

456/2

MATHEMATICS

Paper 2

July - August 2017

2 ½ hours



**KAYUNGA SECONDARY SCHOOLS HEAD TEACHERS AND PRINCIPALS
ASSOCIATION (KASSHPA)
JOINT MOCK 2017
MATHEMATICS
PAPER TWO
2 HOURS 30 MINUTES**

INSTRUCTIONS TO CANDIDATES

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

SECTION A: (40 MARKS)Answer **all** questions in this section

1. If $g(x) = 4 - x^2$ and $h(x) = 2x + 1$. Find;
(i) $hg(x)$
(ii) $hg(4)$ (04 marks)
2. Use logarithm table to evaluate; $\frac{4.43 \times 0.41}{0.013}$ (04 marks)
3. Given that position vectors $\mathbf{OP} = \begin{pmatrix} 4 \\ 3 \end{pmatrix}$ and $\mathbf{OQ} = \begin{pmatrix} 4 \\ -1 \end{pmatrix}$. Find the magnitude of \mathbf{PQ} . (04 marks)
4. The number of people who play football, (F) or basket ball (B) is twice the number of people who play F and B. If $n(F) = 9$ and $n(B) = 6$ how many play both games. (04 marks)
5. Find the equation of a line passing through the point $(0, -5)$ and is perpendicular to the line $y + 3x = 1$. (04 marks)
6. Given that vector $\mathbf{OA} = \begin{pmatrix} -2 \\ 1 \end{pmatrix}$ and $\mathbf{OB} = \begin{pmatrix} 7 \\ 4 \end{pmatrix}$, find the magnitude of vector
$$\mathbf{P} = \mathbf{OA} + \frac{2}{3} \mathbf{AB}.$$
 (04 marks)
7. Six boys, three girls and father shared shs. 360,000 in the ratio of 4:5:3 respectively. Find how much each girl got. (04 marks)
8. Find the coordinates of the points of intersection of the curve. $y = 5x^2 - 13$ and the line $y = 7$. (04 marks)
9. Solve the equation: $\log_2(3x - 5) - 1 = \log_2 x$. (04 marks)
10. On a map whose scale is 1:50000, a swimming pool is represented by an area of 8cm^2 . Calculate the actual area of the swimming pool. (04 marks)

SECTION B: (60 MARKS)Answer any **five** questions from this section

All questions carry equal marks

11. (a) Given that $h(x) = \frac{4+8x}{x^2-4} + \frac{2}{x+2}$ by first expressing $h(x)$ in the form $\frac{nx}{x^2+m}$ find,
- (i) the values of x for which $h(x)$ is undefined
 - (ii) $h(4)$ (07 marks)
- (b) Given that $f(x) = x^2 - 7$ and $g(x) = x + 1$, find $fg(x)$ and simplify the expression. (05 marks)
12. Districts P and R are 500km apart. A bus left P and traveled towards R at an average speed of 60km/hr. After $2\frac{1}{2}$ hrs, a car left P and travelled along the same road at an average speed of 100km/hr
- (a) Find the;
 - (i) distance of the bus from R when the car took off
 - (ii) distance the car traveled to catch up with the bus.
 - (b) Immediately as the car caught up with the bus, the car stopped for 25 minutes. Find the new average speed at which the car travelled in order to reach R at the same time as the bus. (12 marks)
13. In a workshop, 30 guests speak Arabic (A), 25 speak German (G), 10 speak French (F) and Arabic (A), 4 speak French and German only. The number of guests who speak French and Arabic only are two more than those speaking neither language. If $n(A \cap G \cap F) = 3$, $n(A \cap G \cap F') = n(A' \cap G \cap F') = x$ and the probability that a guest speaks at least two languages is $\frac{1}{3}$, use a Venn diagram to find;

- (i) The value of x
- (ii) How many guest speak only one language
- (iii) $n(\varepsilon)$ where ε is the universal set.
- (iv) The percentage of guest speaking German only. (12 marks)

14. Ojok’s gross monthly salary is shs. 1,200,000, with the following allowances:

- Medical shs 600,000 per annum
- Marriage one fifth of the gross monthly income
- Unmarried shs. 200,000 per month
- Family allowance for one child at the following rates;
 - A child below 10yerars shs 150,000
 - A child above 10 years shs. 100,000

Ojok is married with two sons; One aged 7 years and other 12 years.

The monthly income tax is calculates as follows.

Taxable income (shs)	Tax rate (%)
01 300,000	20
300,001 500,000	25
500,001 900,000	30
900,001 and above	40

Calculate Ojok’s monthly;

- (i) Taxable income
- (ii) Income tax
- (iii) Net income (12 marks)

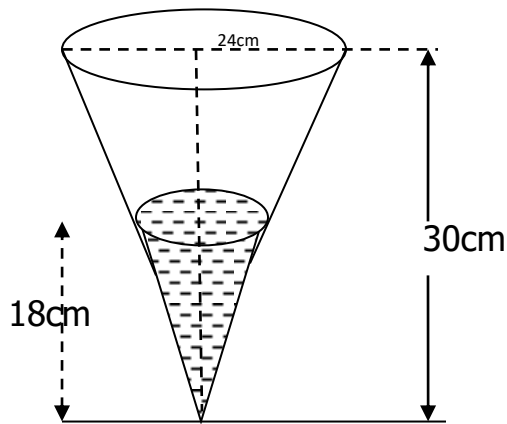
15. A quantity M is partly constant and partly varies as N^2 , when $N=2$, $M=40$. When $N=3$, $M=65$.

a) Form an equation relating M and N.

b) Determine the values of N when $M = 100$.

(12 marks)

16. The diagram below show a right cone shaped flask of base radius 24cm and depth of 30cm contain water at a depth of 18cm.

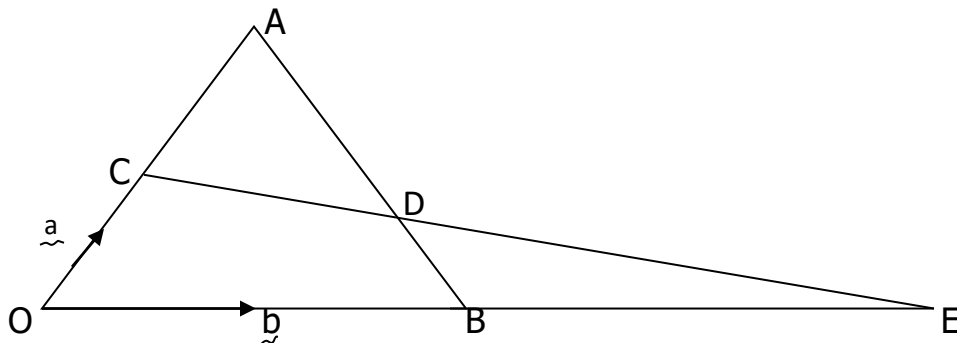


Calculate;

- (i) the radius of the surface of the water.
- (ii) Volume of the water
- (iii) Volume of the whole cone

(12 marks)

17. In the diagram below, $\mathbf{OA} = \mathbf{a}$, $\mathbf{OB} = \mathbf{b}$, $\mathbf{OC} = \mathbf{CA}$, $\mathbf{OB} = \mathbf{BE}$ and $\mathbf{BD} : \mathbf{BA} = 1 : 3$.



a) Express in terms of \mathbf{a} and \mathbf{b}

i) **BA** ii) **BD** iii) **CD** iv) **CE**

b) Find the ratio of **CD: DE**

(12 marks)

END