K25U 0929

Reg. No. : .....

Name : .....

IV Semester B.C.A. Degree (C.B.C.S.S. – O.B.E. – Regular/Supplementary/ Improvement) Examination, April 2025
(2019 to 2023 Admissions)
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 a bijective function.
2. Draw a Venn diagram for $A \cap B$.
3. Define a graph.
4. What is a path in graph theory ?
5. What is an incidence matrix ?
6. Define equivalence relation with an example.

PART – B
(Short Essay)

Answer **any 6** questions. (6×2=12)

7. What are tautologies ? Give an example.
8. Compare surjective and injective functions.
9. Define an equivalence relation.
10. Explain reflexive closure with example.
11. Prove $A + A'B = A + B$ using Boolean algebra.

P.T.O.

12. Differentiate between sum-of-products (SOP) and product-of-sums (POS).
13. Define an isomorphic graph.
14. Explain trees in graph theory.

PART – C
(Essay)

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

15. Explain the rules of inference with an example.
16. Discuss the applications of set theory in computer science.
17. Explain function composition and properties.
18. Explain minimization using K-maps.
19. Explain Hamiltonian paths and circuits.
20. What is a planar graph ? Explain the concept of planarity testing in graphs.

PART – D
(Long Essay)

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

21. Explain Hasse diagram construction.
22. Minimize the Boolean function $F(w, x, y, z) = \sum m(0, 1, 3, 4, 5, 7, 8, 9, 11, 12, 13, 14, 15)$.
23. Explain the Traveling Salesman Problem (TSP).
24. Identify Hamiltonian path and Hamiltonian circuit, if exist. If not, explain the reason.