

Roll No.

BBA-406(N)

**B. B. A. (Fourth Semester)
EXAMINATION, May, 2017**

(New Course)

Paper Sixth

OPERATIONS RESEARCH

Time : Three Hours]

[Maximum Marks : 70

Note : Section A is compulsory. Attempt four more questions selecting two questions each from Sections B and C.

Inst. : The candidates are required to answer only in serial order. If there are many parts of a question, answer them in continuation.

Section—A

(Short Answer Type Questions)

Note : All questions are compulsory. Each question carries 3 marks.

1. (A) What are important operations research techniques ?
- (B) Describe characteristics of operations research.
- (C) What are methods for solving Linear Programming problems ?

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- (D) Draw the Feasible Region of the given constraints :

$$5x + 4y \leq 100 \quad (1)$$

$$3x + 5y \leq 75 \quad (2)$$

$$5x + y \geq 40 \quad (3)$$

$$x \geq 0 \quad (4)$$

$$y \geq 0 \quad (5)$$

- (E) Explain Degeneracy in a transportation problem.
- (F) Describe the steps in solving assignment problem.
- (G) How is expected monetary value calculated in statistical decision making ?
- (H) Discuss the various criteria for decision-making under uncertainty when event probabilities are known.
- (I) Write short notes on floats.
- (J) Explain three time estimates in PERT.

Section—B

(Long Answer Type Questions)

Note : Attempt any two questions. Each question carries 10 marks.

2. Discuss the role and scope of quantitative methods for scientific decision-making in business environment.
3. Apply Big-M method to solve the following L. P. P. :

Maximize :

$$z = -2x_1 - x_2$$

Subject to constraints :

$$3x_1 + x_2 = 3$$

$$4x_1 + 3x_2 \geq 6$$

$$x_1 + 2x_2 \leq 4$$

and

$$x_1, x_2 \geq 0$$

4. Solve the given L. P. P. graphically :

Maximize :

$$z = -10,000x + 8,000y$$

Subject to constraints :

$$20x + 30y \leq 300$$

$$40x + 20y \leq 320$$

$$60x + 20y \geq 270$$

$$x - 2y \leq 0$$

$$x + y \geq 5$$

and $x, y \geq 0$.

5. Find the optimum transportation schedule for the given problem :

Destination	Origin				Requirement
	A	B	C	D	
1	7	4	3	4	15
2	3	2	7	5	25
3	4	4	3	7	20
4	9	7	5	3	40
Available	12	8	35	25	

Section—C

(Long Answer Type Questions)

Note : Attempt any *two* questions. Each question carries 10 marks.

6. Solve the following unbalanced assignment problem of minimizing total time for doing all the jobs :

	Jobs				
	1	2	3	4	5
1	6	2	5	2	6
2	2	5	8	7	7
3	7	8	6	9	8
4	6	2	3	4	5
5	9	3	8	9	0
6	4	7	5	6	8

7. Pay-off of three acts X, Y and Z and the states of nature P, Q and R are given below :

State of nature	Pay-off (₹)		
	Acts		
	X	Y	Z
P	-120	-80	100
Q	200	400	-300
R	260	-260	600

The probabilities of the states of nature are 0.3, 0.5 and 0.2 respectively. Tabulate the expected monetary values for the above data and state which can be chosen as the best act.

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8. Draw a network diagram on the basis of the following data :

Activity	Duration (days)
1—2	2
1—4	2
1—7	1
2—3	4
3—6	1
4—5	5
4—8	8
5—6	4
6—9	3
7—8	3
8—9	5
9—10	2

Find :

- (i) Critical Path
 - (ii) Total Duration
 - (iii) Three types of floats for various activities
9. Write short notes on the following :
- (a) PERT
 - (b) MaxiMin
 - (c) MaxiMax
 - (d) L. C. M.

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