TB252887K

Reg. No :.....

Name :.....

BACHELOR'S DEGREE (C.B.C.S) EXAMINATION, MARCH 2025

2023 ADMISSIONS SUPPLEMENTARY

B.VOC SWD SEMESTER II - SKILL

MT2B03B23 - Basic Mathematics

Time : 3 Hours **Maximum Marks : 80**

Part A

I. Answer any Ten questions. Each question carries 2 marks **(10x2=20)**

1. Define contrapositive propositions.
2. Describe when two propositions are said to be logically equivalent ?
3. Explain tautology using truth table.
4. A non-homogeneous system of linear equations may have infinitely many Solution. Justify.
5. Define inconsistent system of linear equations?
6. Find the determinant of the matrix $\begin{bmatrix} 1 & -1 & 0 & 0 \\ 0 & 2 & 3 & 0 \\ 0 & 3 & 2 & 1 \\ 0 & 1 & 0 & 1 \end{bmatrix}$
7. Explain briefly about any two set operations.
8. Identify empty sets from the following.
   i) set of all multiples of 5.
   ii) set of all even integers ends in 7.
9. Define 'cycle' in a graph G.
10. Explain briefly about the 'undelying simple graph'.
11. Draw a graph having the following matrix as its adjacency matrix
$$\begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 2 \\ 0 & 0 & 1 \end{bmatrix}$$
12. Draw the graph and determine how many edges each has.K1,5

Part B

II. Answer any Six questions. Each question carries 5 marks **(6x5=30)**

13. Show that the following argument is invalid: ' If I buy stocks , I will lose money. Therefore, if I lose money ,I buy stocks'.
14. Show that { (p V q) ∧ (~p V ~q)} V q is a tautology.
15. Define equal matrix with example
16. Find the rank of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 1 \\ -2 & -3 & -1 \end{bmatrix}$.
17. Draw the Venn diagram of A ∪(B∩ C).
18. Prove that (A∪B)∪C = A∪(B∪C)
19. Explain reflexive , antisymmetric and transitive relations with examples.
20. Discuss about tree with examples.

21. if G_1 and G_2 are the two subgraphs of G, then $vVG_1) = \{ a,b,c,d \}$, $V(G_2) = \{ b,e.d \}$ and $E(G_1) = \{ e_1,e_2,e_3,e_4 \}$,$E(G_2) = \{ e_3,e_4,e_5 \}$. find $V(G_1 \cap G_2)$ also draw the graph of G_1 , G_2 and $G_1 \cap G_2$

Part C

III. Answer any Two questions. Each question carries 15 marks **(2x15=30)**

22. 1. Show that (a) $p \Rightarrow q = \sim q \Rightarrow \sim p$ (b) $(p \Rightarrow q) \Rightarrow r \neq p \Rightarrow (q \Rightarrow r)$ (c) $(p \Leftrightarrow q) = (q \Leftrightarrow p)$

23. Find the solution of $x_1 - x_2 + x_3 = 1$

$x_1 + 2x_2 + x_3 = 0$

$2x_1 + x_2 + 3x_3 = 1$. .

24. Solve the system of equations

$x + 2y + z = 2$

$3x + y - 2z = 1$

$4x - 3y - z = 3$

$2x + 4y + 2z = 4$.

25. State and prove distributive laws for sets.