

II B. Tech I Semester Regular Examinations, Feb/March - 2022
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

(Com to CSE, CST, CSE, (AIML), AI, DS, CSE(AIDS), CSE(CS), IOTCSBT, CSBS, IOT, AIDS, CS, AUML)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions each Question from each unit
 All Questions carry **Equal** Marks

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- 1 a) Construct truth table for $(P \wedge Q) \vee (\neg P \wedge Q) \vee (P \wedge \neg Q) \vee (\neg P \wedge \neg Q)$. [7M]
 b) Process the followings using automatic theorem $(P \vee Q) \wedge (Q \rightarrow R) \wedge (P \rightarrow M) \Rightarrow (R \vee M)$. [7M]

Or

- 2 a) Show that the following implication without constructing truth table [7M]
 (i) $(p \rightarrow q) \rightarrow q \Rightarrow (p \vee q)$ (ii) $p \rightarrow q \Rightarrow p \rightarrow p \wedge q$.
 b) Obtain the principal conjunctive normal formula for S, which is given by $(\neg P \rightarrow Q) \wedge (Q \rightarrow P)$. [7M]

- 3 a) If A, B, C are three sets such that $A \subseteq B$. show that $(A \times C) \subseteq (B \times C)$? [7M]
 b) Draw the Hasse diagram for the poset $(P(S), \subseteq)$, where $S = \{1, 2, 3, 4\}$ [7M]

Or

- 4 a) Consider the group $G = \{1, 2, 4, 7, 8, 11, 13, 14\}$ under multiplication Modulo 15. Construct the multiplication table of G and verify whether G is cycle or not? [7M]
 b) Let $A = \{1, 2, 3, 4\}$ and $P = \{\{1, 2, 3\}, \{4\}\}$ be a partition of A. Find the equivalence relation determined by P. ? [7M]

- 5 a) In a group 32 people save paper or bottles (or both) for recycling, 30 save paper and 14 save bottles. Find the number of people who (a) save both (b) save only paper and (c) save only bottles. [7M]
 b) 15 males and 10 females are members are seated in a round table meeting. How many ways they can seated if all the females seated together? [7M]

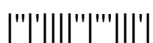
Or

- 6 a) Eight people enter an elevator at the first floor. The elevator discharges a passenger on each successive floor until it empties the fifth floor. How Many different ways can this happen? [7M]
 b) Explain in brief about Fermats theorem? [7M]

- 7 a) Solve the recurrence relation using generating function $a_n - 6a_{n-1} = 0$ for $n \geq 1$ where $a_0 = 1$. [7M]
 b) Solve the recurrence relation $a_n - 5a_{n-1} + 25a_{n-2} - 24a_{n-3} = 6$ for $n \geq 3$. [7M]

Or

- 8 a) Solve the recurrence relation of Fibonacci series. [7M]
 b) Solve the following recurrence relation using characteristic roots $a_n + 4a_{n-1} + 6a_{n-2} = 0$ and $a_0 = 2, a_1 = -7$. [7M]



- 9 a) Define Minimum Spanning tree? Describe in brief about prims algorithm with example? [7M]
b) Define Graph? Explain in brief about Applications of graphs? [7M]
- Or
- 10 a) Prove that isomorphism is an equivalence relation on diagraphs? [7M]
b) How many vertices will the graph contain 6 edges and all vertices of degree 3? [7M]

