Printed Pages: 4

NMCA315/MCA315

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 2289992

Roll No. | | | | | | | | | | |

M.C.A.

Regular Theory Examination (Odd Sem-III) 2016-17

COMPUTER BASED OPTIMIZATION TECHNIQUES

Time : 3 Hours *Max. Marks : 100*

Section - A

Attempt all parts of the following. All parts carry equal marks. (10×2=20)

1. Write Answer of each part in short.

a) What is an inventory system?

b) Define replacement problem.

c) Give an example for Artificial Variables.

d) How an assignment problem can be solved?

e) What do you mean by Degeneracy in Transportation Problem?

f) Distinguish between integer programming problem and linear programming problem.

g) Define kuhn-Tucker.

h) State the principle of Bellman's Optimality.

i) Differentiate between Steady and Transient States.

j) What is queuing system?

Section - B

Attempt any 5 questions from this Section. (5×10=50)

2. Discuss the Economic lot size model with different rates of demands in different cycles.

3. Solve the following L.P.P. using Graphical method.

Min. $Z = 1.5X_1 + 2.5X_2$

s.t. $X_1 + 3X_2 >= 3$

$X_1 + X_2 >= 2$

$X_1, X_2 >= 0$

4. Solve the following L.P.P. using Big-M Method.

Min $Z = 4X_1 + 3X_2$

s.t. $2X_1 + X_2 >= 10$

$-3X_1 + 2X_2 <= 6$

$X_1 + X_2 >= 6$

$X_1, X_2 >= 0$

5. Solve the following Transportation Problem :

Warehouse	W1	W2	W3	W4	Capacity
F1	19	30	50	10	7
F2	70	30	40	60	9
F3	40	8	70	20	18
Requirement	5	8	7	14	34

6. A company has 5 jobs to be done. The following matrix shows the return in rupees on assigning ith (i = 1, 2, 3, 4, 5) machine to the jth job (j = A, B, C, D, E). Assign the five jobs to the five machines so as to maximize the total expected profit.

7. Write the Kuhn-Tucker Conditions for Non Linear Programming Problems.

8. State and prove the Markovian property of inter-arrival time.

9. 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 service time distribution is also exponential with an average 36 minutes. Calculate the following :

a) The average number of trains in the queue.

b) The probability that the queue size exceeds 10. If the input of trains increases to an average 33 per day, what will be change in (a) and (b).

Section - C

Attempt any 2 questions from this section. (2×15=30)

10. Solve the following using Dual Simplex.

Max $Z = -3X_1 - X_2$

s.t. $X_1 + X_2 >= 1$

$2X_1 + 3X_2 >= 2$

$X_1, X_2 >= 0$

11. Find the necessary conditions for the following Non Linear Programming Problem.

Min $Z = 2(X_1)_2 - 24X_1 + 2(X_2)_2 - 8X_2 + 2(X_3)_2 - 12X_3 + 200$

s.t. $X_1 + X_2 + X_3 = 11$

$X_1, X_2, X_3 >= 0.$

12. Discuss the Erlang distribution in Queuing theory. Also write its mean, variance and probability density function.