5. (a) Show that every equivalence relation defined on a set decomposes the set into disjoint equivalent classes. (10)

   (b) Find all the partition of

   $$X = \{ a, b, c, d \}. \quad (10)$$

6. Write an algorithm for multiplying two polynomials P and Q.

7. Suppose G is a finite cycle for graph with at least one edge, show that G has at least two vertices of degree 1.

8. Show that language L is recognizable by a Turing machine M if L is a type O language.

Register Number :

Name of the Candidate :

7 2 5 6

B.C.A. DEGREE EXAMINATION, 2007

(FIRST YEAR)

(PART - III)

(PAPER - I)

530. SCIENTIFIC COMPUTING

(New Regulations)

May] [Time : 3 Hours

Maximum : 100 Marks

Answer any FIVE questions.
All questions carry equal marks.

$(5 \times 20 = 100)$

1. (a) A manufacturer of furniture makes two products chairs and tables. Processing of these products in done on machines - A and B. A chair requires 2 hours on machine - A and 6 hours on machine - B. A table requires 5 hours on machine - A and no time on machine - B. There are 16 hours of time per day available on

Turn over

machine - A and 30 hours of time on machine - B. Profit gained by the manufacturer from the chair and table is Rs. 2 and Rs. 10 respectively. What should be the daily production of each of the two products ? (10)

(b) Use simplex method to solve the LPP

maximize $z = 5x_1 + 3x_2$

subject to constraints

$$x_1 + x_2 \leq 2$$
$$5x_1 + 2x_2 \leq 10$$
$$3x_1 + 8x_2 \leq 12$$
$$x_1, \; x_2 \geq 0.$$ (10)

2. (a) Solve the following LPP by using its dual :

maximize $z = 2x_1 + x_2$

subject to constraints

$$x_1 + 2x_2 \leq 10$$
$$x_1 + x_2 \leq 6$$
$$x_1 - x_2 \leq 2$$
$$x_1 - 2x_2 \leq 1,$$
$$x_1, \; x_2 \geq 0.$$

(b) Solve the following assignment problem :

	E	F	G	H
A	18	26	17	11
B	13	28	14	26
C	38	19	18	15
D	19	26	24	10

(10)

3. Use revised simplex method to solve LPP

Maximize $z = 2x_1 + x_2$

subject to constraints

$$3x_1 + 4x_2 \leq 6$$
$$6x_1 + x_2 \leq 3$$
$$x_1, \; x_2 \geq 0.$$

4. Find the optimal sequences for processing the jobs on 4 machines whose processing times are given as

	M_1	M_2	M_3	M_4
J_1	25	15	14	24
J_2	22	12	20	22
J_3	23	13	16	25
J_4	26	10	13	29

Turn over