2013 E.C. WONDIRAD SENIOR HIGH SCHOOL FIRST SEMESTER MATHEMATICS Work Sheet 4For Grade 11

InstructionI :Choose the correct answer using the necessary steps.

1. Which one of the following has true truth value if x *and* y are natural numbers?

A. $(\exists_x)(\forall_y)(x \le y)$ B. $(\forall_x)(\forall_y)(x^2 \le y)$ C. $(\exists_x)(\exists_y)(x + y = 0)$ D. $(\forall_x)(\exists_y)(x < y)$

2. Which one of the following argument is invalid?

A. p $\vdash p \vee q$ B. p $\Rightarrow q$, q $\vdash p$ C. p $\Rightarrow q$, p $\vdash q$ D. p $\vee q$, $\neg p \vdash$ q

3. If 7 is even, then 2 is prime. 2 is prime if and only if 6 is positive. 6 is not positive. Therefore, 7 is not even.

Then the argument is:- A. Valid B. Invalid C. Both D. Cannot be determined

4. Which one of the following is not tautology?

A. $(p \wedge q) \Rightarrow p$ B. $p \Rightarrow (p \vee q)$ C. $[\neg p \wedge (p \vee q)] \Rightarrow q$ D. $[q \wedge (\neg p \vee \neg q)] \Rightarrow \neg p$

5.Which of the following is equivalent to (p $\Rightarrow q$) $\wedge$ (q$\Rightarrow$ p)

A. (p $\wedge$ q) $\wedge$ (q $\vee$ p) B. (p $\Rightarrow q$) $\vee$ (q$\Rightarrow$ p) C. p $\wedge$ q D. p $\Leftrightarrow$ q

6. If p$\Rightarrow$ ┐ q is false, then for any proposition r. Which one of the following compound proposition is true? A. (p$\vee$q) $\Rightarrow$ (q $\wedge$ r) B..(┐ p $\vee$ r) $\Leftrightarrow$(┐ q $\wedge$ r) C..(p$\wedge$┐ q) $\Leftrightarrow$(┐ r $\wedge$ r) D.(p$\wedge$r) $\Rightarrow$(r $\wedge$┐ r)

7. Let p,q and r are propositions, such that p$\Rightarrow$ (r$\vee$┐ q) is false. Then which following is true.

A .p$\Rightarrow$r B.┐ r$\Rightarrow$q C.┐ p $\Leftrightarrow$┐ qD.q $\Leftrightarrow$r

8. Which of the following compound proposition is true? If pand r are false and q is true.

A. (q$\Rightarrow$ p) $\Rightarrow$ r B. (p $\vee$ r)$\Rightarrow$q C.(q $\wedge$ p) $\Rightarrow$r D. (p $\vee$ q) $\Leftrightarrow$ r

Instrucion II: Work out (show all the necessary steps clearly and neatly)

9. Suppose that:- p: He missed that tournament.

q: He got the gold medal.

r: He took a trip abroad. Write the following compound statement verbally.

A.(p $\Rightarrow$q) $\wedge$ ┐ r B. r $\wedge$ (p $\Rightarrow$q) C. (r $\wedge$ ┐ p) $\Rightarrow$q D. ┐ (r $\vee$ p) $\vee$ q

10. Determine the following compound statements, tautology, contradiction or neither.

A. $[p \vee (q \Rightarrow r)] \Leftrightarrow [\neg p \Rightarrow (q \Rightarrow r)]$ B. $p \vee (q \Rightarrow \neg p)$ C. $p \Rightarrow (r \Rightarrow p) \vee q$

B. $[p \Leftrightarrow (q \wedge \neg r)] \Leftrightarrow [\neg p \Leftrightarrow (\neg p \vee r)]$ E. $(p \Rightarrow q) \Leftrightarrow (\neg q \Rightarrow \neg p)$

11. Suppose that the statements p, q, r, and s are assigned the truth values T, F, F, & T respectively. Find the truth value of each of the following.

A.$(q \vee \neg s)] \Rightarrow (p \Leftrightarrow s)$ B. $(p \vee r) \Leftrightarrow (r \wedge \neg s)$ C.$(r \wedge s) \Rightarrow [p \Rightarrow (\neg q \vee s)]$

D. $[p \Rightarrow (q \vee r)] \Leftrightarrow [\neg p \Rightarrow (q \Rightarrow r)]$ D.$[\neg (\neg p \vee q) \vee r] \Rightarrow \neg (\neg s \vee s)$

12. Construct truth table for each of the following propositions.

A.$(p \Rightarrow q) \Leftrightarrow (\neg p \Leftrightarrow q)$ B. $(p \wedge q) \Rightarrow [(q \vee \neg q) \Leftrightarrow (r \wedge q)]$

C.$(r \wedge s) \Rightarrow [p \Rightarrow (\neg q \vee s)]$D.$(p \Rightarrow q) \wedge \neg r$

13. Let $\cup$= the set of real numbers. Determine the truth value of the following propositions.

A).$\forall_x)(\forall_y)$ $(x^2 + y \geq 0)$ B. $(\exists_x)(\forall_y)$ $(x^2 + y \geq 0)$C. $(\exists_x)(\exists_y)$ $(x^2 + y^2=1)$

14. Suppose that:- A.If All rhombus are rectangle, then 1 is prime.

B. If Cairo is the capital city of Somalia, then man is not mortal.

Then determine: i. converse, ii. Inverse and iii.Contrapositive

15. Determine whether the given argument is valid. Justify your answer.

A. $p \Rightarrow q$ B.$p \Rightarrow q$

$r \Rightarrow q$ $\neg (q \vee r)$

q $\neg p$

$p \vee \mathbf{r}$

SET BY: DEP. OF MATHEMATICS