2012

Time : 3 hours

Full Marks : 80

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

The questions are of equal value.

*Answer **five** questions, selecting **two** questions from each Group and Q. No. 1 is compulsory.*

1. Choose the correct alternatives for the following :

   (a) If p = It is raining

   q = She will go to college

   "It is raining and she will not go to college" will be denoted by :

   (i) $p \wedge \neg q$ (ii) $p \wedge q$

   (iii) $\neg (p \wedge q)$ (iv) $\neg p \wedge q$

   (b) In a directed graph of a Irreflexive relation, there should be :

   (i) Loop on a one point

(ii) No loop at any point

(iii) No point connected

(c) How many functions are there from a set with three elements to a set with two elements ?

(i) 6 (ii) 8

(iii) 12

(d) If a set contains exactly m distinct elements where m denotes some non-negative integer then the set is :

(i) Finite (ii) Infinite

(iii) None of these

(e) Let f and g be the functions defined by $f(x) = 2x + 3$ and $g(x) = 3x + 2$ then composition of f and g is :

(i) $6x + 6$ (ii) $5x + 5$

(iii) $6x + 7$

(f) Let f is defined recursively by

$F(0) = 3$

$F(n + 1) = 2f(n) + 2$

then $f(2) =$

(i) 8 (ii) 10

(iii) 18 (iv) 21

(g) The greatest common divisor of 27 and 72 is :

(i) 27 (ii) 9

(iii) 1 (iv) None of these

(h) If T is a full binary tree and has 5 internal vertices then the total vertices of T are :

(i) 11 (ii) 12

(iii) 13 (iv) None of these

Group – A

2. Define the terms set, subset, cartesian product of sets. Define the following operations on sets using examples :

(a) Union

(b) Intersection

(c) Complementation

(d) DeMorgan's Law

3. What is Karnaugh Map ? What is its importance ? Simplify the following expressions using Karnaugh Maps.

$F(A, B, C, D) = \Sigma(0, 1, 2, 3, 4, 8, 9, 12)$

4. (a) Define relation. Explain reflexive, symmetric and transitive relations with example.

(b) Use the method of induction to prove that the number $n^2 + 5n + 6$ is even for every natural number n.

5. Solve the recurrence relation, $S(n) = S(n-1) + 2(n-1)$, with $S(0) = 3$, $S(1) = 1$, by finding its generating function. Prove that the following argument is valid.

$p \rightarrow \neg q, r \rightarrow q, r \rightarrow \neg p$.

Group – B

6. Explain the Features of Tally. What Hardware and Software required for Tally ?

7. Why is Ledger needed in accounting ? Compare the advantages and disadvantages of manual and computerized accounting. What is trial balance ?

8. Write short notes on the following :
   (a) Balance Sheet
   (b) Profit and Loss Account
   (c) Day Book
   (d) Inventory Books

9. What is E-mail ? How is to useful to financial related activities ? What is Web browser ? Explain the main features of at least two popular web browsers.