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B.Tech
(SEM VIII) THEORY EXAMINATION 2022-23
INDUSTRIAL OPTIMIZATION TECHNIQUES

Time: 3 Hours ***Total Marks: 100***

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

SECTION A

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

(a) Discuss the followings: (i) key row, (ii) key column and (iii) limiting ratio?
(b) What is optimization?
(c) Differentiate between CPM and PERT.
(d) What is transshipment problem?
(e) Write short note on Game Theory.
(f) What is Queuing Theory?
(g) What are the advantages and disadvantages of simulation?
(h) Discuss dynamic programming with example.
(i) What do you mean by replacement model in industrial optimization?
(j) What do you mean by the term set-up cost and holding cost as applied to an inventory model?

SECTION B

2. Attempt any *three* of the following: 10 x 3=30

(a) From three warehouses, A, B, and C orders for certain commodities are to be supplied to demand points X, Y, and Z. Find the least cost transportation schedule with relevant information given below:

From Warehouses	To demand points (Transportation cost in Rs. per units):			Availability in units.
	X	Y	Z	
A	5	10	2	100
B	3	7	5	25
C	6	8	4	75
Units Demand:	105	30	90	

(b) Define optimistic time, pessimistic time and most likely time and explain how will you estimate the expected time to complete the activity in PERT technique. Explain application of PERT in industries.

(c) A and B play a game in which each has three coins, a 5 paise, 10 paise and 20 paise coins. Each player selects a coin without the knowledge of the other's choice. If the sum of the coins is an odd amount, A wins B's coins. If the sum is even, B wins A's coins. Find the optimal strategies for the players and the value of the game.

(d) Explain the steps involved in Monte Carlo simulation. Discuss the application of Monte Carlo Simulation in engineering.

(e) What do you mean by deterministic and probabilistic inventory models? Illustrate their engineering applications.

SECTION C

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

(a) Explain how a linear programming problem can be solved by graphical method and give limitations of graphical method.

(b) Use dual simplex method for solving the given problem.

Maximize :Z= 2a– 2b– 4c s.t

$2a+ 3b+ 5c \geq 2$

$3a+1y+ 7z \leq 3$

$1a+ 4b+ 6c \leq 5$ and a,b,c all ≥ 0

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

(a) What is sequencing? How will you solve the sequencing of n jobs on three machines?

(b) What is CPM? What are the essential steps in CPM for project planning?

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

(a) Given an arrival rate of 20 per hour, is it better for a customer to get service at a single channel with mean service rate of 22 customers or at one of two channels in parallel, with mean service rate of 11 customers for each of the two channels? Assume that both queues are of M/M/S type.

(b) Explain the following terms in relation to game theory: (i) Pure strategy , (ii) Mixed Strategy, (iii) Saddle point, (iv) Dominance, (v) Value

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

(a) Define simulation. State the advantages and limitations of simulation. What are the elements of simulation model?

(b) What do you mean by dynamic programming algorithm? What are dynamic programming algorithm steps?

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

(a) What is the replacement problem? Discuss different types of Individual and Group Replacement policies & their applications in Engineering.

(b) Obtain an expression for the EOQ for any inventory model, stating the assumption made.