

Homework – 01

Topic: Compound Propositions using \neg , \wedge , \vee , \oplus

1. Develop truth tables for the following compound propositions.
 - a) $(p \wedge q) \vee (\neg p \vee (p \wedge \neg q)) \vee r$
 - b) $(p \wedge \neg q) \wedge (\neg p \vee q) \wedge r$
 - c) $((\neg p \wedge q) \wedge (q \vee r)) \wedge \neg q \wedge r$
2. Let h : "Amir is handsome", c : "Amir is clever", p : "Amir is optimistic". Rewrite the following in symbolic forms using \neg , \wedge , \vee and \oplus . You should not simplify the compound propositions.
 - a) Amir is handsome and clever but not optimistic.
 - b) Amir is either clever or handsome or both.
 - c) Amir is either clever or handsome but not both.
 - d) Amir is neither handsome, nor clever nor optimistic.
 - e) Amir is not both handsome and clever, but he is optimistic.
 - f) Amir is optimistic but not clever nor handsome.
3. Let p , q , and r be the propositions:
 p : You get an A on the final exam.
 q : You do every exercise in this book.
 r : You get an A in this class.

Express the following in symbolic form:
 - a) You get an A in this class, but you do not do every exercise in this book.
 - b) You get an A on the final, you do every exercise in this book, and you get an A in this class.
 - c) You get an A on the final, but you don't do every exercise in this book; nevertheless, you get an A in this class.
4. Consider the simple propositions: r : Roses are red, b : Violets are blue and s : Sugar is sweet. Translate the following statements into intelligible English.
 - a) $b \vee \neg s$
 - b) $r \vee (b \wedge \neg s)$
 - c) $(r \vee b) \wedge \neg s$
5. Consider the proposition labels: f : food is good, s : service is excellent, p : price is high. Translate each of the following compound statements into symbolic notation.
 - a) The food is good but the service is not excellent.
 - b) The food is good and the service is excellent, but the price is high.
 - c) Neither the food is good nor is the service excellent.