QP Code : U24A045

Reg. No : .....
Name : .....

ST MARY'S COLLEGE (AUTONOMOUS), THRISSUR-20

I SEMESTER B.Voc (CBCSS-VUG) DEGREE EXAMINATION, November 2024
B.Voc Software Development
SDC1IT01 : Discrete Mathematics
2024 Admission Onwards
(Credits: 4)

Time : 2.5 Hours **Maximum Marks : 80**

Section A

*Short answer type carries **2** Marks each **(15x2=30 marks) (Ceiling 25)***

1. "Do you speak English" Is this a proposition or not? Justify. [BTL1]
2. Define Tautology. [BTL3]
3. Define predicate with an example. [BTL4]
4. State De Morgan's law in Boolean Algebra. [BTL2]
5. Show that the relation R = { (a,b)$\in$z : a=b} is a partial ordering. [BTL3]
6. Draw the schematic diagram of NOR gate with input output table. [BTL5]
7. Define a multigraph with an example. [BTL2]
8. Draw the cubic graph. [BTL1]
9. Define a complete bipartite graph. [BTL3]
10. Describe a weighted graph with the help of an example. [BTL4]
11. Describe the eccentricity and radius of a tree. [BTL4]
12. Define a cut vertex and give an example. [BTL1]
13. Define Kuratowski's second graph and give an example. [BTL2]
14. Describe the dual graph of a graph. [BTL4]
15. Sketch a graph with 5 vertices and 7 edges. [BTL3]

Section B

*Paragraph types carries **5** Marks each **(8x5=40 Marks) (Ceiling 35)***

16. Check whether which of the following relations is an equivalence relation or not on the set S = {0,1,2,3} [BTL2]
    i) R_1 = { (0,0) , (1,1) , (2,2) , (3,3) , (3,1) }
    ii) R_2 = { (0,0) , (1,1) , (1,2) , (2,1) , (2,2) , (3,3) , (2,3) , (1,3) , (3,2) , (3,1) }
17. Explain Distributive laws of logic with truth table. [BTL4]
18. State and prove boundedness law of Boolean Algebra. [BTL1]
19. Simplify the Boolean function Y = (A+B).(A+C). [BTL3]

Turn Over

20. Explain the following terms with a suitable example [BTL3]
    i) walk
    ii) trail
    iii) path

21. Explain colour class of a graph. Draw the graph $G = (V, X)$, where [BTL4]
    $V = \{1, 2, 3, 4\}$, $X = \{\{1, 2\}, \{2, 3\}, \{3, 4\}\}$ and find the chromatic number and colour class of the graph $G = (V, X)$.

22. Explain the terms connectivity and edge connectivity of a graph. [BTL4]

23. Define a directed graph, and draw a digraph with 4 vertices and 8 edges. [BTL2]

Section C

*Essay-type carries **10** Marks : Answer **any two** questions.*

24. Construct the truthtable of $\neg(p \wedge q) \vee (p \wedge r) \rightarrow p$. [BTL2]

25. State and prove De morgan's law of Boolean Algebra. [BTL2]

26. Explain an Eularian graph and a Hamiltonian graph with the help of an example. [BTL4]

27. Draw the graph $G = (V, X)$ where $V = \{v_1, v_2, v_3, v_4, v_5\}$ and [BTL4]
    $X = \{\{v_1, v_2\}, \{v_2, v_3\}, \{v_1, v_4\}, \{v_4, v_5\}\}$. Also, give its incidence matrix.

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