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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

BBA

SEM: II - THEORY EXAMINATION (20 - 20.....)

Subject: Quantitative Techniques for Decision Making

Time: 2.5 Hours

Max. Marks: 60

General Instructions:

IMP: Verify that you have received the question paper with the correct course, code, branch etc.

1. This Question paper comprises of three Sections -A, B, & C. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.

2. Maximum marks for each question are indicated on right -hand side of each question.

3. Illustrate your answers with neat sketches wherever necessary.

4. Assume suitable data if necessary.

5. Preferably, write the answers in sequential order.

6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A

15

1. Attempt all parts:-

1-a. A feasible solution to an LPP: (CO1, K2)

1

- (a) Must satisfy only the objective function
- (b) Must satisfy all constraints
- (c) Must violate some constraints
- (d) Must always be optimal

1-b. Which method usually gives a better initial solution in terms of cost (CO2, K2)

1

- (a) North-West Corner Rule
- (b) Vogel's Approximation Method
- (c) Least Cost Method
- (d) MODI Method

1-c. When maximin and minimax values of the game are same, the situation arises as (CO3, K4)

1

- (a) No solution exists.
- (b) Solution is mixed
- (c) Saddle point exists.
- (d) None of the above

1-d. In a two-machine sequencing problem, Johnson's Rule aims to: (CO4, K4)

1

- (a) Maximize cost
- (b) Minimize idle time

(c) Minimize total elapsed time

(d) Maximize production

1-e. The Minimax Regret criterion is based on: (CO5, K7) 1

(a) Minimizing the maximum profit

(b) Maximizing the minimum payoff

(c) Minimizing the maximum regret

(d) Maximizing the expected value

2. Attempt all parts:-

2.a. Write the necessarily requirement to formulate LPP. (CO1, K2) 2

2.b. Define unbalanced transportation problem. (CO2, K2) 2

2.c. How would you differentiate between zero-sum and non-zero-sum games. (CO3, K4) 2

2.d. Write two applications of sequencing in management. (CO4, K4) 2

2.e. Define decision tree. (CO5, K7) 2

SECTION-B 15

3. Answer any three of the following:-

3-a. Solve the following LPP by using simplex method (CO1, K2) 5

$$\text{Max } Z = 3x_1 + 2x_2$$

$$\text{Subject to } x_1 + x_2 \leq 4$$

$$x_1 - x_2 \leq 2$$

$$x_1, x_2 \geq 0$$

3-b. Obtain an initial basic feasible solution to the following transportation problem by using least cost entry method. (CO2, K2) 5

	I	II	III	IV	Supply
A	10	11	9	22	4
B	15	14	11	13	9
C	18	18	15	12	12
Demand	5	6	4	10	

3.c. Solve the game whose payoff matrix is given by: (CO3, K4) 5

$$\begin{bmatrix} -5 & 2 \\ -7 & -4 \end{bmatrix}$$

3.d. Give Johnson's procedure for determining an optimal sequence for processing n items on two machine. Give justification of the rule used in the procedure. (CO4, K4) 5

3.e. Explain Maximin Criterion with examples. (CO5, K7) 5

SECTION-C 30

4. Answer any one of the following:-

- 4-a. Give the main characteristics of Operations Research. (CO1, K2) 6
- 4-b. Solve the following LPP by Graphical method (CO1, K2) 6
- Max $z = 10x + 20y$
s.t. $2x + y \leq 70$,
 $x + y \leq 40$,
 $x + 3y \leq 90$,
 $x \geq 0, y \geq 0$

5. Answer any one of the following:-

- 5-a. Discuss the advantages and disadvantages of each method in finding an initial feasible solution of transportation problem. (CO2, K2) 6
- 5-b. Use VAM, to determine an initial basic feasible solution of the following transportation problem.(CO2, K2) 6

	D1	D2	D3	D4	Supply
O1	6	4	1	5	14
O2	8	9	2	7	6
O3	4	3	6	2	5
Demand	6	10	5	4	

6. Answer any one of the following:-

- 6-a. Explain Hungarian method to solve assignment problems. (CO3, K4) 6
- 6-b. Find the optimal solution for the assignment problem with the following cost matrix. (CO3, K4) 6

	I	II	III	IV	I
A	11	17	8	16	20
B	9	7	12	6	15
C	13	16	15	12	16
D	21	24	17	28	26
E	14	10	12	11	15

7. Answer any one of the following:-

- 7-a. Predict the outcome on throughput when a non-optimal sequence is used in a sequencing problem. (CO4, K4) 6
- 7-b. Find the sequence that minimize the total elapsed time required to complete the following tasks on two machines. (CO4, K4) 6

Task	A	B	C	D	E	F
Machine I	2	4	9	6	3	2
Machine II	5	6	8	8	7	5

8. Answer any one of the following:-

- 8-a. In decision making under uncertainty explain the following: 6
- a) Maximax Criterion,
b) Maximin Criterion. (CO5, K7)
- 8-b. The payoff table is given below: 6

<i>Events</i>	<i>Actions</i>			
	S_1	S_2	S_3	S_4
<i>A</i>	27	12	14	26
<i>B</i>	45	17	35	20
<i>C</i>	52	36	29	15

Which is optimal course of action according to

- i) Maximax criterion
- ii) Hurwicz criterion (value of $\alpha = 0.7$)
- iii) Minimax regret criterion
- iv) Laplace criterion (CO5, K7)

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