Reg. No. : | | | | | | | | | | |

Question Paper Code: 45021

B.E. / B.Tech. DEGREE EXAMINATION, AUGUST 2021

Fifth Semester

Computer Science and Engineering

14UMA521 - DISCRETE MATHEMATICS

(Regulation 2014)

(Common to IT Branch)

Duration: 1:45 hour Maximum: 50 Marks

PART A - (10 x 2 = 20 Marks)

(Answer any ten of the following questions)

1. Using truth table, show that $P \vee \neg (P \wedge Q)$ is tautology.
2. Find the recurrence relation from $y_k = A2^k + B3^k$.
3. Give an example of a graph which is both Eulerian and Hamiltonian.
4. Draw all the spanning trees of $\boldsymbol{K_3}$.
5. Let A={ a, b, c } and $\rho(A)$ be its power set. Draw the Hasse diagram of $(\rho(A), \subseteq)$.
6. Using truth table, show that $P \vee \neg (P \wedge Q)$ is tautology.
7. Find the recurrence relation from $y_k = A2^k + B3^k$.
8. Give an example of a graph which is both Eulerian and Hamiltonian.
9. Draw all the spanning trees of $\boldsymbol{K_3}$.
10. Is the poset$(Z^+, /)$ a lattice?
11. Define quantifiers. What are its types.
12. Find the recurrence relation from $y_k = A2^k + B3^k$.
13. State any two properties of trees.

14. Draw all the spanning trees of $\boldsymbol{K_3}$.

15. Is the poset$(Z^+,/)$ a lattice?

PART – B (3 x 10= 30 Marks)

(Answer any three of the following questions)

16. Obtain the principal disjunctive and principal conjunctive normal forms of $\big(P \to (Q \wedge R)\big) \wedge \big(\sim P \to (\sim Q \wedge \sim R)\big)$. (10)

17. Solve the recurrence relation $y_{n+2} - 6y_{n+1} + 9y_n = 0,\ y_1 = 4\ and\ y_0 = 1$. (10)

18. Find the adjacency matrix of the following graph G.

Find $A^2, A^3$and $Y = A + A^2 + A^3 + A^4$. What is your observation of entries in A^2andA^3? (10)

19. Let $*$ be defined on R by $x * y = x + y + 2xy\ \forall x, y \in R$. Check whether $(R,*)$ is a monoid (or) not. Is it commutative? Also find the inverses of $(R,*)$. (10)

20. Prove that De Morgan's laws hold good for a complemented distributive lattice. (10)