Subject Code: KOE075

PAPER ID-410979

Roll No: | | | | | | | | | | | | | |

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

Time: 3 Hours *Total Marks: 100*

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

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

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: **10 x 3 = 30**

a. Classify and explain different models used in OR.
Solve the following problem by using graphical method:
Minimize $Z = 2X1 + 3X2$
Subjected to $X1 + 2X2 \geq 40$, $2X1 + X2 \geq 50$, $X1, X2 \geq 0$

b. Show that transportation is a special type of LPP. Use least cost method to find initial basic feasible solution of the given problem.

	D1	D2	D3	D4	Supply
S1	19	30	50	10	7
S2	70	30	40	60	9
S3	40	8	70	20	18
Demand	5	8	7	14	

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.

		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?

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SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

(a) Solve using Simplex method the following problem:

Maximize $Z = 3x + 2y$

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

(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. $4a + 2b + c \leq 25$; $2a + 3b - c \geq 20$; $a + 2b + 3c \leq 15$; $b + 2c = 10$ and $a, b, c \geq 0$

4. Attempt any *one* part of the following: 10 x 1 = 10

(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	