Roll No. | | | | | | | | | | |

B.E (FT) DEGREE EXAMINATIONS – APR/MAY 2025

Computer Science and Engineering

MA6251 & DISCRETE MATHEMATICS

(Regulation 2018 - RUSA)

Time: 3 Hours Answer ALL Questions Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Write the negation of the following statements: $\forall x(x^2 > x)$ and $\exists x(x^2 = 2)$.
2. Prove that "if $3n + 2$ is odd, then n is odd".
3. How many different words are there in the word "MATHEMATICS"
4. Find the recurrence relation for the sequence given by $S(n) = 3(2)^n, n \geq 0$.
5. How many edges are there in a graph with 10 vertices each degree 5?.
6. Define self-complemented graph and give an example.
7. Prove that every cyclic group is abelian.
8. Define Ring and give an example.
9. Find the dual of $x\bar{z} + x.0 + \bar{x}$.
10. What values of the Boolean variable x and y satisfy $xy = x + y$?

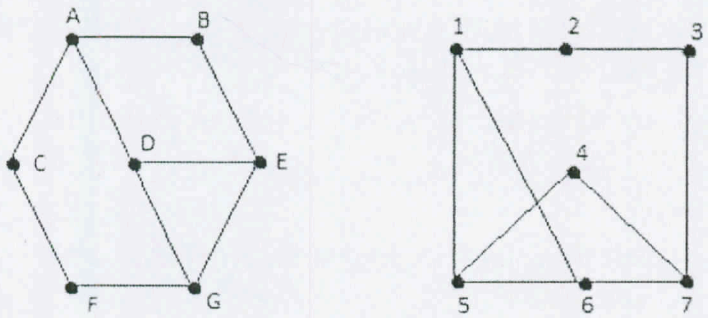
PART – B (8 x 8 = 64 marks)

(Answer any 8 questions)

11. Obtain the principal disjunctive normal form of $(P \wedge \neg(Q \wedge R)) \vee (P \rightarrow Q)$, then find principle conjunctive normal form.
12. For the following argument determine whether the argument is correct or incorrect and explain why? "All the student in this class understands mathematical logic. Selvi does not understand mathematical logic. Therefore, Selvi is not a student in this class".
13. Use mathematical induction, prove that $3^{2n} + 4^{n+1}$ is a divisible by 5.
14. Find the number of integers between 1 and 1000 that are not divisible by any of the integers 2,3 and 5.
15. Solve the recurrence relation $S(n+1) - 2S(n) = 4^n, n \geq 0$.
16. A graph G is bipartite if and only if it contains no odd cycle.
17. If G is a simple graph with n vertices where $n \geq 3$ and the degree of each vertex is atleast $n/2$, then G is Hamiltonian.
18. In any group $(G,*)$, $(a * b)^{-1} = b^{-1} * a^{-1}$, for any $a, b \in G$.
19. State and prove Lagrange's theorem.
20. Prove that every subgroup of a cyclic group is cyclic.
21. Prove that any chain is modular.
22. Show that De Morgan's laws are Valid in a Boolean algebra.

PART – C (2 x 8 = 16marks)

23. Explain isomorphism on graphs and check whether the following graphs are isomorphic?



24. Define complemented lattice and verify whether $< D_{45}, / >$ is complemented lattice or not?