CHUKA   UNIVERSITY

UNIVERSITY EXAMINATIONS

**FIRST YEAR EXAMINATION FOR THE AWARD OF CERTIFCATE
IN ANIMAL HEALTH AND PRODUCTION**

MATH 00100: MATHEMATICS FOR SCIENCE

STREAMS: CERT. ANHE (Y1S1)   **TIME: 2 HOURS**

DAY/DATE: FRIDAY 18/12/2020   **8.30 A.M. – 10.30 A.M.**

INSTRUCTIONS:
- Answer all questions in **section A** and any other two in **section B**
- Do not write anything on the question paper
- Non-programmable electronic calculators may be used
- Write your answers legibly and use your time wisely

SECTION A

QUESTION ONE (30 MARKS)

a) Define the following type of number system; give an example in each case.
   (i)   Irrational numbers
   (ii)   Real numbers
   (iii)   Complex numbers   (3 marks)

(b)   Write out the following series in full   (3 marks)

$$\sum_{i=-1}^{4}\left(i^{2}+2\right)$$

(c)   Simplify

$$\frac{12x^{6}}{3x^{4}5x^{-2}}$$ (2 marks)

(d)   Use Pascal's triangle to write out the expansion of $(3x-4y)^{5}$ (4 marks)

(e)   Evaluate using a calculator

    (i) $log_3 91$ (2 marks)

    (ii) $log_5(50)$ (2 marks)

(f)   Solve the Quadratic equation by completing square method
$$3x^2 - 3x + 1 = 0$$
(4 marks)

(g)   Solve for x given that $9(81^x) = \dfrac{1}{27^{x-2}}$ (3 marks)

(h)   Find the sum of the first 10 terms of a GP with first term 3 and common ratio 2

(3 marks)

(i)   Solve the trigonometric equation   (4 marks)

$2\tan^2 \theta = \tan \theta + 1$ for $0 \le \theta \le 360^0$

QUESTION TWO (20 MARKS)

a)   A Geometric progression has first term 4 and common ration 0.5, find the sum of the first 10 terms.   (7 marks)

b)   In how many possible ways can the letters of the word COMMITTEE be arranged without any repetition.   (5 marks)

c)   Plot a graph of $y = Cos\theta$ for $0° \le \theta \le 360°$ at an interval of $30°$.   (8 marks)

QUESTION THREE (20 MARKS)

a)   Use Pascal's triangle to write out the expansion of $(2x-y)^6$ (5 marks)

b)   Obtain the remainder when $3x^3 + 4x^2 - 6x + 9$ is divided by $x + 1$ (5 marks)

c)   Solve the equation whose $2\sin^2 x = \sin x$ for $0 \le x \le 360^0$ (5 marks)

d)   Find the value of x in the equation $50(1.5)^x = 4000$ (5 marks)

QUESTION FOUR (20 MARKS)

a)   Simplify $\dfrac{\cos^2 \theta}{1+\sin \theta} + \dfrac{\cos^2 \theta}{1-\sin \theta}$ (6 marks)

b)   Solve the following equations by using the Quadratic formular method   (8 marks)
$$2x^2 - 9x + 1 = 0$$
$$-4x^2 + 7x - 3 = 0$$

c)   Solve for x in $10^{4x+1} - 100^x = 0$ (6 marks)

QUESTION FIVE (20 MARKS)

a)   From a bag containing 5 white balls, 2 blue balls and 7 red balls. One ball is drawn at random. What is the probability that either blue or red ball is drawn?   (6 marks)

b)   In an AP of 25 terms, 4th term is 4, 22nd term is 5. Find the sum of AP   (7 marks)

c)   How many terms at least of the AP 1,4,7,10…. Are needed to give a sum greater than 590 from the first term of AP   (7 marks)