Printed pages: 02 **Sub Code:RCA304**

Paper Id: **214304** **Roll No:** | | | | | | | | | | |

MCA

(SEM I) THEORY EXAMINATION 2018-19

COMPUTER BASED OPTIMIZATION TECHNIQUES

Time: 3 Hours ***Total Marks: 70***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14

a. What do you mean by Linear Programming? Describe the limitations of L.P.
b. Explain the queuing system transient state.
c. What is the degeneracy in L.P. Problem
d. Discuss the Bellman's principle of optimality.
e. Discuss steady state in terms of Queuing theory.
f. Discuss EOQ with its formula.
g. Differentiate between Slag Variables and Surplus Variables.

SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21

a. Use Big-M method to maximize $Z= 4x_1-x_2$
Subject to the constraints
$2x_1 + x_2 \geq 6$
$x_1 + 3x_2 \leq 2$
$x_2 \leq 3$
and $x_1, x_2 \geq 0$.
b. Develop algorithm for Vogel's approximation method for solving transportation problem.
c. What is the dynamic recursive relation? State the 'principle of optimality' in dynamic programming and give a mathematical formulation of D.P.
d. Describe the problem of inventory control, when the stochastic demand is uniform, production of commodity is instantaneous and lead time is negligible.
e. What is queuing system? Explain the main characteristics and steady state of queuing system.

SECTION C

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

(a) Describe the use and limitations of Operation Research. Also explain the methodology of operation research.
(b) Explain various models and modeling in operation research. Which method is best for Operation Research and decision making application?

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

(a) Explain Degeneracy in Transportation problem. How degeneracy is overcome?
(b) Determine the optimum basic feasible solution to the following Transportation problem:

		To		
From ↓	A	B	C	Available
I	50	30	220	1
II	90	45	170	3
III	250	200	50	4
Required	5	2	1	

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

(a) Write short note on the following
   (i) Shortest route-problem with example.
   (ii) Maximum flow-problem with example.

(b) What is the dynamic programming? State the 'principle of optimality' in dynamic programming and give a mathematical formulation of D.P.

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

(a) A truck has been purchased at a cost of Rs. 1,60,000. The value of truck is depreciated in the first three years by Rs. 20,000 each year and Rs. 16,000 per year thereafter. Its maintenance and operating costs for the first three years are assuming an interest rate of 10%. Find the economic life of the truck.

(b) Derive an inventory model with one price break and obtain the decision rules for finding optimal order quantity.

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

(a) Define the concept of busy period in queuing theory and obtain its distribution for the system M/M/1. (∞/ FCFS). Show that the average length of busy period is $1/(\mu-\lambda)$.

(b) Prove that arrival distribution theorem if the arrivals are completely random then the probability distribution of number of arrivals in affixed time interval follows a Poisson distribution.