

1	<p>Define the following and give an example wherever possible</p> <ol style="list-style-type: none"> Paradox Contra Positive Tautology De Morgan's Law Absurdity Modus Ponens Disjunctive Syllogism Universe of discourse Existential Quantifier Exportation
2	<p>a) Using truth tables prove that $(P \Leftrightarrow Q) \Leftrightarrow [(P \Rightarrow Q) \wedge (Q \Rightarrow P)]$</p> <p>b) Five persons A,B,C,D,E are in a compartment in a train. A,C,E are men and B and D are women. The train passes through a tunnel and when it emerges, it is found that E is murdered. An enquiry is held. A, B, C, D makes the following statements. A: I am innocent; B was talking to E when the train was passing through the tunnel. B: I am innocent; I was not talking to E when the train was passing through the tunnel. C: I am innocent; D committed the murder. D: I am innocent; one of the men committed the murder. Four of these 8 statements are true and four are false. Assuming only one person committed the murder, who did it? Explain the logic behind your solution.</p> <p>c) Prove $\forall x \forall y P(x,y) \Leftrightarrow \forall y \forall x P(x,y)$</p> <p>d) Write four rules of inference involving quantifiers</p>
3	<p>a) Prove the following with the help of rules of inference. Babies are illogical. Illogical people are despised. Nobody who can manage a crocodile is despised. Babies cannot manage crocodiles.</p> <p>b) Convert the following into CNF and DNF $(\neg P \vee \neg Q) \Rightarrow (P \Leftrightarrow \neg Q)$</p> <p>c) An Inductive definition of the set consists of three distinct components. Describe all three components in detail.</p> <p>d) Prove that the sum of interior angles of a n sided convex polygon is $(n-2)\pi$</p>
4	<p>a) Let A and B be arbitrary subsets of Σ^* such that $\lambda \notin A$. Then the equation $X = AX \cup B$ has the unique solution $X = A^*B$</p> <p>b) Explain the Following Terms with example</p> <ol style="list-style-type: none"> Auto Epistemic Logic Fuzzy Logic Modal Logic Backtracking List Manipulation in Prolog Herbrand Universe Diagramming arguments