Code: 9A03701 **R09**

B.Tech IV Year I Semester (R09) Supplementary Examinations June 2016

OPERATIONS RESEARCH

(Mechanical Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 Solve the following LPP:

Maximize $z = 3x_1 + 2x_2$

Subject to $2x_1 + x_2 \leq 40$

$2x_1 + 3x_2 \leq 60$

$x_1 + x_2 \leq 24$

$x_1,\ x_2 \geq 0$

2 Describe linear programming. What are its limitations and applications?

3 The yearly cost of 2 machines A and B when money value is neglected is as follows:

Year	1	2	3	4	5
Machine A	1800	1200	1400	1600	1000
Machine B	2800	200	1400	1100	600

Find their cost patterns if money value is 10% per year and hence find which machine is most economical.

4 Two competitors A and B are competing for same product. Their different strategies are given in the following payoff matrix. Use dominance principle to find the optimal strategies.

	I	II	III	IV
I	3	2	4	0
II	3	4	2	4
III	4	2	4	0
IV	0	4	0	8

5 A post office has 3 windows providing the same service. It receives on an average 30 customers per hour. Arrivals are Poisson distributed and service time is exponentially distributed. Each window serves as an average 12 customers per hour.

(a) What is the probability that a customer will be served immediately?

(b) What is the probability that a customer will have to wait/

(c) What is the average number of customers in the system?

(d) What is the average total time a customer must spend in the post office?

6 (a) Explain classifications of inventories.

(b) ABC manufacturing company needs ball bearings of worth Rs. 28,800 per year. The cost of placing an order is Rs. 48 and inventory carrying cost as a percentage of average inventory investment is 12%. Determine: (i) Value of each assignment. (ii) Number of orders per year.

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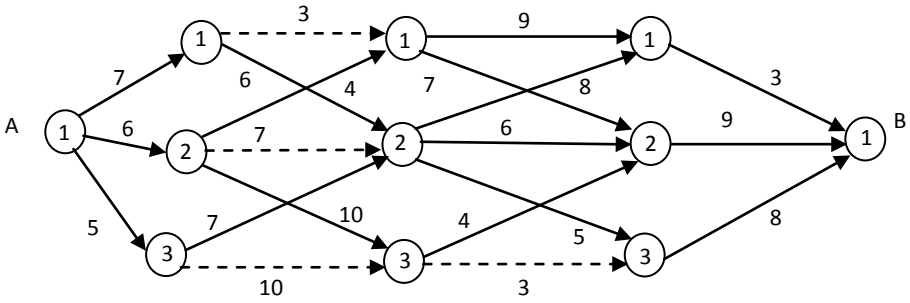
7 Find the shortest path from A to B.



8 What are the applications of simulation? Explain basic steps in Monte Carlo simulation.

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