MCA/M12
Computer Oriented Optimization Technique
Paper-MCA-204

Time allowed: 3 hours **M.M.: 80**

Note: Attempt Q. No. 1 and one question from each of Units-I, II, III and IV.

1. (i) Define a model.
   (ii) Define surplus variable with suitable examples.
   (i) What do you mean by CPP
   (ii) Discuss Duality.
   (iii) Define al integer programming with examples.
   (iv) Define an unbalanced assignment problem with an example.
   (v) Define an ideal time.
   (vi) Define PERT/ CPM

UNIT-I

2. (a) What is operations research ? Describe briefly its applications.
   (b) State the role of O.R. in decision making
3. Distinguish the following models with suitable examples:
   (i) Stochastic and deterministic models
   (ii) Static and Dynamic models

Unit-2

4. Solve the following LPP by simplex method and also draw the flow chart of it

   Min $z = x_1-3x_2+2x_3$
   Subject to
   $3x_1-x_2+2x_3\leq 7$
   $-2x_1-4x_2\leq 12$
   $-4x_1+3x_2+8x_3\leq 10$
   And $x_1,x_2,x_3\geq 0$

3. State the utilities of Duality and solve the following LPP by Dual Simplex method
   Max $Z=-2x_1-x_3$
   Subject to
   $X1+x2-x3\geq 5$
   $X1-2x2+4x3\geq 8$
   $X1,x2\geq 0$

UNIT-3

6. State the mixed integer programming with suitable example and solve the following LPP

   Max Z= 7x1+9x2
   Subject to
   $-X1+3x2\leq 6$
   $7x1+x2\leq 35$
   X1,x2, ≥0 and are integer

7. A department head has four sub-routines and four tasks have to be performed. Subroutines differ in efficiency and tasks differ in their intrinsic difficulty. Time each man would take to perform each task is given in the effectiveness matrix. How the task should be allocated to each person so as to minimize the total man hours?

Subroutines

Tasks	I	II	III	IV
A	8	26	17	11
B	13	28	4	26
C	38	19	18	15
D	19	26	24	10

UNIT-4

8 (a) State the Characteristics of a Queuing system

(b) In a factory cafeteria the customers have to pass through three counters. The customers buy coupons at the first counter, select and collect the snacks at the second counter and collect tea at the third. The serving at each counter takes on an average 1.5 minutes although the exponential. If the arrival of the customers to the cafeteria is approximately poison at an average rate of 6 per hour Calculate.

(i) The Average time a customer spends waiting in the cafereria

(ii) the average time of getting the service

9. (a) Define the following

(i) Floats

(ii) Critical path and critical activity