full marks.

Q.1) Answer any Three questions

a) Explain 'Graphical Method' of solving Linear programming Problem.(LPP) (5)

b) Explain Travelling Salesman problem. How the technique of solving Assignment problem is used to solve Travelling Salesman problem. (5)

c) Explain 'Matrix Minima Method' of obtaining initial solution for Transportation problem. (5)

d) Define Dual of a primal problem. Hence write dual of following LPP (5)

$$\text{Maximize } Z = 14X_1 - 60X_2 + 9X_3$$

Subject to

$$7X_1 + 11X_2 + 19X_3 = 29$$

$$4X_1 + 8X_2 + 9X_3 \geq 54$$

Where $X_1, \geq 0$ and X_2, X_3 unrestricted.

Q.2) a) Explain Hungarian method of solving an assignment problem. (7)

b) Answer any One question.

i) Explain Johnson's method of solving sequencing problem involving '3' machines 'n' jobs. (8)

ii) 1) Obtain an optimum duration and sequence for following sequencing problem when jobs are processed in order A and B. Also obtain idle time for machine B and job 5. (4)

	Processing Time							
	Jobs							
Machines	1	2	3	4	5	6	7	8
A	10	15	20	28	19	17	12	18
B	15	16	21	18	20	12	17	26

- 2) There are 4 jobs A, B, C and D to be performed on 4 machine centers (4)
I, II, III and IV. Expected costs are given in following table. If the
machine center IV goes out of order, which job will then be allocated
to rest of the centers at minimum cost?

	I	II	II	IV
A	15	14	12	16
B	23	22	25	24
C	31	34	32	33
D	21	32	44	53

- Q.3) a) Explain Transportation problem. Represent it as Linear Programming (7)
Problem. When it is said to be balanced problem?
- b) Answer any One question.
- i) Explain MODI method of solving Transportation problem. (8)
- ii) (8)

Store Factory	1	2	3	4	5	6	Supply
A	5 (4)	8	7 (3)	10	6 (11)	4	18
B	10	12 (8)	8	9 (4)	12	15	12
C	14	17	11 (6)	8 (5)	10	12	11
D	18	19 (5)		15	17	14 (0)	5
Demand	4	13	9	9	11	0	

For the above Transportation problem answer the following questions.

- i) Is the current solution degenerate solution?

ii) Is it optimum? If no, obtain optimum solution.

iii) Is it unique? If no, obtain alternate solution.

{ Entries in \bigcirc represent allocation }

Q.4 a) Define following terms in Linear Programming Problem (LPP) (7)

1) Feasible Solution

2) Basic Solution

3) Basic feasible Solution

4) Degenerate basic feasible Solution

5) Optimum Solution

6) Infinitely many Solutions

7) Unbounded Solution

b) Answer any One question.

i) Explain 'Big M Method' of solving LPP. (8)

ii) 1) How do you obtain the solution to dual problem from solution of (4) primal problem?

2) Obtain any two basic solutions of following set of equations and (4) recognize status of your solutions.

$$7X_1 - 13X_2 + 9X_3 + 8X_4 = 30$$

$$4X_1 + 21X_2 - 19X_3 - 6X_4 = 25$$

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