

4. Determine the sequence that minimize the total time required to complete the following poles on three machines :

Job :	1	2	3	4	5	6	7
Machine-I :	4	9	8	5	10	9	8
Machine-II :	5	4	3	6	2	5	4
Machine-III :	7	8	6	12	6	7	13

5. (a) Let

$$A = \{ 1, 2, 3, 4 \}$$

$$\text{and } R \{ (1, 1), (1, 4), (2, 1), (2, 2), \\ (3, 3), (4, 4) \}$$

Use Warshall's algorithm to find the transitive closure of R.

- (b) Let

$$f(x) = x + 3,$$

$$g(x) = x - 2$$

$$\text{and } h(x) = 3x,$$

for $x \in \mathbb{R}$, the set of real numbers.

Find $g \circ f$; $f \circ g$; $f \circ f$; $g \circ g$,
 $f \circ h$; $h \circ g$; $h \circ f$; and $f \circ g \circ h$.

Register Number :

Name of the Candidate :

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B.C.A. DEGREE EXAMINATION, 2008

(FIRST YEAR)

(PART - III)

(PAPER - I)

530. SCIENTIFIC COMPUTING

(New Regulations)

December]

[Time : 3 Hours

Maximum : 100 Marks

Answer any FIVE questions.
All questions carry equal marks.
(5 × 20 = 100)

1. (a) Use graphical method to

Minimize

$$z = 6,000 x_1 + 4,000 x_2$$

Subject to

$$3x_1 + x_2 \geq 40$$

$$x_1 + 2.5x_2 \geq 22$$

$$3x_1 + 3x_2 \geq 40$$

$$x_1, x_2 \geq 0.$$

Turn over

- (b) Use BIG – M method to solve the following LPP:

Minimize

$$z = 4x_1 + 3x_2$$

Subject to

$$2x_1 + x_2 \geq 10$$

$$-3x_1 + 2x_2 \leq 6$$

$$x_1 + x_2 \geq 6$$

$$x_1, x_2 \geq 0.$$

2. (a) Use dual simplex method to

Maximize

$$z = x_1 + 6x_2$$

Subject to

$$x_1 + x_2 \geq 2$$

$$x_1 + 3x_2 \leq 3$$

$$x_1, x_2 \geq 0.$$

- (b) Solve the following travelling salesman problem:

		To					
		A	B	C	D	E	F
From	A	∞	20	23	27	29	34
	B	21	∞	19	26	31	24
	C	26	28	∞	15	36	26
	D	25	16	25	∞	23	18
	E	23	40	23	31	∞	10
	F	27	18	12	35	16	∞

3. State the computational procedure for the solution of all integer programming problem by Gomory method.

Maximize

$$z = 4x_1 + 3x_2$$

Subject to

$$x_1 + 2x_2 \leq 4$$

$$2x_1 + x_2 \leq 6$$

$$x_1, x_2 \geq 0$$

and are integers.

Turn over

6. (a) Show that in a Boolean algebra, for any a, b, c

$$((a \vee c) \wedge (b' \vee c))' = (a' \vee b) \wedge c'.$$

- (b) Find a Boolean equation for the function

$$f = \Sigma (000, 001, 010, 011, 111).$$

7. (a) Explain in detail about tree searching and undirected graphs.
- (b) Find the phrase - structure grammar that generates the set

$$L = \{ 0^n / 1^n ; n \geq 0 \}.$$

8. (a) Design a finite state machine that performs serial addition.
- (b) Prove that an (m/n) encoding function

$$e : B^n \rightarrow B^n$$

can correct k or fewer errors if and only if, its minimum distance is atleast $(k + s)$.

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