Additional Exercise For SMT

Propositional Logic

1. When is the expression $p \Rightarrow q$ **false**?

    A) $\neg p \wedge \neg q$
    B) $p \wedge q$
    C) $\neg p \wedge q$
    D) None of the above

2. Is the following expression true?
    $p \vee q \Rightarrow p$

    A) True in all cases.
    B) False in all cases.
    C) True for some cases and false for others.
    D) None of the above.

3. Is the following expression true?
    $(p \wedge (q \vee \neg p)) \wedge \neg q$

    A) True in all cases.
    B) False in all cases.
    C) True for some cases and false for others.
    D) None of the above.

4. Is the following expression true?
    $\neg(\neg p \vee \neg q \vee \neg r) \Leftrightarrow p \wedge q \wedge r$

    A) True in all cases.

B) False in all cases.
C) True for some cases and false for others.
D) None of the above.

5. Is the following expression true?
   ¬((¬p ∨ q) ∧ (p ∨ ¬q))

   A) True in all cases.
   B) False in all cases.
   C) True for some cases and false for others.
   D) None of the above.

6. Is the following expression true?
   ¬((p ∧ q) ∨ (¬p ∧ ¬q))

   A) True in all cases.
   B) False in all cases.
   C) True for some cases and false for others.
   D) None of the above.

7. Given the expression: **M: p ∨ ¬p**
Which of the following expressions implies the above given expression **M** -:

   A) p ∨ ¬p
   B) p ∧ ¬p
   C) (p ∧ ¬p) ∨ ¬p
   D) (¬p ∨ p) ∧ ¬p

8. Given the expression: **M: p ∧ ¬p**
Which of the following expressions are implied by the above given expression **M** :

A) p ∨ ¬p

B) p ∧ ¬p

C) (p ∧ ¬q) ∨ ¬r

D) (¬p ∨ p) ∧ ¬p

9. Is the following expression true?
$(p \Rightarrow (q \Rightarrow r)) \Rightarrow ((p \Rightarrow q) \Rightarrow r)$

A) True in all cases.

B) False in all cases.

C) True for some cases and false for others.

D) None of the above.

10. Is the following expression true?
$((p \Rightarrow q) \Rightarrow r) \Rightarrow (p \Rightarrow (q \Rightarrow r))$

A) True in all cases.

B) False in all cases.

C) True for some cases and false for others.

D) None of the above.