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10204

MCA/M- 13
COMPUTER SCIENCE
(Computer Oriented optimization techniques)
Paper- MCA- 204

Time allowed : 3 hours]   [*Maximum marks : 80*

Note : Attempt five questions in all, selecting at least one question from each unit.
.   Question No. 1 is compulsory.
   1.   **(compulsory Question)**
            (a) Define a model.
            (b) Discuss surplus variable with suitable examples.
            (c) Define duality and its benefits.
            (d) Explain all integer programming with suitable examples.
            (e) Define a balanced assignment problem with suitable examples.
            (f) Explain busy period and busy cycle.
            (g) Define PERT and CPM.
            (h) Explain basic feasible solution.
                                UNIT-I

   2. Define U.R. and also discuss its management applications and development in India.
   3. (a) Discuss the general methods for solving models.
       (b) State the rule of U.R. in decision making.
                                UNIT-II
   4. Solve the following LPP by using simplen method and also chain its flow chart:
        MIN Z = x1 – 3x2 + 2x3
        Subject to
                3x1 – x2 + 3x3 $\leq$ 7
                -2x1 + 4x2 $\leq$ 12
                -4x1 + 3x2 + 8x3 $\leq$ 10
        And   x1,x2,x3 $\geq$ 0.

   5.   Define degeneracy and also solar the following LPP by using dual simplex method
        MAX   Z = -2x1 – x3
        Subject to
                x 1 – x2 – x3 $\geq$ 5
                x 1 -2x2 + 4x3 $\geq$ 8
        and   x1,x2,x3 $\geq$ 0.

UNIT-III

6. Discuss the necessities of integer programming and solve the following LPP:

MAX $Z = x1 + x2$

Subject to

$2x2 \leq 7$

$x1 + x2 \leq 7$

$2x1 \leq 11$

$x1, x2 \geq 0$ and are integers.

7. (a) Define an unbalanced assignment problem with suitable example.

(b) A car hire company has one car at each of five depots a, b, c, d and e. A customer requires a car in each town, namely A, B, C, D and E. Distance (m/cm) between depots (origin) and town (destination) one given in the following distance matrix:

	a	b	c	d	e
A	160	130	175	190	200
B	135	120	130	160	175
		110	155	170	185
C	140	50	80	80	110
D	50				
E	55	35	70	80	105

How cars should be assigned to customers so as to minimize the distances traveled?

UNIT-IV

8. (a) State the characteristics of a queueing system.

(b) If for a period of 2 hours in a day (8-10 A. M.) trains arrive at the Y and every 20 minutes but the service time continuous to remain 36 minutes thus calculate for the period.

Or

(a) The probability that the Y and is empty.

(b) Average queue lengths. On the assumption that the line capacity of they and is limited to 4 trains only.

9. (a) Define slack time and critical activity.

(b) A project is represented by the following network shown bel