J-261

BCA (Part-I) Examination, 2021

(Theoretical Foundation of Computer Science)

Paper - I

DISCRETE MATHEMATICS

Time Allowed : Three Hours

Maximum Marks : 50

Minimum Pass Marks : 20

Note : Attempt all the five questions. One question from each unit is compulsory. All questions carry equal marks.

Unit - I

Q. 1. Distributive law : Prove that $P \vee (q \wedge r)$ and $(p \vee q) \wedge (p \vee r)$ are logical equivalence.

OR

Q. 2. What do you understand by quantifiers ? Explain its types.

Unit - II

Q. 3. In a Boolean algebra B, prove that $x \leq y$ if and only if $x + y = y$ where $x, y \in B$.

OR

Q. 4. Explain algebra of propositions.

Unit - III

Q. 5. State and prove Boole's expansion theorem.

OR

Q. 6. Convert the following function in conjunctive normal form :

$$f(x,y,z,t) = x'y + x \cdot y \cdot z' + x \cdot y' \cdot z + x' \cdot y' \cdot z' \cdot t + t'$$

Unit - IV

Q. 7. Prove that the relation :

$R = \{(a, b) : a, b \in I$ and $(a - b)$ is divisible by 5$\}$ is an equivalence relation.

OR

Q. 8. What do you understand by cartesian product of

two sets ?

Unit - V

Q. 9. What is graph ? Explain various types of graphs.

OR

Q. 10. Explain various operations on graphs.

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