

**Problem 1.** Suppose that  $X$  is true and  $Y$  is false. What is the truth value of the sentence “ $X$  if and only if  $Y$ ”?

- A) True
- B) False

*Solution. B)*

**Problem 2.** The statement “ $X$  implies  $Y$ ” is logically equivalent to “ $Y$  or not  $X$ ”.

- A) True
- B) False

*Solution. A)*

**Problem 3.** The truth value of  $F \rightarrow T$  is

- A) T
- B) F

*Solution. A)*

**Problem 4.** The sentence

$$(X \vee \neg Y) \wedge (\neg X \vee Y)$$

is logically equivalent to which of the following:

- A)  $(X \wedge Y) \vee (\neg X \wedge \neg Y)$
- B)  $X \leftrightarrow Y$
- C) Both
- D) Neither

*Solution. C)*

**Problem 5.** What is the truth value of the following sentence?

$$X_1 \wedge (X_2 \wedge (X_3 \wedge (X_4 \wedge (X_5 \wedge (X_6 \wedge \neg X_1))))))$$

- A) True
- B) False
- C) It could be true or false

*Solution. B)*