1. Which of the following compound proposition is a tautology?

   A. $\neg(q \to r) \wedge r \wedge (p \to q)$

   B. $\neg(p \vee q) \wedge (p \vee r)$

   C. $(p \wedge q) \to (p \vee q)$

   D. $\neg(p \vee (q \wedge r)) \leftrightarrow ((p \vee q) \wedge (p \to r))$

   ANSWER: C

2. $\neg(p \vee (\neg p \wedge q))$ is equivalent to

   A. $\neg p \wedge q$

   B. $\neg p \wedge \neg q$

   C. $p \wedge \neg q$

   D. $p \wedge q$

   ANSWER: B

3. _____ can be derived from the premises, $a \to b, c \to b, d \to (a \vee c)$ and d

   A. b

   B. c

   C. d

   D. a

   ANSWER: A

4. The negation of the following statement "Some of the students do not keep quiet or the teacher is absent" is

   A. $Q(x)$

   B. $\exists x Q(x)$

   C. $\forall x Q(x) \wedge \exists x Q(x)$

   D. $\forall x Q(x) \wedge T$

   ANSWER: D

5. Symbolize the following expressions:

   All integers are rational numbers.

   Some integers are power of 2.

   Therefore some rational numbers are power of 2.

   A. $\forall x(I(x) \rightarrow R(x)), \exists x(I(x) \wedge P(x)) \Rightarrow \exists x(R(x) \wedge P(x))$

   B. $\forall x(I(x) \wedge R(x)), \exists x(I(x) \rightarrow P(x)) \Rightarrow \exists x(R(x) \wedge P(x))$

   C. $\forall x(I(x) \rightarrow R(x)), \exists x(I(x) \rightarrow P(x)) \Rightarrow \exists x(R(x) \wedge P(x))$

   D. $\forall x(I(x) \wedge R(x)), \exists x(I(x) \rightarrow P(x)) \Rightarrow \exists x(R(x) \rightarrow P(x))$

   ANSWER: A

6. Let $P(n) = n^2 - n + 41$ is a prime number then

   A. $P(3)$ is not true

   B. $P(5)$ is not true

   C. $P(41)$ is not true

   D. $P(1)$ is not true

   ANSWER: C