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 + – *3 2/8 4 1.

19. Differentiate between the adjacency matrix and incidence matrix.

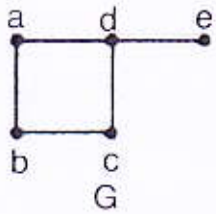
20. Show that $(\neg(p \vee q)) \vee (\neg p \wedge q)$ is logically equivalent to $\neg p$.

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.



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23. Discuss the travelling salesman problem with example.

24. State and prove the basic laws and theorems of Boolean algebra.

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