K21U 1073

Reg. No. : .....

Name : .....

IV Semester B.C.A. Degree CBCSS (OBE) Regular Examination, April 2021
(2019 Admission Only)
General Awareness Course
4A 14 BCA : DISCRETE MATHEMATICAL STRUCTURES

Time : 3 Hours Max. Marks : 40

PART – A
(Short Answer)

Answer **all** questions. **(6×1=6)**

1. A set with no elements is called _____
2. Define proposition.
3. a. a = ?
4. Define onto mapping.
5. Let G = (V, E) be a graph. If the elements of E are ordered pairs of vertices, then the graph G is called _____
6. What is planar graph ?

PART – B
(Short Essay)

Answer **any 6** questions. **(6×2=12)**

7. Determine the truth table of ~p (q p).
8. Let p be "it is cold" and q be " it is raining". Give a simple verbal sentence which describes each of the following :
   a. ~p
   b. ~p ∧ ~q
9. Define Hasse diagram.
10. Define relation from A to B with example.
11. Describe laws of Boolean Algebra.
12. Simplify F = + + A + AB.
13. Define complete graph with example.
14. What is graph coloring ?

P.T.O.

PART – C
(Essay)

Answer **any 4** questions. **(4×3=12)**

15. Prove that $(p \wedge q)\ p$ is tautology.
16. $A = \{1, 2\}$, $B = \{1, 2, 4, 5\}$, $C = \{5, 7, 9, 10\}$. Find the following :
    a) $(A \cup B) \cup C$
    b) $(A \cap B) \cap C$
    c) $(A \cup B) \cap C$.
17. Prove that the theorem : Let f : A B then g : B be both one-one and onto functions, then gof : A C is also one-one and onto.
18. Simplify $Y = (P + Q)\ (P + Q')\ (P' + Q)$.
19. Prove that K_5 is non planar graph.
20. The adjacency structure of a graph G is given as G = [A : B, E; B : A, E, F, G; C : D, G, H; D : C, H; E : A, B; F : G; G : B, C, F; H : C, D].

PART – D
(Long Essay)

Answer **any 2** questions. **(2×5=10)**

21. Compare DFS and BFS graph.
22. Describe shortest paths in weighted graphs.
23. Without using truth tables prove that $(\sim p \vee q) \wedge (p \wedge (p \wedge q)) = p \wedge q$.
24. Write down the properties of Union operations in sets.
