Activity-3

Problem-1 use truth table

    a) Show that $(p \land \neg q) \land (\neg p \lor q)$ is a contradiction

    b) Show that $(p \to q) \leftrightarrow (\neg q \to \neg p)$ is tautology

Problem-2 Use De Morgan's laws to find the negation of each of the following

       statements.

    I.   Jan is rich and happy.

    II.   Carlos will bicycle or run tomorrow.

    III.   The fan is slow or it is very hot.

Problem-3 Prove the following equivalences by using laws of logic:

$$(p \land (\neg (\neg p \lor q))) \lor (p \land q) \equiv p$$

Problem-4 write inverse, converse and contrapositive of the following

        If my car is in repair shop, then I can't get to class

Problem-5 Use symbols to write logical form of argument and use truth table to test the argument for validity

    If Maxwell is not on team A , then David is on team B

    IF David is not on team B , then Maxwell is on team A

    Therefore Maxwell is not on team A or David is not on team B

Problem-6 show that the following argument is valid

$$p \lor (q \lor r)$$

$$\neg r$$

$$\therefore p \lor q$$

Problem-7 state which rule of interference is used in the argument

    i) If it rains today, then we will not have a barbecue today. If we do not have a barbecue today, then we will have a barbecue tomorrow.

    Therefore, if it rains today, then we will have a barbecue tomorrow.

    ii) "It is below freezing and raining now. Therefore, it is below freezing now."