AMREF INTERNATIONAL UNIVERSITY

SCHOOL OF PUBLIC HEALTH

DEPARTMENT OF COMMUNITY HEALTH

HIGHER DIPLOMA IN COMMUNITY HEALTH PRACTICE

END OF SEMESTER EXAMINATION AUGUST /DECEMBER 2022

UNIT CODE: DCHP 119

UNIT NAME: BASIC MATHEMATICS

Exam Date: 28th November 2022

Time: 2 hours **Start: 2.00 PM** **Stop: 4.00 PM**

INSTRUCTIONS

1. This exam is marked out of 60 marks
2. This Examination comprises TWO Sections
   Section A: Compulsory Question (20 Marks)
   Section B: Long Answer Questions (40 Marks)
3. All questions in Section A are compulsory and Answer any TWO questions in Section B
4. No movement is allowed during the examination
5. Any aspect of cheating detected during and or after the exam administration will lead to nullification of your exam
6. Do Not write anything on the question paper -use the back of your booklet for rough work if need be

SECTION A: ANSWER ALL QUESTION (20 Marks)

1. Simplify the following expressions by collecting like term.

i) $8x + 3x + 4x - 6x$ (2 marks)

ii) $5u - 6(w - v) + 2(3u + 4w - v) - 11u$ (2 marks)

2. a) Let X = {1, 2, 3, 4}, Y = {2, 3, 5} and Z = {4, 5, 6}.

(i) Verify $X \cup Y = Y \cup X$ (2 marks)

(ii) Verify $(X \cup Y) \cup Z = X \cup (Y \cup Z)$ (4 Marks)

b) Let A = {x : x is a natural number and a factor of 18}

B = {x : x is a natural number and less than 6}

Find (i) $A \cup B$ (2 marks)

(ii) $A \cap B$ (2 marks)

3. a) What is the probability of throwing one dice and getting the number greater than 4 ? (2 marks)

b) What is the probability of throwing two dice and getting the sum of the fallen numbers greater than 3 ? (2 marks)

c) Wajakoya wrote a random natural number from 1 to 20. Determine the probability that he wrote a prime number. (2 marks)

SECTION B: ANSWER ANY FOUR QUESTIONS (40 MARKS)

4.

A. The sum of the first 3 terms of an arithmetic series is 21 and the sum of the next three terms is 66.

a) Find the value of the first term and the common difference. (4 Marks)

b) Write an expression for the nth term of the series (2 marks)

c) Find the difference between the sum of the first 10 and 13 terms. (4 Marks)

B. At a poultry farm, six hens and one duck cost Ksh. 8,000, while four hens and three ducks cost Ksh. 7,200. What is the cost of each type of bird? (4 Marks)

b) Solve the following simultaneous equation:

$p + q + 5 = 0$

$p2 = q2 + 5$ (6 marks)

5. a) How many different four -digit numbers can be constructed from the digits 1, 2, 3 (2 marks)

b) There is 24 boys and 15 girls in a dance circle. How many different pairs can be formed if the dancing couple is always a pair of girl-boy? (3 marks)

c) The registration number of the vehicle consists of three letters, three numbers and one letter. How many registration numbers can we form if we use 26 letters? (5 marks)

6. a) A dealer has two types of grades of tea, A and B. Grade A costs Sh. 140 per kg. Grade B costs Sh. 160 per kg. If the dealer mixes A and B in the ratio 3:5 to make a brand of tea which he sells at Sh. 180 per kg, calculate the percentage profit that he makes (6 marks)

7. a) Solve for x in the equation.

$9^{(2x-1)} \times 3^{(2x+1)} = 243$ (3 Marks)

b) A lecture room measures (x + 2) m by (x – 5)m. If the area of the classroom is $60m^2$.

Find its length. (3 marks)

c) Given that sin (2Θ + 30) = Cos (Θ - 60). Find the value of tan Θ to two decimal places.

(4 marks)

8. a) The probability of passing the national secondary exam depends on the performance in that year. If the candidate passes the primary exam , the probability of passing national secondary is $\frac{4}{5}$. If the candidate fails in the primary exam, the probability of passing national secondary is $\frac{3}{5}$. If a candidate passes national secondary the probability that he/she will get employed is $\frac{5}{8}$. If he/she fails national secondary the probability of getting employed is $\frac{1}{3}$. The probability of passing primary exam is $\frac{2}{3}$.

i. Draw a well labelled tree diagram to represent the above information. (4 Marks)

ii. Using the tree diagram, find the probability that a candidate: -

(i) Passes the national secondary (3 Marks)

(ii) Gets employed (3 Marks)