Roll No. | | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 08

M.Tech (ECE)EL (2018 Batch) (Sem.–3)

OPERATIONS RESEARCH

Subject Code : MTOE-O301C-18

M.Code : 76589

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1.Attempt any FIVE questions out of EIGHT questions.

2.Each question carries TWELVE marks.

1. Find the dual of the following problem :

   Maximize $Z = 30x_1 + 20x_2$

   Subject to $-x_1 - x_2 \geq -8$

   $-6x_1 - 4x_2 \leq -12$

   $5x_1 + 8x_2 = 20$

   $x_1, x_2 \geq 0$

2. ABC company produces a cable at the rate of 5000 metres per hour. The cable is used at the rate at 2500 metres/hour. The cost of the cable is Rs. 5 per metre. The inventory carrying cost is 25 percent and set-up costs are Rs. 4050 per set-up. Determine the optimal number of cycles required in a year for the manufacture of this cable.

3. What is EOQ? Derive an expression for the economic order quantity when the stock replenishment is non-instantaneous giving the assumptions made.

4. Solve by Dual Simplex

   Max. $Z = -4x_1 - 4x_2 - 8x_3$

   Subject to $4x_1 + 6x_2 + 10x_3 \geq 4$

   $6x_1 + 2x_2 + 14x_3 \leq 6$

   $2x_1 + 8x_2 + 12x_3 \leq 10$

   $x_1, x_2, x_3 \geq 0$

5. What is PERT? Define Pessimistic time, optimization time and most likely time and explain how you will estimate the expected time to complete the activity in PERT technique.

6. A Xerox machine in an office is operated by a person who does other jobs also. The average service time for a job is 6 minutes per customer. On an average, in every 12 minutes one customer arrives for Xeroxing. Find :

   a) The Xerox machine utilization

   b) Percentage of time when an arrival has not to wait

   c) Average time spent by a customer

   d) Average queue length

   e) The arrival rate if the management is willing to deploy the person exclusively for Xeroxing when the average time spent by the customer is 15 minutes.

7. We have 5 jobs, each of which must be processed on two machines A and B in order AB. Processing time in hours are given in table below :

Jobs	**1**	**2**	**3**	**4**	**5**
Machine A	5	1	9	3	10
Machine B	2	6	7	8	4

   Find the optimal sequence and total elapsed time.

8. Explain the following :

   a) Sensitivity Analysis

   b) Model Formulation

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