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Course: MBA, Program: MBA (General)
Subject: Decision Science, Code: MAN-904
Semester-III

Time: 03 Hours

Max Marks: 70

Instructions to the Students:

1. This Question paper consists of two Sections. All sections are compulsory.
2. Section A comprises 10 questions of short answer type. All questions are compulsory. Each question carries 2 marks.
3. Section B comprises 8 long answer type questions out of which students must attempt any 5. Each question carries 10 marks.
4. Do not write anything on the question paper.

Q. No.	SECTION –A (SHORT ANSWER TYPE QUESTIONS)	Mark s
1. a	Write any two advantages of Linear Programming Problem (LPP).	(2)
b	What do you understand by the dual of an LPP? Why do we need this?	(2)
c	Describe the concept of degeneracy in a transportation problem. How do you resolve it?	(2)
d	What is an assignment problem? Illustrate with the help of an example.	(2)
e	What is the difference between decision-making under risk and decision-making under certainty.	(2)
f	Describe the steps in decision-making analysis?	(2)
g	What is a queue? Give an example.	(2)
h	State two applications of queuing theory in business enterprises.	(2)
i	Write down the assumptions made in game theory?	(2)
j	Explain the difference between a pure strategy and a mixed strategy.	(2)

SECTION –B (LONG ANSWER TYPE QUESTIONS)

2. A firm manufactures two types of pens, A and B and sells them at a profit of Rs 10 on type A and Rs 3 on type B. Each product is processed on two machines G and

H. Type A requires one minute of processing time on G and two minutes on H; type B requires one minute on G and one minute on H. The machine G is available for not more than 6 hours 40 minutes while machine H is available for 10 hours during any working day. Formulate the problem as a linear programming problem (LPP). Also determine the dual of the LPP.

3. Solve the following LPP by simplex method (10)

$$\text{Maximize } z = 3x_1 + 2x_2$$

subject to

$$x_1 + x_2 \leq 4$$

$$x_1 - x_2 \leq 2$$

$$x_1, x_2 \geq 0.$$

4. A company has three plants A, B, C, three warehouses X, Y, Z. The number of units available at the plants is 60, 70, 80 and the demand at X, Y, Z are 50, 80, 80, respectively. The unit cost of the transportation is given in the following Table. (10)

	X	Y	Z
A	8	7	3
B	3	8	9
C	11	3	5

Optimize the allocation so that the total transportation cost is minimum.

5. A department has five employees with five jobs to be performed. The time (in hours) each man will take to perform each job is given in the cost matrix. (10)

		Employees				
		I	II	III	IV	V
Jobs	A	10	5	13	15	16
	B	3	9	18	13	6
	C	10	7	2	2	2
	D	7	11	9	7	12
	E	7	9	10	4	12

How should the jobs be allocated, one per employee, so as to minimise the total man-hours?

6. Use an example to explain the basic queuing process. Draw a diagram showing the physical layout of a queuing system with multi-server multi-channel service facility. (10)