K22U 1509

Reg. No. : ....

Name : ....

IV Semester B.C.A. Degree CBCSS (OBE) Regular/Supplementary/ Improvement Examination, April 2022
(2019 Admission Onwards)
GENERAL AWARENESS COURSE
4A14BCA : Discrete Mathematical Structures

Time : 3 Hours Max. Marks : 40

PART – A
(Short Answer)

Answer **all** questions. **(6×1=6)**

1. Define set.
2. Define Tautology.
3. Distinct elements of A are mapped into distinct elements of B is called
4. Pictorial representation of a finite partial order on a set is called
5. A graph which allows more than one edge to join a pair of vertices is called a
6. A path of graph G, that includes each edge of G exactly once and intersects each vertex of G at least once is called

PART – B
(Short Essay)

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

7. Determine the truth table of ~p (q p).
8. Let p be "He is tall" and q be "He is handsome". Write each of the following statements in symbolic form using p and q :
   a) He is tall and handsome.
   b) He is neither tall nor handsome.

P.T.O.

9. Find conjunctive normal form of p (p q).
10. Brief note on disjunctive normal form.
11. Prove that $\forall a \in B, a \cdot a = a$.
12. Simplify z(y + z) (x + y + z).
13. Define Tree with example.
14. What is Hamiltonian graph ?

PART – C

(Essay)

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

15. Illustrate the following identities by means of Venn diagrams.
    a) A (B C) = (A B) (A C)
    b) (A B).
16. Write down any three properties of complementation of sets.
17. Define inverse mapping with example.
18. Explain Pigeonhole principle.
19. Explain Travelling salesman's problem.
20. Define BFS for a graph and explain with example.

PART – D

(Long Essay)

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

21. Prove that a graph is connected if and only if it has a spanning tree.
22. Show that (p r) (q r) and (p q) r are not logically equivalent.
23. Let A, B, C are the sets. Prove that $A - (B - C) = (A - B) - C$ if and only if $A \cap C = \phi$.
24. If f : AB and g : BC are bijections, then prove that gof : AC is also a bijection.