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

Total No. of Questions : 08

M.Tech. (CSE) OE (2021 Batch) (Sem.–3)

OPERATIONS RESEARCH

Subject Code : MTOE303-18

M.Code : 76514

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

INSTRUCTIONS TO CANDIDATES :

1.Attempt any FIVE questions out of EIGHT questions.

2.Each question carries TWELVE marks.

Q1. Discuss the role of sensitivity analysis in linear programming. Under what circumstances is it needed and under what conditions do you think it is not necessary ?

Q2. Use the Simplex Method to solve the following LP problem.

Maximize $Z=5X_1 + 7X_2 + 6X_3$

Subject to the constraints : (i) $2X_1 + 3X_2 \leq 8$,

(ii) $2X_2 + 5X_3 \leq 10$,

(iii) $3X_1 + 2X_2 + 4X_3 \leq 15$

and $X_1, X_2, X_3 \geq 0$

Q3. A shopkeeper estimates the annual requirement of an item as 2,000 units. He buys it from his supplier at a cost of Rs. 10 per item and the cost of ordering is Rs. 50 each time per orders. If the stockholding costs are Rs. 25 percent per year of the stock value, how frequently should he replenish his stocks? Further, suppose the supplier offers a 10 percent discount on orders between 400 and 699 items, and a 20 percent discount on orders exceeding or equal to 700. Can the shopkeeper reduce his costs by taking advantage of either of these discounts?

Q4. What is duality in linear programming? Explain its role in solving the managerial problems.

Q5. What are Kuhn-Tucker conditions? Discuss its applications for solving managerial problems.

Q6. A project data is given below in the table :

a) Construct a precedence diagram.

b) On the diagram, compute the four schedule dates (ESD, EFD, LSD, LFD).

c) The floats (TF, FF, and IDF) for each activity, and the lag for each link.

d) Identify the critical path.

No	ACT	DUR	PREDECESSORS
5	B	5	-
10	M	4	B
15	N	9	B
20	Q	15	B
25	A	1	M,N
30	F	4	N,Q
35	X	9	Q
40	C	9	Q
45	Y	9	A,F,X
50	S	6	F
55	J	5	X,F
60	T	10	C
65	V	5	Y,S
70	U	10	V,T,J

Q7. A manufacturing company processes 6 different jobs on two machines A and B. Number of units of each job and its processing times on machines A and B are given in the following table. Find the optimum sequence, the total minimum elapsed time and the idle time for each machine.

Job No.	No. of units of each job	Machine Time (hours)	
		Machine A	Machine B
1	3	5	8
2	4	16	7
3	2	6	11
4	5	3	5
5	2	9	7.5
6	3	6	14

Q8. Write short notes on the following :

a) Geometric Programming.

b) Deterministic Inventory Control Models.

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.