TOPIC : 12 – Tutorial 3

1. Prove that $(\forall x)$ $(P(x) \rightarrow Q(x))$, $(\forall x)$ $(R(x) \rightarrow \neg Q(x)) \Rightarrow (\forall x)$ $(R(x) \rightarrow \neg P(x))$.

2. Show that the conclusion $(\forall x)$ $(F(x) \rightarrow \neg S(x))$ follows from the premises $(\exists x)(F(x) \wedge S(x)) \rightarrow (y)$ $(M(y) \rightarrow W(y))$ and $(\exists y)$ $(M(y) \wedge \neg W(y))$.

3. Show that $(\forall x)$ $(P(x) \vee Q(x)) \Rightarrow (\forall x)$ $(P(x) \vee (\exists x)$ $Q(x))$ by indirect method of proof.

4. Show that (x) $(P(x) \rightarrow Q(x) \wedge (x)$ $(Q(x) \rightarrow R(x)) \Rightarrow (x)$ $(P(x) \rightarrow R(x)$

5. Show that $\exists x\, P(x) \longrightarrow \forall x\, Q(x) \Rightarrow \forall x\, (P(x) \longrightarrow Q(x))$