Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER 2012

Subject code: 711306N **Date: 16-01-2013**

Subject Name: Decision Models in Management

Time: 02.30 pm – 05.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 (a) Define – Feasible solution, Optimal solution, Unbounded solution, Infeasible solution, Degenerate solution, Constraints, Model **07**

(b) Solve the following LP problem graphically **07**

Maximize $Z = X_1 + X_2$

Subject to $X_1 + 2X_2 \leq 10$

$X_1 + X_2 \leq 6$

X_1 and $X_2 \geq 0$

Q.2 (a) Find the feasible solution of the following transportation problem using north – west corner method **07**

		Warehouses				Supply
		W1	W2	W3	W4	
	F1	14	25	45	5	6
Factories	F2	65	25	35	55	8
	F3	35	3	65	15	16
Requirement		4	7	6	13	30 (Total)

(b) Find the initial basic feasible solution to the following transportation problem by Least cost method. **07**

	To			Supply
	2	7	4	5
	3	3	1	8
From	5	4	7	7
	1	6	2	14
Demand	7	9	18	

OR

(b) A Company has four machines to do three jobs. Each job can be assigned to one and one machine. The cost of each job on each machine is given in the following table **07**

		W	X	Y	Z
	A	18	24	28	32
Jobs	B	8	13	17	19
	C	10	15	19	22

Q.3 (a) Explain the steps of kruskal's algorithm **07**

(b) Solve the following LP problem using Simplex method **07**

Maximize $Z = 10X_1 + 15X_2 + 20X_3$

Subject to $2X_1 + 4X_2 + 6X_3 \leq 24$

$$3X_1 + 9X_2 + 6X_3 \leq 30$$
$$X_1, X_2 \text{ and } X_3 \geq 0$$

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OR

Q.3	**(a)**	What are the applications of dynamic programming?	**07**
	(b)	Explain – Balanced Transportation Problem and Unbalanced Transportation Problem.	**07**
Q.4	**(a)**	The arrival rate of customers at a banking counter follows Poisson distribution with a mean of 50 per hour. The service rate of the counter clerk follows Poisson distribution with a mean of 70 per hour. (a) What is the probability of having 0 customer in the system (P_0)? (b) What is the probability of having 5 customer in the system (P_5)? (c) Find Ls, Lq, Ws and Wq.	**07**
	(b)	Define simulation and explain its advantages.	**07**

OR

Q.4	**(a)**	Explain – Balking, Reneging, Jockeying	**07**
Q.4	**(b)**	What is Kendall notation? Give the classification of queuing system based on Kendall notation.	**07**
Q.5	**(a)**	Discuss the similarity between transportation problem and assignment problem.	**07**
	(b)	Cars arrive at a restaurant with a mean arrival rate of 30 cars per hour and the service rate of the cars is 22 per hour. The arrival rate and the service rate follow Poisson distribution. The number of parking space for cars is only 5. Find the standard result of this system.	**07**

OR

Q.5	**(a)**	Explain Branch and Bound Technique of integer programming.	**07**
	(b)	Distinguish between integer programming and linear programming problem.	**07**

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