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Total No. of Pages : 02

Total No. of Questions : 08

M.Tech. (CAD/CAM) (2018 Batch) (Sem.–1) OPTIMIZATION TECHNIQUES Subject Code : ME-507 M.Code : 23511

Time : 3 Hrs. INSTRUCTIONS TO CANDIDATES :

Max. Marks : 100

- 1. Attempt any FIVE questions out of EIGHT questions.
- 2. Each question carries TWENTY marks.

Q1. a) State dual theorem and its implications. What is the essential difference between regular simplex method and dual simplex method?

b) Prove that the dual of the dual of a given primal is again primal.

Q2. The XYZ company has five jobs A, B, C, D, E to be done and five men L, M, N, O, P to do these jobs. The number of hours each man would take to accomplish each job is given by the following table :

	L	М	Ν	0	Р
A	4	6	11	16	9
В	5	8	16	19	9
С	9	13	21	21	13
D	6	6	9	11	7
E	11	11	16	26	11

Find the optimal solution for the above assignment problem.

- Q3. a) Discuss the advantages and disadvantages of simulation model giving examples.
 - b) How is a simulation technique better than mathematical models in solving problems of business and industry? Explain Monte Carlo Simulation with examples.
- Q4. Solve the following L.P.P. by dynamic programming approach

Maximize Z = 3X1 + 4X2Subject to $2X1 + X2 \le 40$ $2X1 + 5X2 \le 180$ $X1, X2 \ge 0$ Q5. a) State the assumptions of M/M/1 Queuing Model.

b) An airlines organization has one reservation clerk on duty in its local branch at any given time. The clerk handles information regarding passenger reservations and flight timings. Assume that the number of customers arriving during any given period is poisson distributed with an arrival rate of eight per hour and that the reservation clerk can service a customer in six minutes on an average, with an exponentially distributed service time.

- i) What is the probability that the system is busy?
- ii) What is the average time a customer spends in the system?
- iii) What is the average length of the queue and what is the average number of

customers in the system?

Q6. Write a detailed note on the following :

- a) Role of sensitivity analysis in Linear Programming.
- b) Travelling salesmen model and their industrial applications.
- Q7. Solve the following LPP using its dual :

Maximize Z = 5X1 – 2X2 + 3X3

Subject to $2X1 + 2X2 - X3 \ge 2$

- $3X1 4X2 \le 3$ $X2 + 3X3 \le 5$ $X1, X2, X3 \ge 0$
- Q8. a) Write a detailed note on Dynamic Programming and its industrial applications.
 - b) Distinguish between assignment and transportation model. Describe a method to solve an assignment problem.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.