Roll No. .....

Subject Code—6776-X

M. Sc. (CS)/M.C.A. EXAMINATION

(Fourth Semester)

(MCA 3 Years)

(For Re-appear Batch Prior to 2009)

MS-19

COMPUTER BASED OPTIMISATION METHODS

Time : 3 *Hours* *Maximum Marks* : 100

Note : Attempt any *Five* questions. All questions carry equal marks.

1. What is Operational Research ? What are the main characteristics of Operational Research ? Discuss its application areas.

2. (a) A paper mill produces two grades of paper namely X and Y. Owing to raw material restrictions, it cannot produce more than

400 tons of grade X and 300 tons of grade Y in a week. There are 160 production hours in a week. It requires 0·2 and 0·4 hours to produce a ton of products X and Y respectively with corresponding profits of Rs. 300 and 400 per ton. Formulate the above as a LPP to maximize profit.

(b) "Model building is the essence of the Operation Research approach." Discuss.

3. Solve the LPP by Simplex Method :

Maximize $Z = 3x_1 + 9x_2$

Subject to $x_1 + 4x_2 \leq 8$

$x_1 + 2x_2 \leq 4$

$x_1, x_2 \geq 0$

4. Use Dual Simplex to solve the LPP :

Maximize $Z = -2x_1 - x_3$

Subject to $x_1 + x_2 - x_3 \geq 5$

$x_1 - 2x_2 + 4x_3 \geq 8$

$x_1, x_2, x_3 \geq 0$

5. What are the uses of PERT/CPM (networks) for management ? Discuss the application areas of PERT/CPM techniques. Explain the disadvantages of network techniques.

6. A small Maintenance project consists of the following jobs, whose precedence relations are given below :

Job	Duration
1–2	15
1–3	15
2–3	3
2–5	5
3–4	8
3–6	12
4–5	1
4–6	14
5–6	3
6–7	14

(a) Draw an arrow diagram representing the project.

(b) Find the total float for each activity.

(c) Find the critical path and the total project duration.

7. What do you understand by Markov Chains ? Explain how it can be used for predicting sales-force needs.

8. Discuss the following :

   (a) Stationary state of the queue system

   (b) Concept of Degeneracy

   (c) Integer linear programming with reference to its flow chart.