

### **Question-8:**

Let  $p$  and  $q$  be the propositions

$p$  : I bought a lottery ticket this week.

$q$  : I won the million dollar jackpot.

Express each of these propositions as an English sentence.

**a)**  $\neg p$                       **b)**  $p \vee q$                       **c)**  $p \rightarrow q$

**d)**  $p \wedge q$                       **e)**  $p \leftrightarrow q$                       **f)**  $\neg p \rightarrow \neg q$

**g)**  $\neg p \wedge \neg q$     **h)**  $\neg p \vee (p \wedge q)$

### **Answer:**

**(a)** I did not buy a lottery ticket this week.

**(b)** I bought a lottery ticket this week or I won the million dollar jackpot.

**(c)** If I bought a lottery ticket this week, then I would win the million dollar jackpot.

- (d) I bought a lottery this week and I won the million dollar jackpot.
- (e) I bought a lottery ticket this week if and only if I won the million dollar jackpot.
- (f) If I did not buy a lottery ticket this week, then I did not win the million dollar jackpot.
- (g) I did not buy a lottery ticket this week and I did not win the million dollar jackpot.
- (h) I did not buy a lottery ticket this week or, I bought a lottery ticket this week and won the million dollar jackpot.

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**SECTION: A**