

**B.Tech. – VIEP – COMPUTER SCIENCE AND
ENGINEERING (BTCSVI)**

Term-End Examination

00933

June, 2018

BICS-008 : DISCRETE MATHS STRUCTURE

Time : 3 hours

Maximum Marks : 70

Note : Attempt any **five** questions. All questions carry equal marks.

1. (a) Prove that the relation of similarity in the set of all triangles in a plane is an equivalence relation. 7
- (b) Prove that $A - (B \cup C) = (A - B) \cap (A - C)$, where A, B and C be any sets. 7
2. (a) What do you understand by fields ? Explain with axioms. 7
- (b) Define Rings with the axioms. 7
3. (a) State and prove Lagrange's theorem. 10
- (b) Prove the following using Venn Diagram : 4
$$A \cap B \oplus C = (A \cap B) \oplus (A \cap C)$$

4. Prove the following propositions are tautology : 7+7
- (a) $p \vee \sim p$
 - (b) $\sim (p \wedge q) \vee q$
5. (a) Prove that the set {AND, NOT} is a functionally complete set. 7
- (b) Using K-Map, simplify the expression $A'B' + A'B$. 7
6. Convert the Boolean function : 14
- $$f(x, y, z) = (x' + y + z') (x' + y + z) (x + y' + z)$$
- in Disjunctive Normal Form (DNF)
7. Prove that the relation R on the set $N \times N$ defined by $(a, b) R (c, d) \Leftrightarrow a + d = b + c$ for all $(a, b), (c, d) \in N \times N$ is an equivalence relation. 14
-