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422/MH

C-2050

DISCRETE MATHEMATIC-II

Paper-IV

Time allowed : 2 Hours] [Maximum Marks : 40

Note : Attempt any four questions. All questions carry equal marks.

1. Solve the recurrence relation $S_n - 2S_{n-1} + S_{n-2} = 12$.

2. Explain the Big-O notation, Big-Omega notation and Big-Theta notation used in algorithm analysis.

3. Define Linear Recurrence Relation and find general solution of recurrence relation

   $S_n - 7S_{n-2} + 6S_{n-3} = 0$.

4. Using the generating function, solve the recurrence relation

   $S_n - 2S_{n-1} - 3S_{n-2} = 0, n \quad 2$ and $S_O = 3, S_1 = 1$.

5. For a non-empty finite set X, Prove that $(P(X), \ , \ , \ , X)$ is a complemented lattice, where $P(X)$ be a power set of X.

6. State and prove De-Morgan laws in Boolean Algebra.

7. Simplify the Boolean function $\bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}C\bar{D} + A\bar{B}\bar{C}\bar{D} + A\bar{B}\bar{C}D + A\bar{B}C\bar{D} + A\bar{B}CD + ABC\bar{D} + \bar{A}\bar{B}\bar{C}\bar{D}$ and draw the logic diagram of the reduced function.

8. Prove that quotient group of cyclic group is cyclic. Give an example of a non-cyclic group whose quotient group is cyclic.

9. Attempt all question

   (i) What is Partial Ordered Set? Give example.

   (ii) Does the converse of Lagrange's theorem hold? Justify.

   (iii) Prove that generating function of sum of two sequences is equal to sum of their generating functions.

(iv) What do you understand by time complexity of an algorithm?

(v) Show that $7x^2 - 9x + 4 = O(x^2)$.

(vi) What is semi-lattice? Give example.

(vii) Show that inverse of each element of group is unique.

(viii) Define integral domain with an example.