

D 32331

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Name.....

Reg. No.....

**FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2022**

BCA

BCA 1C 02—DISCRETE MATHEMATICS

(2019—2022 Admissions)

Time : Two Hours

Maximum : 60 Marks

Section A*Short Answer type questions.**Answer **all** questions.**Each question carries 2 marks.**Ceiling 20 marks.*

1. Let $A = \{a, b, c, d\}$ and $B = \{b, c, d, e\}$. Find $A - B$ and $B - A$.
2. What do you mean by connectives ? Draw truth tables for each connective.
3. Give an example of a relation which is reflexive, transitive but not symmetric.
4. Define lowest upper bound in Poset.
5. What is a cycle ? Explain with an example.
6. Draw K_4 as a planar and write the number of faces for this graph.
7. Define tree with an example.
8. Define pendant vertices of a tree. Give example.
9. Define graph colouring and chromatic number of a graph.
10. Define cut vertices and cut edge.
11. What do you mean by equivalence relation ?
12. Translate into logical expression "A necessary condition for x to be prime is that either x is odd or $x = 2$ ".

Turn over

Section B

Short essay type questions.

*Answer **all** questions.*

Each question carries 5 marks.

Ceiling 30 marks.

13. Show that for any two sets A and B, $A - (A \cap B) = A - B$.
14. What is Boolean algebra ? Write its properties.
15. Let G be a graph in which the degree of vertices is at least 2. Then show that G contains a circuit.
16. Prove that every tree is a bipartite graph.
17. Prove that the number of vertices of odd degree in a graph is always even.
18. Describe Hasse diagram with examples.
19. Show that the statement $((p \Rightarrow q) \wedge (q \Rightarrow r)) \Rightarrow (p \Rightarrow r)$ is a tautology.

Section C

Essay type questions.

*Answer any **one** questions.*

Each question carries 10 marks.

20. Write Prim's algorithm for finding spanning tree and explain it with example.
21. Define planar graph and prove that a graph has a dual if and only if it is planar.

(1 × 10 = 10 marks)