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

B.E (FT) END SEMESTER EXAMINATIONS – MAY 2024

Computer Science and Engineering

VI Semester

MA6251 & DISCRETE MATHEMATICS (BRIDGE COURSE)

(Regulation 2018 - RUSA)

Time: 3 Hours Answer ALL Questions Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Write down the contrapositive and converse of the implication **"If it is raining then I get wet".** (2)
2. State the truth value of "If tigers have wings then the earth travels round the sun. (2)
3. In how many different ways can five men and five women sit around a table? (2)
4 State Pigeon Hole principle. (2)
5. Define complete graph with one example. (2)
6. How many edges are there in a graph with 10 vertices each of degree 5? (2)
7. Define Normal subgroup. (2)
8. Show that every cyclic group is an abelian group. (2)
9. Draw the Hasse diagram for $P = \{2,3,4,6,12,24\}$ and $\leq$ is a relation such that $x \leq y$ iff x|y. (2)
10. Define complete Lattice. (2)

PART – B (8 x 8 = 64 marks)

(Answer any 8 questions)

11. Verify whether the following Statements are Tautology or contradiction or contingency
    "$p \rightarrow (q \rightarrow r) \Rightarrow (\mathrm{p} \rightarrow \mathrm{q}) \rightarrow (\mathrm{p} \rightarrow \mathrm{r})$". (8)
12. Find the PDNF and PCNF of $(P \wedge \mathrm{Q}) \vee (\sim P \wedge \mathrm{R}) \vee (Q \wedge \mathrm{R})$. (8)
13. Prove by mathematical induction that for all $n \geq 1, n^3 + 2n$ is a multiple of 3. (8)
14. Find the number of integers between 1 and 250 that are not divisible by any of the integers 2, 3, 5 or 7. (8)
15. Solve the recurrence relation $a_n - 6a_{n-1} + 8a_{n-2} = 3^n, n \geq 2, a_0 = 3, a_1 = 7$. (8)
16. State and prove Dirac Theorem. (8)
17. Give an example of a graph which contains, (8)
    (i) An Eulerian graph and also Hamiltonian graph.
    (ii) Neither a Eulerian graph nor a Hamiltonian graph
    (iii) An Eulerian graph and but not a Hamiltonian graph
    (iv) Not a Eulerian graph and also not a Hamiltonian graph

18. State and prove Lagrange's theorem. (8)

19. Show that group homomorphism preserves identity, inverse and subgroup. (8)

20. Prove that the every subgroup of a cyclic group is cyclic. (8)

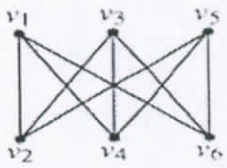
21. State and prove that the De Morgan's law hold for a complemented distributive lattice. (8)

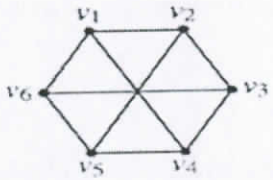
22. Prove that every chain is distributive lattice. (8)

PART – C (2 x 8 = 16marks)

23. Determine the following graphs are isomorphic or not.

G_1





G_2

(8)

24. Show that "**It rained**" is a conclusion obtained from the statements. If does not rain or if there is no traffic dislocation, the sports day will be held and the cultural Programme will go on". "If the sports day is held, the trophy will be awarded' and "the trophy was not awarded. (8)