FIRST SEMESTER B.C.A. DEGREE EXAMINATION, NOVEMBER 2020
(CUCBCSS-UG)
CC15U BCA1 C02 - DISCRETE MATHEMATICS
(Complementary)
(2015 to 2018 Admissions - Supplementary)

Time: Three Hours   Maximum: 80 Marks

PART A
Answer *all* questions. Each question carries 1 mark.

1. The negation of $\forall x P(x)$ is …………

2. Write the contrapositive of the statement $p \rightarrow q$

3. The number of components of K_6 is …………

4. Give an example of a set which has glb but no lub.

5. Give an example of a partially ordered set.

6. Draw a forest with three trees.

7. Define height of a tree.

8. Draw a graph which contains two isolated vertices and three pendent vertices.

9. What is a regular graph? Draw a 4-regular graph.

10. What is a complete bipartite graph?

(10 x 1 = 10 Marks)

PART B
Answer *all* questions. Each question carries 2 marks.

11. Find the glb and lub of $\{1/n; n \in N\}$

12. Draw two sub graphs of K_4 which are not isomorphic.

13. Draw a pair of isomorphic graphs.

14. Construct a truth table for p $(p \vee \neg q) \rightarrow q$

15. What is the chromatic number of K_5?

(5 x 2 = 10 Marks)

PART C
Answer any *five* questions. Each question carries 4 marks.

16. Explain the unilateral connectedness and strong connectedness of a diagraph with examples.

17. Explain trees, rooted trees, and ordered trees.

18. Explain Boolean Algebra with an example.

19. Check whether the graphs K_4 and K_6 are planar or not.

20. Draw a sub tree and a spanning tree of K_5.

21. Draw the compliment and dual of K_3 and $K_{2,3}$

22. Explain different types of logical operators.

23. Determine whether $\neg p \wedge (p \rightarrow q)) \rightarrow \neg q$ is a tautology.
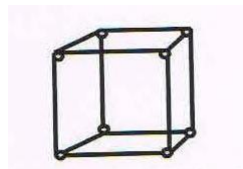
(5 x 4 = 20 Marks)

PART D
Answer any *five* questions. Each question carries 8 marks.
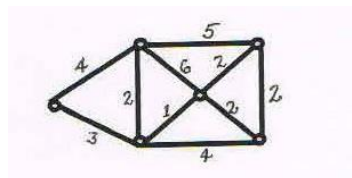
24. Find the adjacency matrix of the following graphs.

25. Check whether the following graph is Eulerian or Hamiltonian. Explain.

26. State and prove Euler's formula.

27. Find a minimum spanning tree using Kruskal's Algorithm of the following graph.

28. What are the different logic gates? Explain.

29. Explain the union, intersection and ring sum of the two graph through examples.

30. (a) Define dual of a compound proposition.

    (b) Show that $p \leftrightarrow q$ and $(p \wedge q) \vee (\neg p \wedge \neg q)$ are logically equivalent.

31. Examine whether the following are equivalence relation or not.

    (a) xRy if $|x| = |y|$

    (b) xRy if $x - y \geq 0$

    (c) xRy if $x - y$ is a multiple of 2

(5 x 8 = 40 Marks)

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