Quiz Questions: Propositional Logic

1. Suppose m and a represent the propositions:
   m : "you are a member of the committee"
   a : "you attend the meeting."
   Express in symbols the compound proposition
   "to be a member of the committee it is necessary that you attend the meeting."
   A. $\neg m \rightarrow a$
   B. $a \rightarrow \neg m$
   C. $m \rightarrow a$
   D. $a \rightarrow m$

2. Suppose m and t are the propositions
   m : "you are a member of the team"
   t : "you take afternoon classes."
   Express in English the compound proposition $m \rightarrow \neg t$.
   A. You are a member of the team only if you take afternoon classes.
   B. You are a member of the team only if you don't take afternoon classes.
   C. If you don't take afternoon classes, then you are a member of the team.
   D. If you take afternoon classes, then you are a member of the team.

3. Let l be "Lois works late", let j be "John works late", and let e be "they will eat at home".
   Consider the proposition "If Lois or John do not work late, then they will eat at home." Which
   of these represents the proposition in symbols?

   A. $\neg(l \vee j) \rightarrow e$
   B. $(\neg l \wedge \neg j) \rightarrow \neg e$
   C. $\neg(l \wedge j) \rightarrow e$
   D. $e \rightarrow (\neg l \wedge \neg j)$

4. Select those statements that are true (multiple answers are possible)

   A. If $1 + 1 = 3$, then $2 + 2 = 4$
   B. If $1 + 1 = 2$, then $2 + 2 = 5$
   C. If $1 + 1 = 3$, then $2 + 2 = 5$
   D. If monkeys can fly, then $1 + 1 = 3$
   E. If $1 + 1 = 2$ if and only if $2 + 3 = 4$

5. Which proposition is not a tautology?

   A. $(\neg p \wedge (p \rightarrow q)) \rightarrow \neg q$
   B. $(\neg q \wedge (p \rightarrow q)) \rightarrow \neg p$
   C. $\neg(p \rightarrow q) \rightarrow \neg q$
   D. $\neg(p \rightarrow q) \rightarrow p$

6. Which of the propositions is logically equivalent to $(p \wedge q) \vee (\neg p \wedge \neg q)$?

   A. $p \leftrightarrow \neg q$
   B. $p \leftrightarrow q$
   C. $q \leftrightarrow p$
   D. $q \leftrightarrow \neg p$

7. Which each of these compound propositions is satisfiable?

A. $(p \rightarrow q) \wedge (p \rightarrow \neg q) \wedge (\neg p \rightarrow q) \wedge (\neg p \rightarrow \neg q)$
B. $(p \leftrightarrow q) \wedge (\neg p \leftrightarrow q)$
C. $(p \vee \neg q) \wedge (\neg p \vee q) \wedge (\neg p \vee \neg q)$

8. Which of the following is the negation of the statement "I drive to work if and only if it is rainy"?

   A. If I drive to work, then it is not rainy.
   B. I drive to work if it is not rainy.
   C. I drive to work if and only if it is not rainy.
   D. I do not drive to work if and only if it is not rainy.
   E. I do not drive to work if it is not rainy.