

2008-09

Time : 3 hours

Full Marks : 80

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

*Answer from **both** the Groups as directed.*

Group – A
(Compulsory)

Answer **all** questions : 2×10 = 20

1. Select the correct option from the following :

   (a) _____ which is not a property of group :

   (i) Cumulative

   (ii) Inverse

   (iii) Identity

   (iv) Associative

   (b) If Relation R = {(1, 1), (1, 2), (3, 3), (1, 3), (3, 1)} on set A = (1, 2, 3), then R is only :

   (i) Reflexive

(ii) Reflexive and Symmetric

(iii) Not Symmetric

(iv) Symmetric but not Reflexive

(c) What is the rank of the following Matrix ?

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

(i) 0

(ii) 1

(iii) 2

(iv) 4

(d) In Regular graph, every node have :

(i) 0 degree

(ii) 1 degree

(iii) Equal degree

(iv) Unequal degree

(e) What is the output EX-OR gate when input is 0 ?

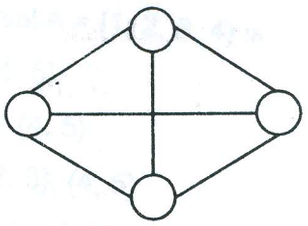
(i) 0

(ii) 1

(iii) Not define

(iv) Both (a) and (b)

(f) How many minimum colors are required for coloring the following graph ?



(i) 1
(ii) 2
(iii) 3
(iv) 4

(g) The simplification of expression AC + AB + B is :
(i) AC + AB + B
(ii) AC + B
(iii) AC + AB
(iv) AB + B

(h) Multi graph have ———— path from one node to another :
(i) 0
(ii) Many
(iii) Infinite
(iv) Two

(i) Tautologies and contradiction means :

(i) All ture, all false

(ii) All true, some false

(iii) Some true, all false

(iv) Some true, some false

(j) Partition of set A = {1, 2, 3, 4} is :

(i) {1, 2}, {4, 5}

(ii) {1, 2, 3}, {4, 5}

(iii) {1, 2}, {2, 3}, {4, 5}

(iv) {1, 2, 3, 4}, {5, 6}

Group – B

Answer any **four** questions.

2. Solve the following system of equation by matrix Inversion method : 15

(a) $X + Y + 2Z = 4$

(b) $2X - Y + 3Z = 9$

(c) $3X - Y - Z = 2$

3. If : 15

$$A = \begin{pmatrix} 3 & 7 & -2 \\ 2 & 3 & 1 \\ 4 & 5 & 9 \end{pmatrix}$$

Find :

(a) Transpose of A

(b) Adjoint of A

(c) Inverse of A

4. Solve the following system of linear equation by Gauss elimination method : 15

(a) $2X + 8Y + 2Z = 14$

(b) $X + 6Y - Z = 13$

(c) $2X - Y + 2Z = 5$

5. In a group of 40 students, 22 can speak Hindi only, 12 can speak English only. How many can speak both Hindi and English laguages ? 15

6. What is graph ? Define multi graph degree of directed and undirected graph ? What is weighed graph ? 15

7. Represent using input NOR – Gate only $Y = (AB + C)$. 15

8. Define the following terms : 15

(a) NUL matrix

(b) Orthogenal matrix

(c) Union

(d) Intersection

(e) Transpose of matrix

9. Represent the following by Venn diagram : 15

(a) $A - B$

(b) $\bar{A} \cap B$

(c) $(A \cup B) \cap C$

(d) $A \cap B \cap C$

10. Let P and Q stands for the statement $2 + 3 = 5$ and $3 + 7 = 8$ respectively. Describe the following statements : 15

(a) $P \wedge Q$

(b) $-P \wedge Q$

(c) $P \wedge -Q$

(d) $-P \wedge -Q$

(e) $P \vee Q$