- *Cheating will lead to the cancellation of your results.*
- *Make your answer brief and complete.*
- *Don't forget to write your name and ID. No.*
- *Switch off your cell phone before starting the exam.*
- *Don't write any unwanted information on the question paper.*

I: Write true if the statement is correct and false if the statement is wrong. (1 pt each)

1. Two sets A and B are equal if and only if $A \subseteq B$ and $B \subseteq A$.
2. The set $\{x \in \mathbb{R}: 2 \leq x \leq 3\}$ is finite set.
3. For two disjoint sets A and B, $A \cup B = A \Delta B$.

t II: Choose the best answer for the given alternatives. (1 pt each)

4. Which one of the following is false?
   A. $A \Delta \phi = A$ B. $C' - D = C \cap D'$ C. $A \Delta A = \phi$ D. $A - B = B - A$,if $A \neq B$
5. Which of the following sentences is not a statement?
   A. $4 + 2 \neq 6$ C. man is mortal.
   B. 2 is odd natural number D. how old are you?
6. Which of the following proposition has a "True" truth value?
   A. $(\forall x \in \mathbb{Z})(\exists y \in \mathbb{Z})(x + y = 6)$ C. $(\exists x \in \mathbb{Z})(\forall y \in \mathbb{Z})(x + y = 6)$
   B. $(\forall y \in \mathbb{Z})(\exists x \in \mathbb{Z})(2x + y = 1)$ D. $(\forall x \in \mathbb{Z})(\exists y \in \mathbb{Z})(x + y = y)$
7. Which one of the following set is not a subset of $\{1, 4, \{\emptyset\}, 0\}$?
   A. $\{\emptyset, 0\}$ B. $\{1, 4, 0\}$ C. $\{1, 4, \{\emptyset\}, 0\}$ D. $\{\{\emptyset\}\}$
8. Let p, q and r be propositions with truth values F, F and T respectively, then which of the following has truth value false?
   A. $\neg(q \wedge r) \vee p$ C. $\neg q \Rightarrow (p \vee \neg r)$
   B. $r \Leftrightarrow \neg(p \vee q)$ D. $\neg p \wedge (q \Rightarrow \neg r)$

amharic tutorial class

B. $\{x \in N: 1 \leq x \leq 2\}$

C. $\{x \in Z: -2 < x < -1\}$

D. None

12. Which one of the following sets are equivalent sets?

A. $S = \{x \in R: x^2 + 1 = 0\}$ and $T = \{x \in N: 6 \leq x \leq 7\}$

B. $Q = \{1,2,3\}$ and $R = \{a,b,c,d\}$

C. $U = \left\{x \epsilon N: \frac{1}{2}x + 1 = 0\right\}$ and $V = \{x \in Z: -6 < x < -5\}$

D. All

art III. Fill in the blank space with the most simplified answer on the space pr

13. If $A = \{\phi\}$, then $P(A) =$ _____ (1 pt)

14. If A and B any two sets in the universal set U, then $(A - B) \cap (B - A) =$ ___

15. Based on the Venn diagram shown below

Find

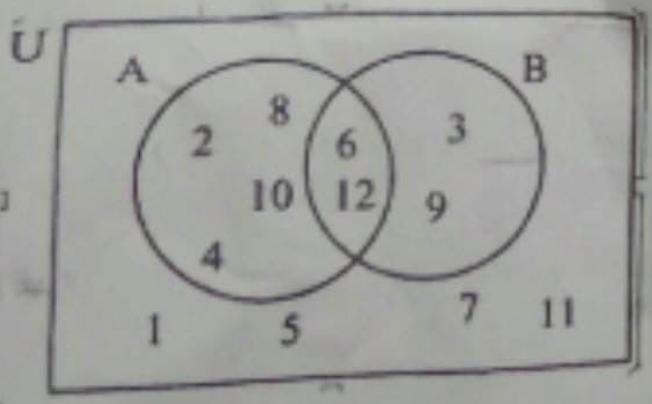
I. $A - B$

II. $(A \cap B)'$

III. $A \cup B'$

IV. $A \triangle B$

(0.5 pt each)



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steps clearly and neatly.

BAHIR DAR UNIVERSITY

SELF-TESTING EXAM

PART I: SHORT ANSWER

Write your answer on the space provided.

1. Let $U = \mathbb{R}^+ \cup \{0\}$.Then the truth value of
   a) $(\exists x)(\forall y)(x \leq y - 1)$ is_____
   b) $(\forall y)(\exists x)(x + 3y = 1 \wedge 2x - y = 1)$ is_____
   c) $(\exists x)(\forall y)(yx = x)$ is _____
2. The negation of $(\forall x)[x > 3 \Longrightarrow x^2 > 9]$ is _____
3. Let p, q and $(p \wedge q) \Leftrightarrow \neg (p \vee \neg r)$ have truth values F, T,and T respectively. Then the truth value of r is____F____

PART II: WORKOUT PROBLEMS:

Show all the necessary steps of your work clearly on the space provided

1. By using **law of propositions**, determine whether $(p \wedge (p \Longrightarrow q)) \Longrightarrow q$. is tautology or contradiction.

2. Show that $\neg (p \vee q) \vee (\neg p \vee \neg q) \equiv \neg p$ (By using **law of propositions**)

33. **II: (2 point each) (Choose the best answer for the following questions:**

1. Let ... the set of even natural numbers less than or equal to 15. Which of the following is true.

   A. $\{2, 6\} \in A$ C. $0 \in A$
   B. $\emptyset \in A$ D. $\{2, 4\} \subset A$

2. Let $P(x, y)$: $xy = 0$, $x, y \in \mathbb{Z}$. Which of the following is false.

   A. $(\forall x)(\forall y)P(x, y)$ C. $(\forall x)(\exists y)P(x, y)$
   B. $(\exists x)(\exists y)P(x, y)$ D. $(\exists x)(\forall y)P(x, y)$

3. Which of the following sentence is not a proposition?

   A. The sum of two prime numbers is even. C. The sun is shining.
   B. Come to class! D. $3 + 4 = 7$.

4. Which of the following statement is true?

   A. The sum of any two irrational numbers is irrational.
   B. The product of any two rational numbers is irrational.
   C. The product of any two rational numbers is rational.
   D. The sum of any two irrational numbers is rational.

5. The GCF and LCM of 80 and 120 is ___ and ___ respectively.

   A. 40, 240 B. 120, 80 C. 240, 40 D. 80, 120

Part IV: Workout: (Show all necessary steps neatly and clearly.)

1. **(3 point)** Prove that $\frac{1}{1\times2}+\frac{1}{2\times3}+\frac{1}{3\times4}+...+\frac{1}{n(n+1)} = \frac{n}{n+1}$, $n \geq 1$ using principle of mathematical induction.

2. **(4 point)** Consider the argument
   " If the professor offers chocolate for an answer, then you answer the professor's question.
   The professor offers chocolate for answer. Therefore, you answer the professor's question."
   Identify all premises, conclusion and verify its the validity using truth table.

3. **(3 point)** Find all cubic roots of $z = -i$.

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Department of
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Date of Exam: Total mark: 30%

33. Name _____ ID No. _____ sec ____ regular ☐

33. GENERAL INSTRUCTIONS

The exam consisting of 16 questions having 4- True/False, 4- Short answer, 5-choice, and 3-workout items into TWO pages.

- Before You are starting to do please fill all the above information correctly.
- **Write your answer on the answer sheet only, and don't mark on the question paper.**
- Students should maintain perfect silence in the examination hall.
- Students should not bring any electronic materials (mobile, laptop,...) to the exam hall.
- Write your name and ID card No. on each answer book and additional sheets if any.
- Nobody should leave the hall with out handling the answer book.
- **Cheating in the examination in any form is a serious offense.**

Part I (True/False) (1 point each) (Say 'True' if the statement given is correct else 'False

1. All arguments with true conclusions are valid. false
2. If $a < b$, then $a.c < b.c$, *for all* $a,\ b,\ c \in \mathbb{N}$. True
3. If $z_1,\ z_2$ are complex numbers, then $Arg(z_1 \times z_2) = Arg\ z_1 \times Arg\ z_2$. True
4. The compound propositions $\neg(p \Rightarrow q)$ and $p \wedge \neg q$ are logically equivalent.

Part II: Short Answer (1.5 point each) (Answer the following questions:)

1. Given two complex numbers $z_1 = 3 + 3i$ and $z_2 = 1 + i$, then $\overline{z_1}.z_2 =$ ____.
2. Given two sets $A = \{2,\ 3,\ 4,\ 5, a,\ b\}$ and $B = \{x, y, z, 2\ 4,\ a,\ b\}$, then $A \triangle B =$ _____.
3. Suppose $p,\ q$ are true, and $r,\ s$ are false, then the truth value of $\neg(p \vee q) \Leftrightarrow (r \Rightarrow s) =$ _____.
4. The fraction form of the rational number $d = 1.2\overline{01}$ is ____.

$\neg(p \Rightarrow q)$

$(T \Rightarrow F)$

T

Injibara University

College of Natural and Computational sciences

Department of Mathematics

Mathematics for social science Mid -Exam (30%)

Time allowed: 75'

*Name:*_____ *ID No:*_____ *Section:*_____

PartI: Write True if the statement is correct and False if the statement is incorrect.[1 po each]

1) Empty set is a propersubset of itself._____

2) $(\forall x \in \mathbb{N})[x^2 + 1 \geq 2]$._____

3) $(\forall x \in \mathbb{R})(\exists y \in \mathbb{R})[x + y = 4]$._____

4) $\neg[(\forall x)[(x > 3) \Rightarrow (x^2 > 9)]] \equiv (\exists x)[(x > 3) \wedge (x^2 \leq 9)]$._____

5) The solution set of $x^2 + 5x + 6 = 0$ is $\{2,3\}$._____

Part II: *Choose* the correct answer from the given alternatives. [1.5 points each]

6) Which one of the following sentence is proposition?_____

A) Human beings are mortal C) What is your name?

B) Read this book carefully D) May God bless you!

7) If setA has 32 subsets, then set A has _____ elements._____

A) 10 B) 32 C) 5 D) 16

8) Which of the following statement is **False**?_____

A) For two sets, A &B , if $A \subseteq B$, *then* $A \cap B = A$

B) For two sets, A &B , if $A \subseteq B$, *then* $A \cup B = A$.

C) For any set A, $A \subset A$.

D) $\{2,3\} \subseteq A \cap B$ *implies that* $\{2,3\} \subseteq A$ *and* $\{2,3\} \subseteq B$

9) The set $A = \{x : x$ *is natural number and* $x \leq 5\}$ is equal to:_____

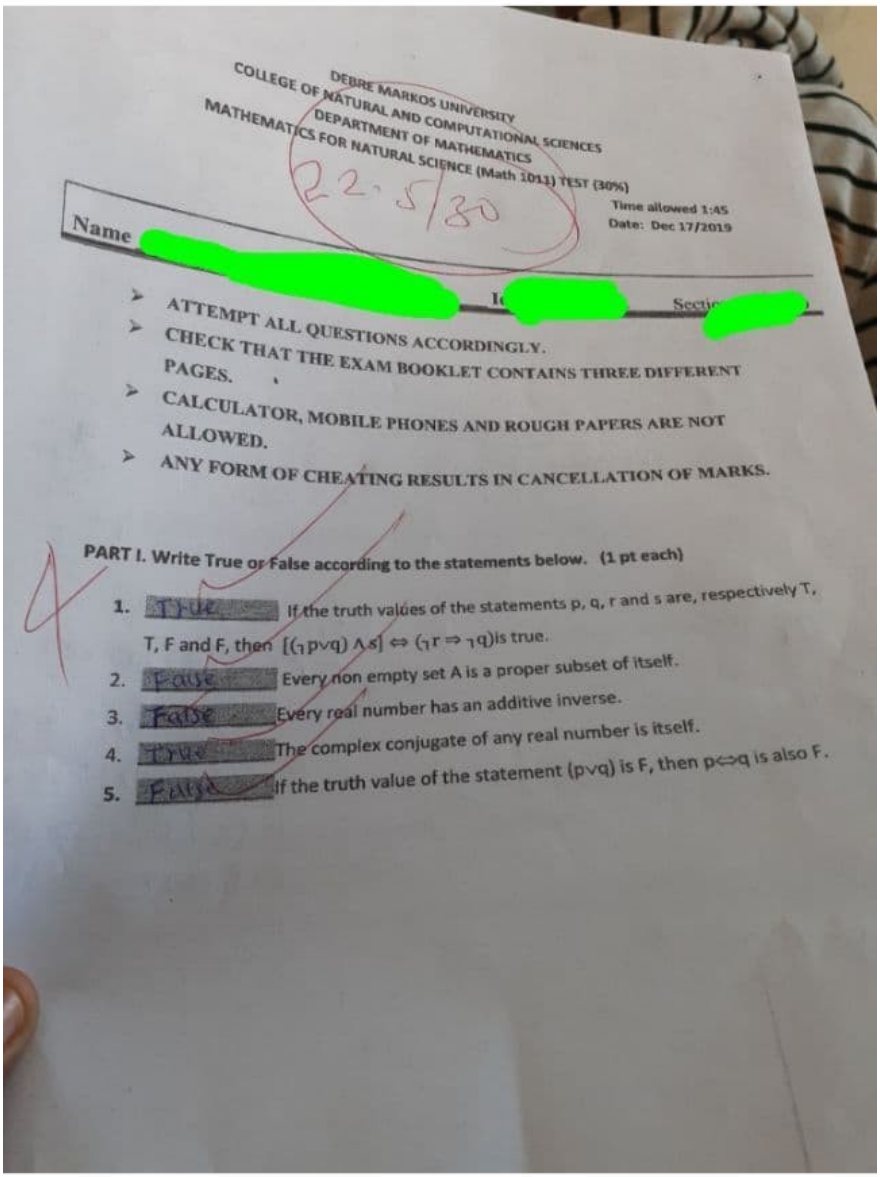
A) $\{\ldots, -2, -1,0,1,2,3,4\}$ B) $\{1,2,3,4,5\}$ C) $\{-2, -1,0,1,2,3,4\}$ D) $\{0,1,2,3,4\}$

10) The solution set of $3x - (8 - 3x) = 5 - (3 - x)$ is:_____

A) $\{4\}$ B) $\{2\}$ C) $\{9\}$ D) $\{12\}$

11) What is the solution set of $\frac{2x-7}{3} \geq \frac{x+3}{4}$ if $x \in \mathbb{N}$?_____

A) $\{1,2,3,4,5,6\}$ B) $\{\ldots,3,4,5,6\}$ C) $\{-3, -4, -2, -1,0,1,2\}$ D) $\{7,8,9,\ldots\}$



DEBRE MARKOS UNIVERSITY
COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES
DEPARTMENT OF MATHEMATICS
MATHEMATICS FOR NATURAL SCIENCE (Math 1011) TEST (30%)

22.5/30

Time allowed 1:45
Date: Dec 17/2019

Name [redacted] I[redacted] Sectio[redacted]

- ATTEMPT ALL QUESTIONS ACCORDINGLY.
- CHECK THAT THE EXAM BOOKLET CONTAINS THREE DIFFERENT PAGES.
- CALCULATOR, MOBILE PHONES AND ROUGH PAPERS ARE NOT ALLOWED.
- ANY FORM OF CHEATING RESULTS IN CANCELLATION OF MARKS.

PART I. Write True or False according to the statements below. (1 pt each)

1. True If the truth values of the statements p, q, r and s are, respectively T, T, F and F, then $[(\neg p \vee q) \wedge s] \Leftrightarrow (\neg r \Rightarrow \neg q)$ is true.
2. False Every non empty set A is a proper subset of itself.
3. False Every real number has an additive inverse.
4. True The complex conjugate of any real number is itself.
5. False If the truth value of the statement $(p \vee q)$ is F, then $p \leftrightarrow q$ is also F.

8. Which one the following pairs of sets are equal.

A. $M = \{a, b, c, d\}$ and $K = \{p, q, r, s\}$

B. $M = \{x: x \text{ is a factor of } 10\}$ and $K = \{1, 2, 5, 4, 10\}$

C. $M = \{1, 4, 9\}$ and $K = \{x: x = n^2, n \in N \text{ and } n < 3\}$

D. $M = \{x: x \text{ is an even natural numbers less than } 10\}$ and $K = \{x: x = 2n, n \in N \text{ and } n < 5\}$

9. For two non-empty sets A and B if $A \cap B' = \emptyset$ then which one of the following is true?

A. $n(A) = n(B)$

B. B is a proper subset set of A

C. A is a proper subset of B

D. None of the above

10. Let A= $\{5, \{6\}, \{7\}\}$, which of the following is not **True** if P(A) denotes the power set of A?

A. $\emptyset \epsilon P(A)$ B. $\emptyset \subseteq P(A)$ C. $\{5, \{6\}\} \subseteq P(A)$ D. $\{5, \{6\}\} \in P(A)$

III. Answer the Following Questions Clearly and Neatly

1. Let p=Abebe is rich

q= Abebe is happy

Write each of the following in symbolic form **(1.5 pts each)**

a. Abebe is poor but happy

b. Abebe is neither rich nor happy

II. Choose the Correct Answer (1.5pt each)

1. Which one of the following proposition is a tautology [redacted]

   A. $(p \vee q) \Rightarrow q$ B. $p \vee (q \Rightarrow p)$ C. $p \vee (p \Rightarrow \neg q)$ D. B and C

2. The proposition $p \wedge (\neg p \wedge q)$ is [redacted]

   A. A tautology B.A contradiction C. Conditional D. Neither contradiction nor Tautology

3. Which one of the following is not an open proposition [redacted]

   A. y is the cube of x B. x is a square of a number C. x is a street in Addis Ababa

   D. Asmara is a city in Europe

4. If P(x,y):x<y then which of the following proposition has **False** truth value? [redacted]

   A. $(\exists x)(\exists y)p(x,y$ B. $(\forall x)(\exists y)p(x,y)$ C.$(\forall x)(\forall y)p(x,y)$ D. None of the above

5. Let $A \cap B = \{1,2\}, A \cup B = \{1,2,3,4,5\}$, *then* $A \Delta B$ *is equal to* . [redacted]

   A. {3,4,5} B. {1,2,3,4,5} C. {1,3,5} D. {1,2}

6. Which of the following proposition is equivalent to $P \vee q$? [redacted]

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

7. Let A= {x: x is a letter in the word FOLLOW}, B={y: y is a letter in the word WOLF}. Which

   of the following is true about A and B ?. [redacted]

   A. A and B are disjoint C. $A \cap B = A \cup B$

   B. $A \cap B = A \setminus B$ D. None of the above

Nam[redacted]
IDNo[redacted]

Wollo University, KIOT
Department Of Pre-Engineering
Mathematics for Natural Science Mid-Examination.

Instruction:

- **Read all the instructions carefully.**
- **Don't detach any paper from the exam paper.**
- **Any attempt of cheating will make your result disqualify.**
- **Switch off your cell phone**

PART I: Choose the best answer from the given alternatives and put your choice in the provided space. (5%)

[redacted] 1) Which one of the following statements is **not true?**

A) $\emptyset \in P(\emptyset)$ C) For any set A, $A \in P(A)$
B) For any set A, $\emptyset \subseteq P(A)$ D) For any set A, $P(A) \subset A$

[redacted] 2) One of the following is an open proposition

A) $x + 9 = 9$
B) There is no real number x such that $x^2 = 4$.
C) For all $x \in \mathbb{R}$, $x^2 + 6x - 12 = 0$.
D) For every real number x, $x^2 + 1 \geq 0$.

[redacted] 3) The negation of a proposition $(P \wedge \neg Q) \Rightarrow Q$ is

A) $\neg P \vee Q$ C) $P \wedge \neg Q$
B) $\neg P \wedge Q$ D) $P \vee \neg Q$

[redacted] 4) If $B \subseteq A$, $A \cap B = \{1,4,5\}$ and $A \cup B = \{1,2,3,4,5,6\}$, then $B =$ _____

A) $\{1,4,5\}$ C) $\{1,2,3,4,5,6\}$
B) $\{2,3,6\}$ D) $\{1,2,3,4,5\}$

[redacted] 5) Which one of the following statement is correct?

A) The sum of any two rational numbers is rational.
B) The sum of any two irrational numbers is irrational.
C) The product of any two irrational numbers is rational.
D) The product of any two irrational numbers is irrational.

PART II: Write "True" if the statement is correct and "False" if it is incorrect.(5%)

[redacted] 1) The truth value of a proposition **"2 is an odd and even number if Addis Ababa is the Capital city of Ethiopia."** is false.

[redacted] 2) The set of natural numbers is closed under addition and subtraction.

[redacted] 3) Two sets A and B are said to be disjoint if $A \cap B = \{\phi\}$.

[redacted] 4) For some real numbers x, such that $|x| = -1$ is an example of proposition.

[redacted] 5) The argument of product of two complex numbers is the product of their arguments.

Wollo University

ADDIS ABABA UNIVERSITY
COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES
DEPARTMENT OF MATHEMATICS
Mathematics for Natural Sciences (Math 1011)
Mid-Term Examination - December 19, 2019

Name _____ ID. No. _____

Select Campus (AAiT, CHS, CNCS, EiABC) Section _____ Time allowed: $2\frac{1}{2}$ Hours

Instructions: This examination has 10 short answer questions and 5 workout problems. Attempt each question on the space provided for each question. Using **Calculators** and **Mobiles** are strictly forbidden.

For Instructor's use only:

PART I	PART II	TOTAL

Part I: (Short Answer) *Give the most simplified answers on the space provided.*

(1) Let p and q be propositions. If $p \Rightarrow q$ is False, then the truth value of $((\neg p) \wedge q) \Leftrightarrow (p \vee q)$ is _____.

(2) If $\frac{x+yi}{i} = 7+9i$, where x and y are real numbers, then the value of $(x+yi)(x-yi)$ is equal to _____.

(3) Let the set $S = \{x \in \mathbb{R} : |x-2| < 3\}$. Then the $lub(S)$= _____ and $glb(S)$= _____.

(4) The simplified form of the set $(2,4]^c \cap ((-\infty, 5) \cap [0, \infty))$ as an interval or union of intervals is equal to _____.

(5) Let the set $B = \{y : y \in \mathbb{N} \text{ and } 1 \leq y \leq \sqrt{5}\}$. Then the power set of B, $P(B)$ is equal to _____.

(6) The smallest positive integer m for which $(\frac{1+i}{1-i})^m = 1$ is equal to _____.

(7) Let $GCF(x, 400) = 20$ and $LCM(x, 400) = 1200$. Then the value of x is equal to_____.

(8) Determine the truth value of the following propositions
(a) $(\exists x \in \mathbb{R})(\exists y \in \mathbb{R})[|x| + y = 0]$ is _____.

(3) Find the three cube roots of the complex number $z = -8i$. [4 Pts.]

(4) Without using truth table, show that $(q \wedge (\neg q \vee p)) \vee (p \wedge \neg(q \wedge p)) \equiv p$ for any propositions p and q. [4 Pts.]

(5) Determine the validity of the argument: [4 Pts.]
If there was a great run, then traveling was difficult.
If they arrived on time, then traveling was not difficult.
They arrived on time.
Therefore, there was no great run.