Printed Pages: 02 **Sub Code: MME105**

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M TECH
(SEM I) THEORY EXAMINATION 2018-19
APPLIED OPERATION RESEARCH

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

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

Q1. Answer any two parts: **10 X 2 =20**

a) Discuss the significance and scope of OR in modern management.

b) Explain the meaning of linear programming problem stating its uses and give its limitations.

c) Solve the following LPP by simplex method:
Maximize $Z = 3x_1 - x_2$
Subject to $2x_1 + x_2 \geq 2$;
$x_1 + 3x_2 \leq 3$;
$x_2 \leq 4$.

Q2. Answer any two parts: **10 X 2 =20**

a) What is parametric programming? Write the algorithm to solve the LPP by parametric programming.

b) State and prove Bayes Theorem and solve the following problem A and B throw an alternately with a pair of dice.

c) Explain the Primal dual relationships. How can dual problem be useful in management decision making? And find the dual of the following Primal:
Max $z = 3x_1 - 2x_2$
Subject to: $x_1 + x_2 \leq 5$;
$-x_2 \leq -1$;
$0 \leq x_1 \leq 4$ $0 \leq x_2 \leq 6$;
and $x_1, x_2 \geq 0$.

Q3. Answer any two parts: **10 X 2 =20**

a) What is degeneracy in transportation problem? How is it resolved?

b) Define the following terms with examples.
(i) Pay off
(ii) (ii) Optimal strategy
(iii) (iii) Value of game
(iv) (iv) Saddle point
(v) (v) Rule of Dominance.

c) Show that the assignment model is a special case of the transportation model.

Q4. Answer any two parts: **10 X 2 =20**

a) Four counters are being run on the frontier of a company to check the passport and necessary papers of the tourists. The tourists chose counter at random. If the arrival at the frontier is poissons at the rate λ and service time is exponential with parameter $\lambda/2$, what is the steady state average at each counter?

b) Explain M/M/1 (∞/FCFS) system and solve it under steady state condition.

c) In a railway marshalling yard, goods trains arrive at a rate of 30 trains per day. Assuming that the inter-arrival time follows an exponential distribution and the service time distribution is also exponential with an average 36 minutes. Calculate the following:
I. Average number of trains in the system.
II. The Probability that the queue exceeds 10.

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Q5. Answer any two parts: **10 X 2 =20**

a) Explain ABC analysis with examples.

b) An investment consultant predicts that the odds against the price of a certain stock will go up during the next week are 2:1 and the odd in favour of the price remaining the same are 1:3. What is the probability that the price of the stock will go down the next week?

c) Describe the following in brief:

(i) Traffic intensity

(ii) Service channel

(iii) Steady and transient state

(iv) Utilization factor

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