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B.E. / B.Tech. (Full Time) DEGREE END SEMESTER EXAMINATIONS – April/May 2012
MANUFACTURING ENGINEERING BRANCH
SEVENTH SEMESTER
MF 9401 – OPERATION RESEARCH
(REGULATIONS 2008)

Time : 3 Hours

Max. Marks : 100

Answer All Questions

PART – A (10 X 2 = 20 Marks)

1. Mention the importance of selecting appropriate input data for a OR study.
2. Explain the fundamental duality theorem.
3. What is the purpose of MODI method?
4. What is dangling in a network?
5. Define holding cost.
6. What are the costs associated with inventory control?
7. Define Markov chain.
8. State Little's law.
9. State the rule of dominance.
10. When is dynamic programming required?

PART – B (16 X 5 = 80 Marks)

11. Use Big M method to solve

$$\text{Minimize } Z = 4x_1 + 3x_2$$

Subject to

$$\begin{aligned} 2x_1 + x_2 &\geq 10 \\ -3x_1 + 2x_2 &\leq 6 \\ x_1 + x_2 &\geq 6 \\ \text{and } x_1, x_2 &\geq 0. \end{aligned}$$

(16)

12. a. Find the optimal solution of the following transportation problem.

	X	Y	Z	Supply
P	1	2	0	30
Origin Q	2	3	4	35
R	1	5	6	35
Demand	30	40	30	

(16)

(or)

b. Draw the following network, find the critical path and also calculate the total float, free float and independent float for the project whose activities are given as follows:

Activities	1-2	1-3	1-5	2-3	2-4	3-4	3-5	3-6	4-6	5-6
Duration (In weeks)	12	11	18	6	15	5	8	14	10	6

(16)

13.a.i. Write notes on various types of inventories.

(6)

ii. A manufacturer has to supply his customer with 600 units of his products per year. Shortage are not allowed and storage cost amounts to 60 paise per unit per year. The set up cost is Rs.80. Find the EOQ, the minimum average yearly cost, the optimum number of orders per year and the optimum period of supply per optimum order.

(10)

(or)

b. Find the optimum order quantity for a product for which the price break is as follows:

Quantity	Purchasing cost (per unit)
$0 \leq Q_1 < 50$	Rs.15
$50 \leq Q_2 < 100$	Rs.12
$200 < Q_3$	Rs.10

For the monthly demand for the product is 200 units. The storage cost is 25% of the unit cost of the product and the cost of ordering is Rs.20 per order.

(16)

14a. A departmental store having a single cashier has customers arriving at a rate of 20 per hour during rush hour. The average number of customers that can be processed by the cashier is 24 per hour. Assume that the conditions for use of the single channel queuing model apply. Find the probability that the cashier is idle, the average number of customers in the queuing system, average time in system, average number of customers in the queue and the average time a customer spends in the queue waiting for service.

(16)

(or)

b.i. For a queuing system with k service stations, each having exponential service time distribution with mean service rate μ feed by a Queue with built up arrival rate λ , find the average number of customers in the sytem, average waiting time of a customer in the system if $k = 2$, $\mu = 5$ per minute and $\lambda = 8$ per minute.

(12)

ii. Write detailed notes on simulation.

(4)

15a. Solve the following game using dominance property.

		B		
		I	II	III
A	I	1	7	2
	II	6	2	7
	III	6	1	6

(16)

(or)

b. Describe briefly various types of variable search techniques.

(16)