

456/2

MATHEMATICS

Paper one

July / August 2019

2 ½ hours



KAMSSA JOINT MOCK EXAMINATIONS

**Uganda Certificate of Education
MATHEMATICS**

**Paper Two
2 ½ HOURS**

INSTRUCTIONS

- Answer all questions in section A and any **five** from section B,
- Any additional questions answered will not be marked.
- All necessary calculations must be done on the same page as the rest of the answers.
- Only silent non – programmable scientific calculators may be used.

SECTION A (40 MARKS)

1. Simplify $\frac{4}{7} + \frac{1}{3}$ of $\frac{9}{14} \div 3\frac{1}{7}$ (4marks)
2. Determine the range corresponding to the domain $\{-\frac{1}{2}, 0, \frac{1}{2}, 1\}$ for the mapping $x \rightarrow 4x + 1$ (4marks)
3. Find the equation of a line that passes through the point (2, 4) and is parallel to the line $y - 2x = 6$. State the y – intercept of the new line (4marks)
4. P and Q are two points with position vectors $Op = \begin{bmatrix} 5 \\ 3 \end{bmatrix}$ and $OQ = \begin{bmatrix} -2 \\ 5 \end{bmatrix}$ respectively.
Find
(i) QP
(ii) The angle QP make with the x – axis (4marks)
5. Given that $A = \{\text{Triangular numbers less than 25}\}$
 $B = \{\text{Prime numbers less than 20}\}$
Find $n(A \cap B)$ (4marks)
6. Muzee sold a bicycle at sh. 150,000, making a loss of 25%. Find the cost price of the bicycle. (4marks)
7. On a map, a swamp of area **75km²** is represented by **12cm²**, find the representative fraction of the map (4marks)
8. A certain amount of money was shared between Joseph (J), Peter (P) and Zaida (Z) in the ratio **2:3:6** respectively. If Zaida got Shs. **28,500** more than Joseph, how much did Peter get? (4marks)
9. A car covered 60km at a speed of 30kmh⁻¹, and then the next 150km were covered in 1½ hours. What was the average speed for the whole journey? (4marks)
10. The angle of elevation of the top of a building 42m tall from a point A, due East of the building is 30°. Find the distance of point A from the building (4marks)

SECTION B (60 MARKS)

11.(a) Given that $P(x) = 3x - 5$, find $p^{-1}(10)$

(b) The functions $h(x) = x + 4$, $g(x) = x^2$ and $f(x) = -2x$ find the value(s) of x for which $gh(x) = f(x)$ (12marks)

12. Maya SS has **1020** students. According to the school rules and regulations, students should bathe everyday (**B**), wash their clothes every week (**W**) and iron their clothes (**C**). During a certain month it was found out that out of **102** senior four students, **41** obeyed **B**, **35** obeyed **W** and **52** obeyed **C**. **9** students obeyed **B** and **W**, **10** students obeyed **C** and **W** and **24** students obeyed **B** and **C**. if **15** students obeyed neither rules.

(a) Represent this information on a Venn diagram.

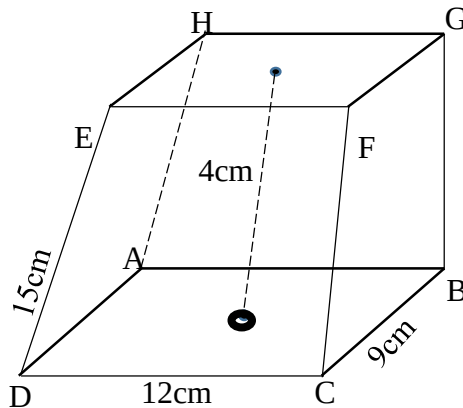
(b) From the Venn diagram, find the number of students who;

(i) Obeyed all the three rules

(ii) Ironed clothes only

(c) If a student is picked at random from senior four, find the probability that he obeyed at least two of the rules (12marks)

13. The figure below shows part of a pyramid whose top was cut off



If $AB = DC = 12\text{cm}$, $CD = 9\text{cm}$, $EF = 4\text{cm}$ and $ED = 15\text{cm}$, Calculate the volume of the Figure

14. Pakwach town is about **420km** from Kampala.

A Gaaga bus leaves Pakwach for Kampala at **10:30 am** travelling at a steady speed of **80kmh⁻¹**. The Bus stopped for **30 minutes** at Karuma check point which is **220km** from Kampala and continues with the steady speed of **60km⁻¹** non – stop up to Kampala. On the same day, a presidential car left Pakwach 2 hours later than the Bus.

The car moved non – stop at a steady speed of **160kmh⁻¹** up to Kampala

On the same axes, draw the distance time graphs for the motion of the two vehicles (**use: 2cm: 40km on the vertical and 2cm: 1 hour on the horizontal axes**)

a) From the graph, find the time and the distance from Kampala when the presidential car overtook the bus

- b) Determine the period of time between the arrivals of the two vehicles (Give your answer in minutes) (12marks)

15.A Community organization gives the following allowances to its employees

Transport	40,000/= per month
Insurance	120,000/= per month
Housing	65,000/= per month
Medical	180,000/= per month
Yaka electricity	20,000/= per month

The tax structure used by the organization is

Taxable income (sh)	Rate (%)
150,001 – 300,000	10
300,001 – 500,000	15
500, 001 – 750,000	20
750,001 and above	30

Given that Charles paid sh. 64,900 as tax, find

(a) Total monthly allowances

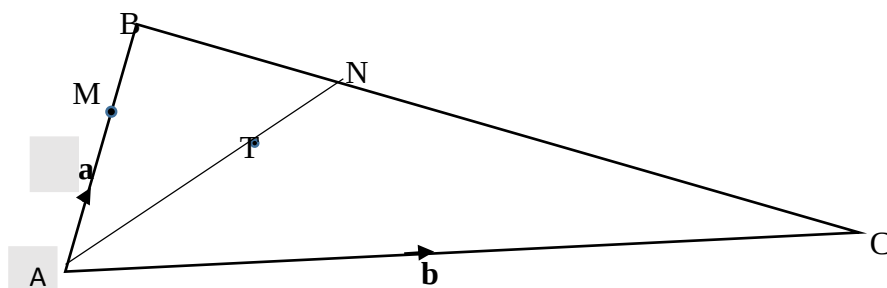
(b) Charles gross salary the percentage of the gross paid as tax (12marks)

16.(a) Express $\frac{7}{2\sqrt{3}-\sqrt{5}}$ in the form $a\sqrt{b} + \sqrt{c}$ where a, b and c are integers and state the value of b

(b) Find the value of $\log_3 27 - \frac{1}{2} \log_3 \frac{1}{9} + \log_3 81$

(c) Given that $125_n = 85_{ten}$, find the value of n (12marks)

17.The triangle ABC, has points M and N on AB and BC respectively such that AM : MB = 1:2. BN = 2NC and T lies on AN such that 3AT = 2AN. Given that AM = a and AC=b



(a) Express the following vectors in terms of a and b

(i) AB

(ii) BC

(iii) BN

(iv) AN

(b) Is M, T and C collinear points?

END