Answer all questions. Write answers in a separate booklet.

When you have eliminated the impossible, whatever remains, however improbable must be the truth. *The Sign of Four.*

SIR ARTHUR CONAN DOYLE

1. The following formula is not an instance of paradox of material implication:
   - A. \( p \vdash q \rightarrow p \)
   - B. \( \neg q \vdash p \rightarrow \neg q \)
   - C. \( p \rightarrow \neg s \vdash (p \land q) \rightarrow s \)
   - D. \( (p \land \neg p) \rightarrow q \)
   - E. \( \vdash p \rightarrow (q \lor q) \)
   - F. \( \vdash p \rightarrow (q \rightarrow p) \)

2. Which of the following sentences are considered to be intensional:
   - A. \( 3 + 4 = 4 + 3 \)
   - B. It is possible that you do not understand me, but it is not necessary.
   - C. If I were Bill Gates, I would be rich.
   - D. If Shakespeare wrote Hamlet, then the sun rises in the east.
   - E. If ice is lighter than water, then ice floats in water.
   - F. If it is necessarily the case that 2 is the smallest prime number, then 2 is the smallest prime number.
   - G. If it is morally obligatory that you love your neighbour, then you love love your neighbor.

3. The strict implication \( p \) is defined as:
   - A. \( \Box (\neg p \lor q) \)
   - B. \( \Box (\neg p \land q) \)
   - C. \( \neg \Diamond (p \land \neg q) \)
   - D. \( \Box (p \rightarrow \neg q) \).
   - E. \( \Box (\neg q \rightarrow \neg p) \).
4. In which of the following sentences, the disjunction used, qualify to be intensional disjunction:
   A. Either life is not always better than death or people do not commit suicide.
   B. Either Sun rises in the east or moon is made of green cheese.
   C. Either Aishwarya loves me or I am beloved.
   D. Either you are allowed to take fruits salad or may be appropriately viewed as follows:

5. Let $\rightarrow$ stand for material implication and $\not\rightarrow$ stand for strict implication. According to C. I Lewis, the process of deduction ($p \vdash q$), i.e., $q$ is deduced from $p$
   A. $p \rightarrow q$ [Material implication]
   B. $p \not\rightarrow q$
   C. Causal Implication: $A \rightarrow_C B$
   D. $\neg\Diamond (P \land \neg Q)$

6. Which of the following were not valid arguments with strict implication $\not\rightarrow$ (but were with material implication in its place):
   A. $\neg p \models p \not\rightarrow q$
   B. $q \models p \not\rightarrow q$
   C. $\Box q \vdash p \not\rightarrow q$
   D. $\neg\Diamond p \vdash p \not\rightarrow q$
   E. $(p \land q) \rightarrow r \models (p \not\rightarrow r) \lor (q \not\rightarrow r)$
   F. $\neg(p \not\rightarrow q) \vdash p$

7. It is possible that $p$, i.e., $\Diamond p$ can be expressed in terms of implication as follows:
   A. $\neg(\neg p \rightarrow p)$
   B. $(p \rightarrow \neg p)$
   C. $\neg\neg(p \rightarrow \neg p)$
   D. $\neg(p \rightarrow \neg p)$

8. Which of the following statements are false with respect to strict implication:
   A. $\models p \not\rightarrow (q \lor \neg q)$
   B. $(p \land \neg p) \not\rightarrow q$
   C. $\neg q \models p \not\rightarrow \neg q$
   D. $\Box \neg p \vdash p \not\rightarrow q$
   E. None of the above.