MDL Assignment 1

Deadline: 8th February 2023

1. Use truth tables to determine validity of:

   [2 * 5 = 10 Marks]

   (a) If it rains, Raju carries an umbrella. Raju is carrying an umbrella, therefore it will rain.

   (b) If the weather is warm and the sky is clear, then either we go swimming or we go boating. It is not the case that if we do not go swimming, then the sky is not clear. Therefore, either the weather is warm or we go boating.

2. Given: A and B are true; X and Y are false, determine truth values of:
   [6 * 2 = 12 Marks]

   (a) $\neg(A \vee X)$
   (b) $A \vee (X \wedge Y)$
   (c) $A \wedge (X \vee (B \wedge Y))$
   (d) $(A \wedge X) \vee \neg B] \wedge \neg[(A \wedge X) \vee \neg B]$
   (e) $(P \wedge Q) \wedge (\neg A \vee X)$
   (f) $[(X \wedge Y) \rightarrow A] \rightarrow [X \rightarrow (Y \rightarrow A)]$

3. Solve the problems using both formal proof method and resolution method.
   [2 * 5 = 10 Marks]

   (a)
   $$P \rightarrow \neg Q, \neg Q \rightarrow R \Rightarrow P \rightarrow R$$

   (b)
   $$\Rightarrow ((P \vee Q) \wedge \neg P) \rightarrow Q$$