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.