Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – WINTER 2017

Subject Code: 172503 Date: 10-11-2017

Subject Name: Optimization Methods

Time: 10:30 am to 01:00 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 following in regard to LPP using neat sketch: **07**

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

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

Q.2 **(a)** Discuss simplex method with suitable example. **07**

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

Maximise $Z = 500x_1 + 300x_2$

S.t. $15x_1 + 5x_2 \leq 300$

$10x_2 + 6x_2 \leq 240$

$8x_1 + 12x_2 \leq 450$

$x_1, x_2 \geq 0$

OR

(b) 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**

Q.3 **(a)** What is game theory? State the assumptions underlying it. Discuss its importance to business decisions. **07**

(b) Solve the following game using dominance method: **07**

		B		
		1	2	3
A	1	-3	1	2
	2	1	2	1
	3	1	0	-2

OR

Q.3 **(a)** Discuss Kendell's Notation for queuing models. **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)** Discuss sensitivity analysis for linear programming problem. **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 degeneracy in transportation problem. **07**

Q.5 **(a)** Solve the following assignment problem for assigning jobs to workers. **07**

		Jobs			
		A	B	C	D
Workers	1	50	70	110	60
	2	80	50	90	60
	3	40	70	100	70
	4	100	40	80	30

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

OR

Q.5 **(a)** Explain the following: **07**

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

(b) Define simulation. Explain the process of simulation with suitable example. **07**

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