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B. TECH.

THEORY EXAMINATION (SEM–VIII) 2016-17
OPERATION RESEARCH

Time : 3 Hours**Max. Marks : 100****Note : Be precise in your answer. In case of numerical problem assume data wherever not provided.****SECTION – A****1. Attempt all parts of the following questions:****10 x 2 = 20**

- What are the essential characteristics of Operation Research?
- What do you understand by Linear Programming Problem?
- What are slack, surplus and artificial variables?
- What do you understand by unbalanced transportation Problem?
- What is meant by optimal solution of an LP Problem?
- What are the advantages of dual problem?
- Explain Indirect Cost associated with a project.
- What is dummy activity in network problem?
- State the various methods of finding the Basic Feasible solution in Transportation problem
- What is meant by restricted assignment problem?

SECTION – B**2. Attempt any five of the following questions:****5 x 10 = 50**

- A road transport company has one reservation clerk on duty at a time. He handles information of bus schedules and makes reservations. Customers arrive at a rate of 8 per hour and clerk can on an average service 12 customers per hour. Answer the following
 - What is the average no of customers waiting for the service of the clerk?
 - What is the average time a customer has to wait before being served?
- Solve the following LP Problem graphically
 Maximize $Z = 3X + 2Y$ Subject to the constraints
 - $-2X + 3Y \leq 9$
 - $3X - 2Y \leq -20$
 and $X, Y \geq 0$
- What do you mean by Simulation? Explain Monte- Carlo simulation process.
- The annual demand for an item is 3200 units. The unit cost is Rs. 6 and inventory carrying charges 25 % per annum. If the cost of one procurement is Rs. 150, determine:
 - Economic order quantity,
 - No of orders per year,
 - Time between two consecutive orders, and
 - The optimal cost
- A work manager has to allocate four different jobs to four workmen. Depending on the efficiency and capacity of the individual the time taken by each differs as shown in table. How the task should be assigned one job to a worker as to minimize work hour.

Jobs	Workers			
	A	B	C	D
1	10	20	18	14

2	15	25	9	25
3	30	19	17	12
4	19	24	20	10

- (f) Describe the computational procedure of the optimality test in a transportation problem.
- (g) Explain the method of obtaining an optimal solution to a 3-machine n job problem under the condition to be stated.
- (h) What is game theory? Discuss the importance to business decisions.

SECTION – C

Attempt any two of the following questions:

2 x 15 = 30

- 3** Solve the following LPP by simplex method
 Minimize $Z = X_1 - 3X_2 + 3X_3$
 Subject to $3X_1 - X_2 + 2X_3 \leq 7$
 $2X_1 + 4X_2 \geq -12$
 $-4X_1 + 3X_2 + 8X_3 \leq 10$
 $X_1, X_2, X_3 \geq 0$
- 4** What are the objectives and assumptions of the Game theory? Explain how the saddle point is determined which indicates the best strategy for both the player in a 'Two person zero sum Game'
- 5** **Write short notes on the following:**
- Two person zero sum game
 - Crashing and resource levelling of operations
 - Application of queuing model for better service to the customer.