



K24U 0830

Reg. No. :

Name :

IV Semester B.C.A. Degree (CBCSS – OBE – Regular/Supplementary/
Improvement) Examination, April 2024

(2019 to 2022 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 complement of a set.
2. What is meant by contingency in propositional logic ?
3. Define symmetric relation.
4. What is a monoid ? Give an example.
5. What is a connected graph ?
6. Define planar graph.

PART – B
(Short Essay)

Answer **any** 6 questions.

(6×2=12)

7. Rewrite the set $S = \{5, 10, 15, 20, 25, 30\}$ in set builder form.
8. Explain conjunctive normal forms.
9. Define asymmetric relation. Give example.
10. Define NAND gate.
11. Define the terms converse, inverse and contra positive in propositional logic.

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12. What is an Abelian group ? Explain.
13. Define minimum spanning tree.
14. What is an isomorphic graph ? Give an example.

PART – C
(Essay)

Answer **any 4** questions.

(4×3=12)

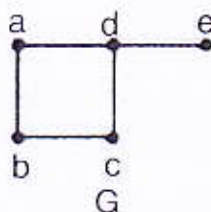
15. Define relation and explain various types of relations.
16. Define complete bipartite graphs. Draw an example for complete bipartite graph $K_{2,3}$.
17. Prove that "sum of degrees of vertices of any finite graph is even".
18. Evaluate the prefix expression $\neg \neg 3 \vee 8 \wedge 4 \wedge 1$.
19. Differentiate between the adjacency matrix and incidence matrix.
20. Show that $(\neg(p \vee q)) \vee (\neg p \wedge q)$ is logically equivalent to $\neg p$.

PART – D
(Long Essay)

Answer **any 2** questions.

(2×5=10)

21. Define equivalence relation. Show that the congruence relation on the set of integers is an equivalence relation.
22. Explain Hamiltonian circuit. Show that the below graph has not a Hamilton circuit.



23. Discuss the travelling salesman problem with example.
24. State and prove the basic laws and theorems of Boolean algebra.