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be reasonable, to be successful

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Arsi University

College of Natural and Computational Sciences

Department of Mathematics

Math1011 Mid-Exam for. 1st year Students

Date: 18/08/2021

Time allowed: 1:30 hr.

Max Load: 30%

Name:_____ **ID NO:** _____

Department:_____ **Section:** _____

Part I: ***Write TRUE if the statement is correct or write FALSE if the statement is incorrect on the space provided.*** **(1 point each)**

1. The number of subsets of a given set is the same as the number of elements of its power set. _____
2. For each $x, x^2+9 \geq 0$ is an open proposition. _____
3. Given set $A = \{\emptyset, \{a, b\}, c\}$, then $\{a, b\} \in A$. _____
4. Empty set is a proper subset of any set. _____
5. Two compound propositions P and Q are equivalent iff $P \Leftrightarrow Q$ is a tautology. _____

Part II: Encircle the correct answer from the chosen alternatives. **(1.5 point each)**

6. Which one of the following is a proposition?
   A. I want to be an Engineer
   C. The 100^{th} digit of π is 5
   B. $x^2+3=10$
   D. Be punctual!

7. How many elements does A contains if it has 127 proper subsets?
   A. 7
   B. 8
   C. 2
   D. 9

8. Which one of the following is a proposition?
   A. I want to be an Engineer
   B. $x^2+3=10$
   C. The 100th digit of π is 5
   D. Be punctual

9. One of the following is **False** $\forall x, y \in R$
   A. $(\forall y)(\exists x)(x-3y=10)$
   B. $(\exists x)(\exists y)(2x+y^3=0)$
   C. $(\forall x)(\exists y)(x^2-y^2=0)$
   D. $(\exists x)(\forall y)(x^2-4y=10)$

10. For any two sets A and B in the Universal set U, which of the following is False
   A. $A' \cap A = \emptyset$
   B. $A \setminus B \subseteq B$
   C. $A \setminus B = A \cap B'$
   D. $A' = U \setminus A$

Part III: **Fill in the blanked space with appropriate answers.** (15 points)

11. Let $A=\{2,3,4,5,a,b,c\}$, $B \setminus A=\{6,7,d,e,g\}$, $C=\{2,4,3,12,b,e,g\}$ and $A \cap B=\{2,3\}$, then $(A \Delta B) \setminus C=$ _____

12. The truth value of $(\forall_{a \in R})(\forall_{b \in R})((a+b)^2>0)$ is _____

13. The negation of $(\exists_{x \in N})(x<x^2)$ is _____

14. Given set $A=\{\emptyset,\{\emptyset,b\}\}$ then, Power set of A is (are) _____

15. The **contrapositive** of, "If 123 is composite number, then π is an irrational number is"

_____

Part IV: ***Show all the necessary steps clearly and neatly.*** (10 points)

16. *Two finite sets have s and t elements. The total number of subsets of the first set is 56 more than the total number of subsets of the second set.*

Find the value of s and t (3 points)