

**N. B. i.** All questions are compulsory.

ii. All questions carry equal marks.

1. Discuss three basic concepts which involved in symbolic logic.
2. Select **any three** of the following arguments and construct formal proofs of validity.

i.  $Q \supset R$   
 $\sim S \supset (T \supset U)$   
 $S \vee (Q \vee T)$   
 $\sim S \quad / \therefore R \vee U$  (Use only 9 rules of inference)

ii.  $(M \vee N) \supset (O \cdot P)$   
 $\sim O \quad / \therefore \sim M$  (Use only 9 + 10 rules)

iii.  $Y \supset Z$   
 $Z \supset [Y \supset (R \vee S)]$   
 $R \equiv S$   
 $\sim (R \cdot S) \quad / \therefore \sim Y$  (Use only 9+10 rules)

iv.  $(N \vee O) \supset P$   
 $(P \vee Q) \supset R$   
 $Q \vee N$   
 $\sim Q \quad / \therefore R$  (Use only 9 rules of inference)

3. While using the rule of I.P .verify the following proposition as tautologies.

**(Any Three)**

- i.  $(X \supset Y) \vee (X \supset \sim Y)$
- ii.  $(A \supset B) \vee (\sim A \supset \sim B)$
- iii.  $(G \supset H) \vee (\sim G \supset I)$
- iv.  $(A \supset B) \vee (B \vee A)$

4. Reduce the following formula to its C.N.F. and decide whether it is tautology or not. **(Any three)**

i.  $\{(\sim X \vee Y) \cdot \sim Y\} \supset \sim X$

ii.  $[F \vee (G \vee H)] \supset [(F \vee G) \vee H]$

iii.  $(P \cdot Q) \equiv (Q \cdot P)$

iv.  $(A \supset B) \supset (A \supset B)$

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