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MCA
(SEM III) THEORY EXAMINATION 2017-18
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 is meant by a mathematical model of real situation?
- b. Define inventory. What are the various type of inventory?
- c. Explain Sensitivity Analysis.
- d. What do you mean by Queueing Theory?
- e. Explain Dynamic Programming. States its applications.
- f. Explain the Bellman's principle of optimality.
- g. Explain limitations of EOQ.

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

- a. Explain the Hungarian Assignment method to solve an assignment problem. Also write the algorithm.
- b. What do you mean by Non-Linear programming?
- c. What are inventory models? Give the classification of different inventory models and describe them briefly.
- d. Define the concept of busy period in queuing theory and obtain its distribution for the system M/M/1 :(∞ /FCFS).
- e. Use Big-M Method to solve it.

$$\text{Max } Z=3x_1-x_2 \quad \text{Subject to the constraints}$$

$$2x_1+x_2 \geq 2,$$

$$x_1+3x_2 \leq 3,$$

$$x_2 \leq 4 \text{ and } x_1-x_2 \geq 0$$

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

- (a) Discuss Wolfe's method for solving a quadratic programming problem.
- (b) Show that inter-arrival times are distributed exponentially, if arrival is a poisson process.

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

- (a) What is the dynamic recursive relation? State the 'principle of optimality' in dynamic programming.
- (b) Give the advantage and limitations of graphical method for solving LPP.

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

- (a) Explain Relation between primal and its dual in LPP
- (b) Explain degeneracy in a transposition problem. How degeneracy is overcome?

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

- (a) What do you mean by Sensitivity analysis?
- (b) Develop a algorithm for north west corner method for solving transposition problem.

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

- (a) Erlang Distribution.
- (b) Markovian process.