456/2
MATHEMATICS
PAPER 2
July/Aug.2023
2½ Hours

PROVINCIAL - NAMIREMBE DIOCESE
COUHEIA SECONDARY
MOCK EXAMINATIONS 2023

KATONDA AHNZA BYONNA

UGANDA CERTIFICATE OF EDUCATION

MATHEMATICS

PAPER 2

2 hours 30 minutes

INSTRUTIONS TO CANDIDATES:

- *Answer **all** questions in section A and any **five** section B*
- *Any additional question(s) answered will **not** be marked.*
- ***All** necessary calculations must be done in the answer booklets(s) provide.*
- *Therefore, no paper should be given for rough work*
- *Graph is provided.*
- *Silent, non-programmable scientific calculators and mathematical tables with a list of formulae may be used.*

TURN OVER

SECTION A (40 MARKS)

Answer all questions in this section.

1. Solve the equation $(128 \times 0.5)^x = \frac{1}{16}$. (04 marks)

2. In a class of 120 students, 76 like fish (F), 25 like meat (M) only and 60 like both fish and meat. How many students like neither F nor M? (04 marks)

3. A line has x-intercept given by point A(-2,0) and a y- intercept given bypoint B(0,4). Find the equation of the line AB and the coordinates of the mid-point M. (04 marks)

4. Express 1.633… in the form $^a/_b$; where a and b are integers. (04 marks)

5. The function $f(x) = \frac{x-4}{x-2}$, determine $f^{-1}(x)$. (04 marks)

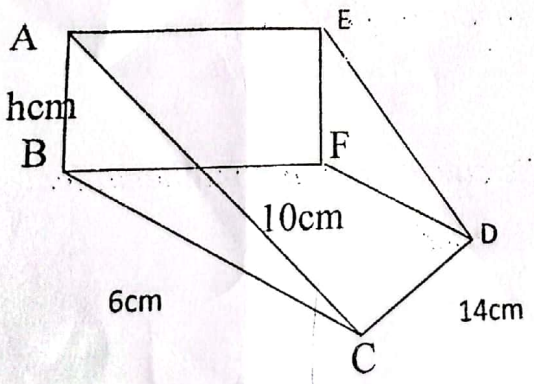
6. A cube has length of each side $2xcm$ and its volume is $216cm^3$.Find the length of each side. (04 marks)

7. Given that $\boldsymbol{a} = \begin{pmatrix} 12 \\ -15 \end{pmatrix}$ and $\boldsymbol{b} = \begin{pmatrix} 4 \\ 11 \end{pmatrix}$,find $\left|\frac{1}{3}\mathbf{a} + \mathbf{b}\right|$. (04 marks)

8. If $log_b\, a = 3$ and $ab = 81$, find the values of a *and* b. (04 marks)

9. A man deposited shs. 20,000,000 on his fixed deposited account in a bank. The bank gives a compound interest of 2% per annum. Calculate the amount, the man will receive at the end of 4 years. (04 marks)

10. The surface area of the prism below is $384cm^2$. $AB = h\ cm$ $BC = 6cm$, AC=10cm and $CD = 14cm$. Find the value of h. (04 marks)



SECTION B (60 MARKS)

Answer any five questions from this section.
All questions carry equal marks

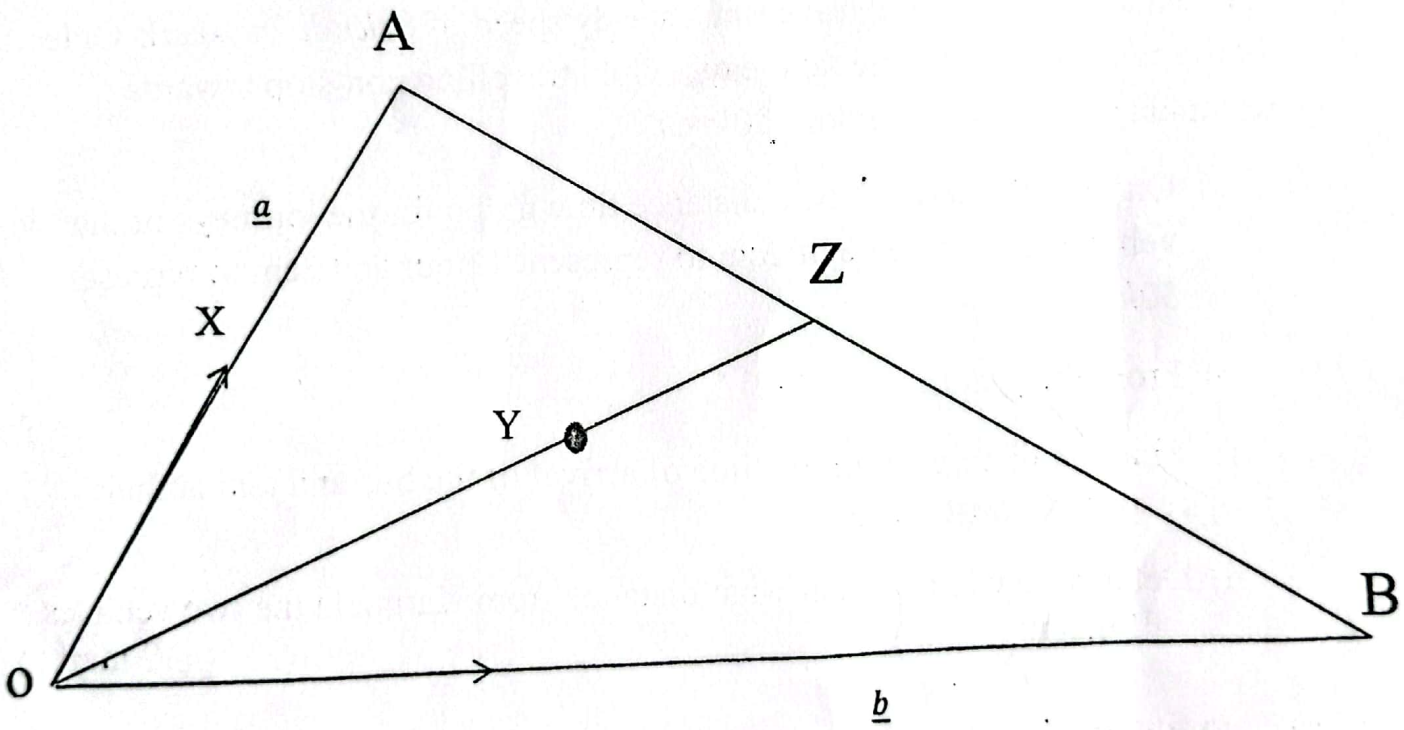
11a) An area of $75km^2$ is represented by $12cm^2$ on the map. Determine the scale factor of the map.

b) The cost **C** of printing success cards is partly constant and partly varies asthe number of cards, n. It cost shs 40,000 to print 500 cards and shs 64,000 to print 900 cards.

i. Form an equation for the cost **C** and the number of cards, n.

ii. What would be the cost of printing 700cards? (12 marks)

12 . OAB is a triangle, $\overrightarrow{OA} = \boldsymbol{a}$ and $\overrightarrow{OB} = \boldsymbol{b}$, point X *and* Z are points on the lines $\overline{OA}$ *and* $\overline{AB}$ Such that they divide the lines in the ratio 1:2 and 3:1 respectively. Point Y lies on OZ such that $\overrightarrow{OY} = 2\overrightarrow{YZ}$.



a) Find the vectors **AB**, **OZ** and **XB** in terms of vectors $\boldsymbol{a}$ and $\boldsymbol{b}$.

b) Show that the points B, Y and X are collinear. (12 marks)

13. In a school, there are 150 students offering mathematics (M), physics(P) and chemistry (C) subjects.

Given that n(M)= 66, n(P) =58 , n(C) =57; n(MnP)=10, n(PnC)=11 , n(MnC) =13, n(MnPnC) = x and $n(M^1nP^1nC^1)=0$.

a. Show this information on the venn diagram.

b. Find the number of students who offer all the three subjects.

c. What is the probability that a student chosen at random does not do mathematics.

(12 marks)

14. The distance from Kampala to Gulu is 360km. An express bus leaves Kampala at 6:30 a.m and travels at a steady speed of $80kmh^{-1}$ towards Gulu. At the same time ,a Drone taxi leaves Gulu travelling non-stop towards Kampala at a steady speed of $100kmh^{-1}$.

a) On the same axes draw a distance time graph for the journeys of the two vehicles , use a scale of 2cm to represent 1 hour and 2cm to represent $50km$.

b) From the graph:

i) Find the difference in the time of arrival of the bus and taxi at their respective destinations.

ii) Determine when, and at what distance from Kampala the two vehicles will meet.

(12 marks)

15.a) Two functions f *and* g are defined as; $f(x) = x^2 - 1$ *and* $g(x) = x + 3$. Find the value of x if $fg\,(x) = f(x)$

(04 marks)

b) Given that $f(x) = x^2 - 9$, find the values of x for which $\frac{1}{f(x)}$ is not defined.

(04 marks)

C) If $f(x) = \frac{x^2+2}{2x-1}$, find the values of x for which $f(x) = 2$.

(04 marks)

16 The table below shows the income tax rates of government employees.

INCOME PER ANNUM	TAX RATE %
1,200,001- 2,400,000	10%
2,400,001- 3,600,000	20%
3,600,001- 4,800,000	30%
4,800,001- 6,000,000	40%
6,000,001 and over	55%

An employee has annual income of shs 8,446,800. Including non taxable monthly allowances given below.

Housing and transport 15% of gross monthly income

Marriage allowance shs. 1,518,000 per year

Medical care 576,000 per Annum

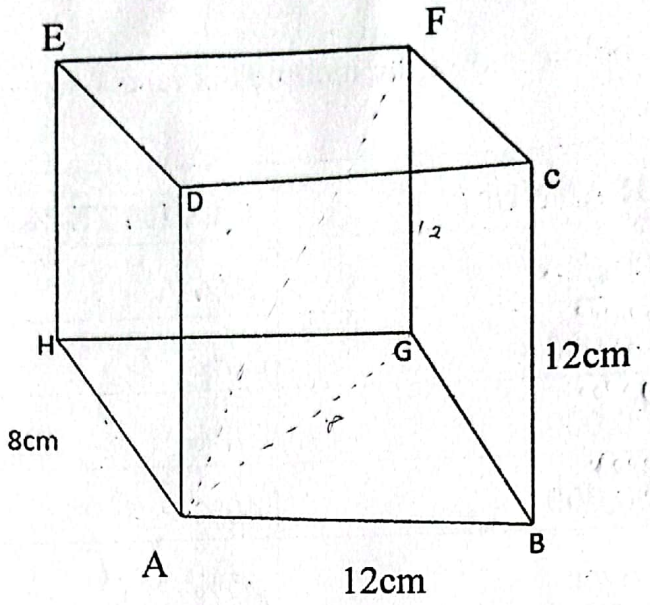
Find his:

a) Taxable income per month:

b) Monthly net income.

(12 marks)

17. The figure below shows a cuboid ABCDEFGH



Calculate the:

a) length AF; (04 marks)
b) angle between the line AF and the plane ABGH (04 marks)
c) angle between the planes ABFE and ABGH (04 marks)

END