TB252576V

Reg. No :.....

Name :.....

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

2019, 2020, 2021, 2022 ADMISSIONS SUPPLEMENTARY

SEMESTER II - SKILL (COMPUTER APPLICATIONS)

MT2C03B18 - Basic Mathematics

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

Part A

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

1. Explain the different types of propositions?
2. Differentiate between conjunction and disjunction of two propositions.
3. Explain tautology using truth table.
4. Illustrate singular matrix?
5. Describe when a system of linear equation is said to be homogeneous?
6. Find the determinant of the matrix $\begin{bmatrix} 2 & 4 & 2 \\ 3 & 1 & 2 \\ 1 & 0 & 3 \end{bmatrix}$.
7. Describe an equivalence relation ?
8. Let $I = [0,1]$ and for each $i \in I$, Let $A_i = [0,i]$. Find $\bigcup_I A_i$ and $\bigcap_I A_i$
9. Describe when a graph is said to be connected?
10. Define vertex degree of a graph.
11. Define graph.
12. Define a cut vertex?

Part B

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

13. Explain converse, inverse and contrapositive propositions of a conditional statement $p \Rightarrow q$ in detail.
14. Show that $p \Rightarrow q = \sim p \vee q$.
15. Describe the different steps to find the solution of a homogeneous equation , with the help of an example.
16. Comment on " system of linear equations" .
17. Explain equivalence relation with an example.
18. If $A = \{1,2,3\}$ and $B = \{x,y,z\}$, list all the elements of $A \times B$ and $B \times A$ and also show that $A \times B \neq B \times A$.
19. Using Venn diagram , prove that $(A \cup B)' = A' \cap B'$.
20. State and prove the first theorem of graph theory.
21. Explain briefly about 'cycles' in graph.

Part C

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

22. i) Explain tautology and contradiction with examples and also simplify $\{(p \vee \sim q) \wedge (\sim p \vee \sim q)\} \vee q$. ii) Explain briefly about 'arguments' in mathematical logic.
23. Solve

$$x_1 - x_2 + x_3 = 2$$
$$3x_1 - x_2 + 2x_3 = -6$$
$$3x_1 + x_2 + x_3 = -18$$

24. Solve the homogeneous equation $2x - y + 3z = 0$

$3x + 2y + z = 0$

$X - 4y + 5z = 0.$

25. State and prove distributive laws for sets.