CBA-249-T

BCA First Semester

(End Semester)

Examination Dec., 2018

COMPUTER SCIENCE AND APPLICATIONS

Paper - CSA–CC–115

(Maths for Computers Science)

Time : Three Hours] [Maximum Marks 60

Note :– Attempt all questions.

[P. T. O.

Section-A

(Objective Type Questions) 10×1=10

1. Choose the correct option.

   (i) The diagonal elements of skew-symmetric matrix are

   (a) nonzero

   (b) zero

   (c) irrational

   (d) none of these

   (ii) If every minor of order $n+1$ vanishes, then rank is

   (a) less thean n

   (b) $n+1$

   (c) $\leq n$

   (d) none of these

(iii) $(7P \wedge (7Q \wedge R)) \vee (Q \wedge R) \vee (P \wedge R)$ is equivalent to

(a) $(7(P \vee Q) \vee (P \vee Q)) \wedge R$

(b) R

(c) both (a) and (b)

(d) none of these

(iv) A statement A is said to tautologically imply a statement B if and only if

(a) $A \rightarrow B$ is a tautology

(b) $A \rightarrow B$ is not a tautology

(c) $B \rightarrow A$ is a tautology

(d) None of these

(v) Let $R = \{(a, b): a + 3b = 12; a, b \in N\}$, then domain of R is

(a) {9,3,6}

(b) {1,2,3}

(c) {3,1,6}

(d) {1,2,3, ... }

(vi) If $o(x) = m$, $o(y) = n$, then total number of functions from x to y are

(a) m^n

(b) n^m

(c) m^n

(d) $2^{m \cdot n}$

(vii) A vertex in a graph is said to be pendent vertex if its degree is

(a) zero

(b) one

(c) two

(d) three

(viii) A null graph which consists of at least two vertices is a

(a) connected graph

(b) disconnected graph

(c) strongly connected graph

(d) none of these

(ix) If $G = (V, E)$ is any connected graph, then $T = (V, E)$ is a spanning tree of G if

(a) T has the same vertex v of vertices as does G

(b) T is a tree

(c) T is a subgraph

(d) All of these

(x) The minimum height of a binary tree with 9 vertices is

(a) 4

(b) 6

(c) 3

(d) 2

Section 'B'

(Short Answer Type Questions) 4×5=20

Note : Attempt any four questions

2. Show that the eigen values of symmetric matrix are real

3. Prove that Rank (A) = Rank (AT)

4. Prove that $(P \to (Q \to R)) \Rightarrow (P \to Q) \to (P \to R)$.

5. If R^{-1} and S^{-1} are inverse of the relations R and S respectively, then prove that $(SOR)^{-1} = R^{-1} o\, S^{-1}$

6. Prove that the vertices of odd degree in a graph is always even.

7. Express the algebric expression $(x - y) + ((y + z) + w)$ in a binary tree

Section 'C'

(Long Answer Type Questions) 3×10=30

8. Solve the following equations with the help of elementry operations of matrix method:

$$x + y + z = 6$$
$$x - y + z = 2$$
$$2x + y - z = 1$$

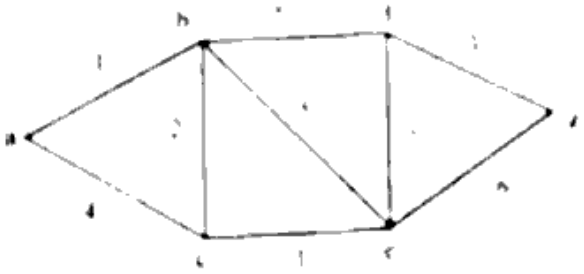
9. Construct the truth table for the formula

(i) $7(P \wedge Q) \rightleftarrows (7P \vee 7Q)$

(ii) $(P \to Q) \wedge (Q \to P)$

10 Show that the relation 'is divisor of' in the set of positive integers is reflexive and transitive, but not symmetric

11 find the shortest path from a to z in the graph shown in figure where numbers associated with the edges are the weights



12 Prove that a tree with n vertices has (n-1) edges