Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – SUMMER 2016

Subject Code:172503 Date:10/05/2016

Subject Name:Optimization Methods

Time:02:30 PM to 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)** Discuss nature and characteristics features of OR. **07**

(b) What is Linear programming? Discuss various assumptions in linear programming. **07**

Q.2 **(a)** The agricultural Research institute suggested to a farmer to spread out at least 4800 kg of a special phosphate fertilizer and not less than 7200 kg of a special nitrogen fertilizer to raise productivity of crops in his fields. There are two sources for obtaining these- mixtures A and mixtures B. Both of these are available in bags weighing 100 kg each and they cost Rs. 40 and Rs. 24 respectively. Mixture A contains phosphate and nitrogen equivalent of 20 kg and 80 kg respectively, while mixture B contains these ingredients equivalent of 50 kg each. Formulate this as an LP problem. **07**

(b) Solve graphically the following LPP: **07**

Maximise $Z = 8x_1 + 16x_2$

S.t. $x_1 + x_2 \leq 200$

$x_2 \leq 1250$

$3x_1 + 6x_2 \leq 900$

$x_1, x_2 \geq 0$

OR

(b) Discuss following in regard to LPP using neat sketch: **07**

1. Multiple optimal solution
2. Unbounded Solution
3. Infeasible solution

Q.3 **(a)** Define simulation. Explain the process of simulation with suitable example. **07**

(b) A bakery keeps stock of a popular brand of cakes. Previous experience shows the daily demand pattern for the item with associated probabilities, as given: **07**

Demand	0	10	20	30	40	50
Probability	0.01	0.2	0.15	0.5	0.12	0.02

Using following random numbers simulate the bakery's stock position for next 10 days and find average daily demand.

Random No: - 25, 39, 65, 76, 12, 05, 73, 89, 19, 49.

OR

Q.3 **(a)** Explain queuing system and its various elements. **07**

(b) A TV repairman finds that the time spend on his jobs has an exponential distribution with a mean of 30 minutes. If he repairs sets on the FCFS basis and if the arrival of sets is with average rate of 10 per 8-hour day, what is repairman's expected idle time each day? Also obtain average number of units in the system. **07**

Q.4 **(a)** What is an assignment problem? Is it true to say that it is a special case of the transportation problem? Explain. **07**

(b) Explain Hungarian method to solve assignment problem with suitable example. **07**

OR

Q.4 **(a)** Describe the transportation problem and gives its mathematical model. **07**

(b) Discuss various methods of finding initial feasible solution of a transportation problem. **07**

Q.5 **(a)** Solve the following game using matrix method: **07**

		B		
		1	2	3
A	1	7	1	7
	2	9	-1	1
	3	5	7	6

(b) Explain the following: **07**

1. Saddle point
2. Pure strategy
3. Mixed strategy

OR

Q.5 **(a)** Solve the following LPP using simplex method: **07**

Maximise $Z = 2x_1 + 5x_2$

S.t. $x_1 + 4x_2 \leq 24$

$3x_1 + x_2 \leq 21$

$x_1 + x_2 \leq 9$

$x_1, x_2 \geq 0$

(b) What is game theory? State the assumptions underlying it. Discuss its importance to business decisions. **07**

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