**TV222720W** **Reg. No :.....**

**Name :.....**

**B. Voc. DEGREE (C.B.C.S.) EXAMINATION, MARCH 2023**

**2022 Admissions Regular & 2021 Admissions Supplementary / Improvement And 2020, 2019 And 2018 Admissions Supplementary**

**SEMESTER II - SKILL COURSE (MATHEMATICS)**

**(For Software Development)**

**MT2C03B18 - BASIC MATHEMATICS**

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

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

1. Let p be the proposition 'high speed driving is dangerous' and the proposition 'Ram was a wise man' .Write down the meaning of the following proposition a) $p \wedge q$ b) $\sim p \vee q$.
2. Define converse propositions.
3. Illustrate negation of a proposition 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. Using elementary transformation find the rank of $\begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 2 \\ 0 & 0 & 1 \end{bmatrix}$.
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. Describe when a walk is said to be closed?
10. Define subgraph and supergraph of a graph G.
11. Explain briefly about the 'undelying simple graph'.
12. Define complete graph.

**Part B**

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

13. Explain the concept of logical equivalence in detail.
14. Prove that $p \vee ( p \wedge q) = p$, using truth table.
15. Check whether the following equations are inconsistent or not

$$x + y + z = 9$$
$$2x + 5y + 7z = 52$$
$$2x + y - z = 0$$

16. Find the rank of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 1 \\ -2 & -3 & -1 \end{bmatrix}$.
17. Explain different set operations using Venn diagrams.

18. Prove that A - (B $\cup$ C ) = (A - B) $\cap$ ( A - C).
19. Let A = { -1,0,1} and B = { 0,2} then find A $\times$ B and B $\times$ A .
20. Explain briefly about " deleted subgraphs".
21. State and prove the first theorem of graph theory.

**Part C**

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

22. i) Use the truth table technique to establish the following is a tautology $(p \wedge q) \vee (p \vee \sim q) \vee (\sim p \wedge q) \vee (\sim p \wedge \sim q)$.
    II) Explain briefly about the different propositions.
23. Solve

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

24. By using elementary transformation row operaion, find solution or solutions ,if they exists, for thr following system of equation

$$x + 3y - 2z = 0$$
$$2x - y + 4z = 0$$
$$X - 11y + 14z = 0.$$

25. Describe the relation of congruence modulo m. Also show that the relation of congruence modulo m in the set Z is an equivalence relation.