Roll No. .....

Subject Code—658-X

M. Sc. EXAMINATION

(Third/Fourth Semester)

(Re-appear)

COMPUTER SCIENCE

MS-19

Computer Based Optimisation Methods

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

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

1. (a) Define OR and also discuss its characteristics.

(b) Discuss the development of OR in India.

2. (a) Define the following :

(i) Slack and surplus variables

(ii) Feasible solution.

(b) Find the solution of the following linear programming problem by using graphical method :

Max $Z = 3x_1 + 5x_2$

Subject to constraints

$$x_1 + 2x_2 \leq 2000$$

$$x_1 + x_2 \leq 1500$$

$$x_2 \leq 600$$

and $x_1, x_2 \geq 0$

3. Solve the following LPP by using Simplex method and also draw the flow chart of Simplex algorithm :

Max $Z = 5x_1 + 8x_2$

Subject to constraints

$$3x_1 + 2x_2 \geq 3$$

$$x_1 + 4x_2 \geq 4$$

$$x_1 + x_2 \leq 5$$

and $x_1, x_2 \geq 0$

4. Define Duality and also solve the following LPP by using Dual Simplex Method :

Max $Z = 2x_1 + x_2$

Subject to constraints

$$3x_1 + x_2 \geq 3$$

$$4x_1 + 3x_2 \geq 6$$

$$x_1 + 2x_2 \geq 3$$

and $x_1, x_2 \geq 0$

5. State the necessities of integer programming and solve the following LPP :

Max $Z = x_1 + 5x_2$

Subject to constraints

$$x_1 + 10x_2 \leq 20$$

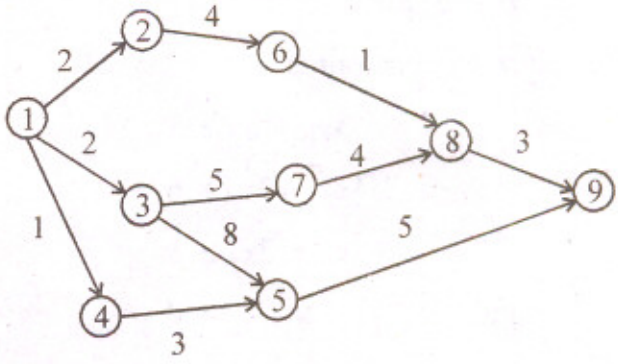
$$x_1 \leq 2$$

$x_1, x_2 \geq 0$ and are integers.

6. (a) Explain in brief the main characteristics of a queuing system.

(b) What do you understand by a queue ? Give some applications of queuing theory.

7. Find the critical path and duration of project for the following PERT diagram :



8. (a) What do you mean by Markov Chains ? Explain how it can be used for predicting sales-force need ?

(b) Determine if the following transition matrix is ergodic Markovian chain :

Future States

Present States	1	2	3	4
1	1/3	1/3	0	1/3
2	0	1/2	1/4	1/4
3	1/4	0	1/2	1/3
4	0	0	1/3	2/3