Subject Code—4262

M. Sc. EXAMINATION

June, 2006

(Third/Fourth Semester)

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

Max. $Z = 7x_1 + 5x_2$

Subject to $-x_1 - 2x_2 \geq -6$

$4x_1 + 3x_2 \leq 12$

and $x_i \geq 0$ where $i = 1, 2$.

P.T.O.

2. (a) Define O.R. and also discuss its characteristics and limitations.

(b) What do you mean by LPP ? Discuss its applications and limitations.

3. (a) Find the dual of the following Primal problem :

Min. $Z = 2x_2 + 5x_3$

Subject to $x_1 + x_2 \geq 2$

$2x_1 + x_2 + 6x_3 \leq 6$

$x_1 - x_2 + 3x_3 = 4$

and $x_1, x_2, x_3 \geq 0$

(b) Solve the following problem by using Dual Simplex Method :

Min $Z = 3x_1 + x_2$

Subject to $x_1 + x_2 \geq 1$

$2x_1 + 3x_2 \geq 2$

and $x_1, x_2 \geq 0$

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

Max $Z = 7x_1 + 9x_2$

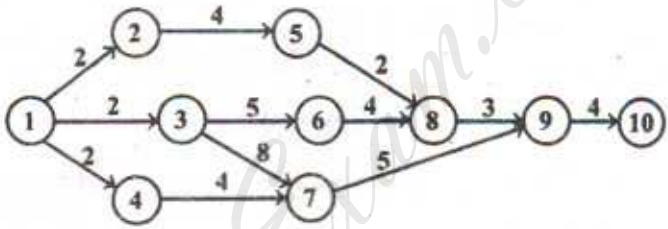
Subject to $-x_1 + 3x_2 \leq 6$

$7x_1 + x_2 \leq 35$

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

5. (a) Discuss the basic steps in PERT/CPM techniques and also discuss its applications.

(b) Consider the following network and find out the time it will take to complete this project :



6. (a) Discuss the following discipline :

(i) FIFO

(ii) CIFO

(iii) SIRO

(b) A car repairman finds that the time spent on his jobs has an exponential distribution with mean 30 minutes. If he repairs car in order in which they come in and if the arrival of cars are approximately Poisson with an arrival rate

of 10 per 8-hour day, what is repairman's expected idle time each day ? How many jobs are ahead of the average can just brought in ?

7. Define Markov Process and Markov Chain. Find if the following transitions matrix is regular and ergodic :

$$P = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ 4 \end{array} \begin{array}{c} \begin{array}{cccc} 1 & 2 & 3 & 4 \end{array} \\ \begin{bmatrix} 0 & x & x & 0 \\ x & 0 & 0 & x \\ x & 0 & 0 & x \\ 0 & x & x & 0 \end{bmatrix} \end{array}$$

8. Write short notes on any *two* of the following :

(a) Customer's Behaviour

(b) Standard form of LPP

(c) Integer Programming

(d) Floats.