**ZERAKI ACHIEVERS' EXAMINATIONS (2023)**

**Term 1 - 2023**

**MATHEMATICS (121)**

**FORM ONE (1)**

**Time: 2 ½ Hours**

**Name**: …… **Adm No**: ……

**School**: …….. **Class**: ……..

**Signature**: …….. **Date**: ……

**Instructions to candidates**

1. *Write your name, admission no. and class in the spaces provided.*
2. *Sign and write the date of examination in the spaces provided above*
3. *The paper contains two sections; Section I and II.*
4. *Answer all questions in Section I and II*
5. *All answers and working must be written on the question paper in the spaces provided below each question.*
6. ***Show all the steps in your calculations, giving your answers at each stage in the spaces provided below each question***
7. *KNEC Mathematical tables may be used, except where stated otherwise*
8. *Silent or non-programmable calculators **SHOULD NOT** be used*

## FOR EXAMINER'S USE ONLY

## SECTION I

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | **TOTAL** |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |

1. (i) Evaluate without using mathematical tables or calculator. (4 marks)

$$\frac{-2(5+3)-9\div 3+5}{-3\times -5+-2\times 4}$$

(ii) Evaluate (3 marks)

$$\frac{-10-(-6)x\,(-6)\div -2+(-18)}{-8+(-6)\div(-2)\,x\,2}$$

(iii) Work out (3 marks)

$$\frac{8-5\times 4}{-9\div 3\times 5}$$

2. All prime numbers between ten and twenty are arranged in descending order to form a number.

a) Write down the number formed. ( 1 mark)

b) State the total value of the second digit in the number formed in (a) above. ( 1 mark)

c) Write in figures and give the place value and total value of the fourth digit in the number; seventy two billion, thirty eight million, seventy nine thousand, seven hundred and fifty nine. (3 marks)

(d) (I) Evaluate 875 + 458 - 548 - (80 +78) (1mark)

(II) Find the number which is when subtracted from the sum of 592 and 87 results in 600. (1mark)

(III) The difference between two natural numbers is 196 and the ratio of the two numbers is 9:5. Find the sum of the two numbers. (3 marks)

3. At a display booth at an amusement park, every visitor gets a gift bag. Some of the bags have items in them as shown in the table below.

Items in the gift bag

| Items | Bags |
|---|---|
| Hat | Every 2nd visitor |
| T-shirt | Every 7th visitor |
| Backpack | Every 10th visitor |

a) How often will a bag contain all three items? (3 marks)

b) A rectangular floor measures 6.6 m by 4.2 m. It is to be carpeted using whole square tiles of length 0.6 m packed in cartons that contain 7 tiles each. Calculate the least number of cartons required. (4 marks)

c) When a certain number is divided by 48, 72 or 100 the remainder is 3 in each case. Find the number. ?? (3 marks)

4.(a) Beginning at 8:30 A.M., tours of the National Capitol and the White House begin at a tour agency. Tours for the National Capitol leave every 15 minutes. Tours for the White House leave every 20 minutes. How often do the tours leave at the same time? (3marks)

(b) Find the greatest number which when used to divide 126, 181, and 236, the remainder is always 5. (4 marks)

(c) Find the GCD of $28x^6$, $36x^4$, $16x^3$ (3 marks)

5. (a) Convert $0.\dot{8}\dot{3}$ into a fraction in its simplest form. (3 marks)

(b) Convert $1.5\dot{1}0\dot{5}$ into an improper fraction. (4 marks)

(c) The total mass of 2 sheep and 12 goats is 241.64kg. The mass of each sheep is 69.4kg. Find the average mass of each goat to the nearest kg. (3 marks)

6. (i) Evaluate: $\frac{\frac{5}{6}of\left(4\frac{1}{3}-3\frac{5}{6}\right)}{\frac{5}{12}\times\frac{3}{25}+1\frac{5}{9}\div2\frac{1}{3}}$ **(**4 marks**)**

(ii) Evaluate $\frac{5}{6}+\left(\frac{-2}{3}\right)+\frac{1}{3}-\left(\frac{-2}{3}\div\frac{3}{2}\right)$ (3 marks)

(iii) If x is subtracted from thrice the rational number $\frac{3}{6}$ to obtain the value of $\frac{2}{5}$, then find the value of x. (3 marks)

7. (a) If 231325q is divisible by 9, then find the least value of q (3 marks)

(b) With reasons state whether the following numbers are divisible by 4. (4 marks)

(i) 522

(ii) 1068

(c) If 1051p85 is divisible by 11, then find the least value of p. (3 marks)

8. (a) Find the volume of the rectangular box whose length, l= mn, breadth, b = $m^2p$, depth, d = $pmn^2$. (4 marks)

(b) The sum of the ages of Ganesh and Ramesh is 35. Ganesh is 5 years elder than Ramesh. Find the difference between the ages of Ramesh and Ganesh (3 marks)

(c) Solve $\frac{3x-5}{2}+x+\frac{2x-3}{3}=\frac{5}{6}-\frac{3x}{2}$ (3 marks)

9. Write the following numbers in terms of their prime factors (10 marks)

(i) 30

(ii) 216

(iii) 392

(iv) 5675

(v) 5103

10. (i) Evaluate using squares and square root tables: $(0.096)^2 + \sqrt{124.7}$ (4 marks)

(ii) Use factor method to find $\sqrt{2025}$ (3 marks)

(iii). The surface area of a hemisphere of radius r is given by the formula $A=3\pi r^2$. What is the radius of a hemisphere whose surface area is $50cm^2$? (3 marks)