B.TECH (SEM VII) THEORY EXAMINATION 2021-22 OPERATIONS RESEARCH

Time: 3 Hours

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

Roll No:

SECTION A

1. Attempt *all* questions in brief.

- a. What are slack and surplus variables?
- b. Explain basic feasible solution of LPP.
- c. Define unbalanced assignment problem.
- d. Discuss the objective of transportation problems.
- e. What is PERT?
- f. What are the rules for drawing the network diagram?
- g. Define saddle point and optimal strategy.
- h. What are various customer's behaviors?
- i. Write down different types of costs on which EOQ depends.
- j. Distinguish between deterministic and stochastic inventory models.

SECTION B

2. Attempt any *three* of the following:

- a. Classify and explain different models used in OR. Solve the following problem by using graphical method: Minimize Z = 2X1 + 3X2Subjected to $X1 + 2X2 \ge 40$, $2X1 + X2 \ge 50$, X1, $X2 \ge 0$
- b. Show that transportation is a special type of LPP. Use least cost method to find initial basic feasible solution of the given problem.

	DI	D_{2}	DS	D4	Supply
S1	19	30	50	10	7
S2	70	30	40	60	9
S3	40	8	70_	20	18
Demand	5	8	7	bī4	

- c. What do you mean by network analysis? What is its significance? Also distinguish between the following:
 - i. CPM and PERT
 - ii. Critical and Dummy activities
- d. For what type of business problem game theory is useful? Explain. Solve the following game graphically and find out the optimal strategies for both of the players.

P	2		Player B				
*		1	2	3	4		
Player A	1	4	-2	3	-1		
	2	-1	2	0	1		
	3	-2	1	-2	0		

e. What are the types of inventory? Why they are maintained. Explain the various costs related to inventory. What are the economic parameters of inventory?

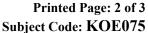
 $2 \times 10 = 20$

 $10 \times 3 = 30$



Total Marks: 100







SECTION C

3. Attempt any *one* part of the following:

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(a) Solve using Simplex method the following problem:

Maximize Z = 3x + 2y

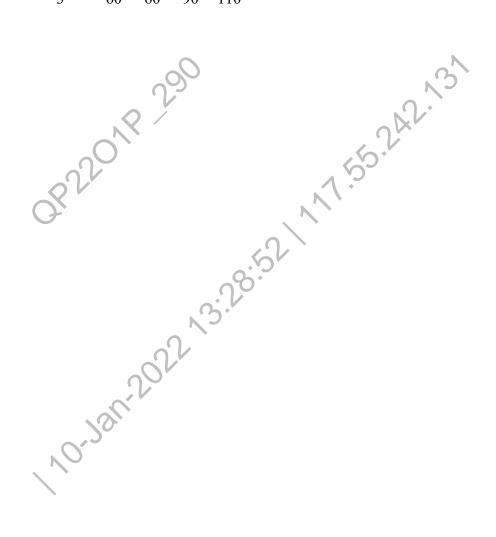
subject to: $2x + y \le 18$; $2x + 3y \le 42$; $3x + y \le 24$; $x \ge 0$, $y \ge 0$

(b) Explain the phenomenon of infeasibility in an LP problem. What are the indicators of such a phenomenon? Write the dual of the given primal problem: Maximize: Z = a + 2b + 3c
s.t. 4a + 2b + c ≤ 25; 2a + 3b - c ≥ 20; a + 2b + 3c ≤ 15; b + 2c =10 and a, b, c ≥ 0

4. Attempt any *one* part of the following:

(a) Applying MODI method, determine the optimal solution of the following transportation problem.

	1	2	3	4	Capacity
1	100	120	90	60	700
2	70	30	70	70	600
3	60	60	90	110	



 $10 \ge 1 = 10$