456/2
MATHEMATICS
Paper 2
JULY / AUGUST, 2022
$2\frac{1}{2}$ *hours*

JINJA JOINT EXAMINATIONS BOARD

Uganda Certificate of Education

MOCK EXAMINATIONS – JULY / AUGUST, 2022

MATHEMATICS

Paper 2

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

Answer **ALL** *questions in Section* **A** *and* ***not more than*** **FIVE** *from section* **B.**

Any additional question(s) answered will not be marked.
All necessary calculations must be shown and should be done on the same page as the rest of the answer.

Mathematical tables and graph papers are provided.

Silent, non-programmable scientific calculators may be used.

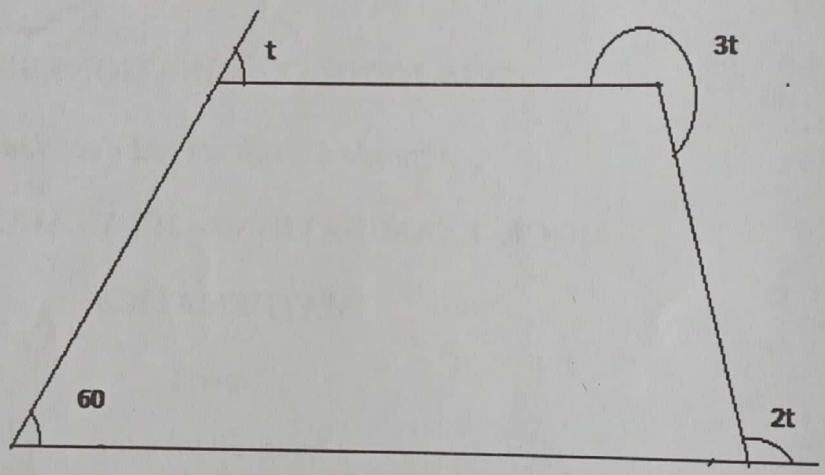
SECTION A (40 MARKS)
Attempt all questions.

1. Express $\frac{10^3 \times \sqrt{45}}{10^2 \times \sqrt{180}}$ leaving your answer in scientific notation.
[04 marks]

2. If the points (3, 5), (-2,-3) and (13, d) are collinear, find the value of d.
[04 marks]

3. In a class of 50 students, 40 like Mathematics, 38 like Physics and 4 do not like any of the two subjects. Determine the number of students who like;
(a) Both subjects
(b) At least one subject
[04marks]

4. Find the value of t in the figure below;



5. Solve for y in the logarithmic equation below;
$5log_{10} y + log_{10} 5 = 1 + 2log_{10} 4$
[04 marks]

6. Given that f (x) = 2x + 3 and g(x) = 5x – 2.Find the value of x for which gf(x) = g(x).
[04 marks]

7. A certain amount of money was invested for 4 years at a rate of 6% per annum simple interest. If the interest was 360,000/=. Find the amount that was invested.
[04marks]

8. A farmer originally stored water in a cylindrical tank of diameter 10m and height of 4 m, This tank has since been replaced by similar tank of Diameter 15m and height 4m, find the ratio of capacity of the first tank to that of the second. [04marks]

9. Factorise completely; $9x^2 - (x-3)^2$ [04marks]

10. Mr Wambwa cycled a distance of 5.4 km to school and he took 6 minutes. Find his average speed in;
(a) Km per hour
(b) Metres per minute [04 marks]

SECTION B [60 MARKS]

11.
(a) Simplify ; $12^{\frac{2}{3}} \times 6^{\frac{2}{3}} \times 8^{\frac{1}{3}} \times 3^{\frac{2}{3}}$ [06marks]

(b) The height (h) of a cylinder varies directly as the volume (V) and inversely as the square of its radius (r). If the V = $540cm^3$, r = 7cm and h= 10cm.
(i) Find the constant of proportionality
(ii) Find the value of h when r = 3.5cm and V = $308cm^3$
[06 marks]

12. There are 42 students in senior four blue. All the students in this class study sciences. 20 students study Physics, 24 study Chemistry, 28 study Biology, 4 students study Physics and Chemistry only, 12 study Physics and Biology, 7 students study Biology and Chemistry only.
(a) Draw a Venn diagram and represent the above information on the Venn diagram.
(b) Determine the number of students who study ;
(i) All the 3 subjects
(ii) Physics and Biology but not Chemistry
(iii) Chemistry only
(iv) At least two subjects [12marks]

13.
(a) The marked price of a Television is 780,000/=. A discount of 5% is given to a customer who pays cash. Or it can be bought through Hire purchase terms by paying a deposit of 100,000/= and 18 monthly instalments of 50,800/- each. Calculate;

(i) The cash price of the television
(ii) The extra amount paid for one who bought the television on hire purchase terms. [06marks]

(b) A hoofer valued 650,000/=depreciates at a rate of 10% in the first year and 20% for the next 2years.What will be the value of the hoofer after 3 years. [03 marks]

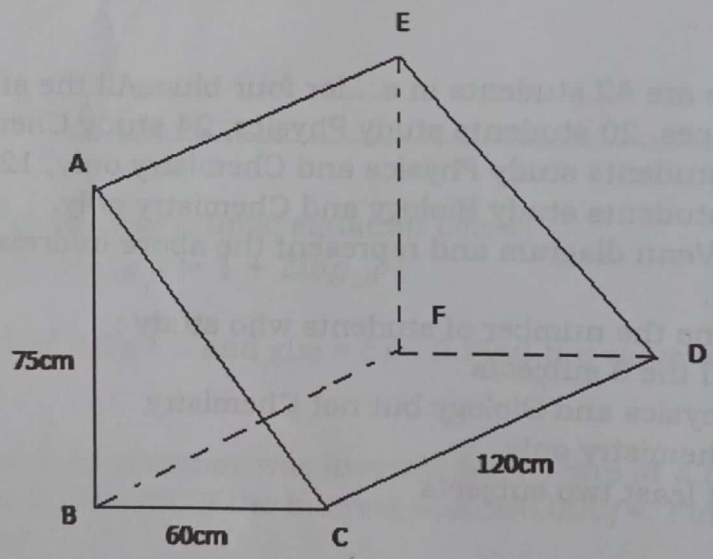
(c) It would take 150 men to dig a trench 2400m long in 80 days. Find how many days it would take 180 men to dig a trench 600m long working at the same rate. [03 marks]

14. Given that $f(x) = \frac{6x-30}{2x^2-50}$ and $g(x) = \frac{21}{x^2+3x-10}$

(a) Find;
(i) f(4)
(ii) f(x) + g(x)

(b)Find the value of x for which
(i) f (x) is not defined
(ii) g (x) not defined [12marks]

15. The figure below shows a tent in the shape of a wedge in which ABC and EFD are similar right angled triangles, AB = 75cm BC = 60cm and CD= 120cm.



Calculate;
(i) Length CF and CE
(ii) Angle between AD and plane BCDF
(iii) Angle between planes ABFE and ACDE. [12marks]

16.

(a) Given a line $2y + 3x - 4 = 0$, Find the equation of the line through;

(i) (4,1) and is parallel to $2y + 3x - 4 = 0$

(ii) (6,2) and is perpendicular to $2y + 3x - 4 = 0$ [06marks]

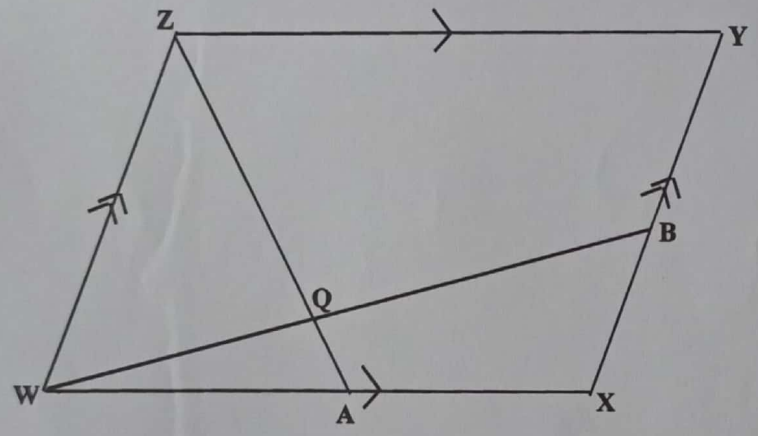
(b)

(i) The line $3x + y = 11$ meets line $x - y - 1 = 0$ at point R. Determine the coordinates of point R.

(ii) Find the equation of the line which is a perpendicular bisector of the line through points R and (1, 8). [06marks]

17. In the parallelogram below WXYZ, a point A is a midpoint of $\overline{WX}$ and B divides $\overline{XY}$ in the ratio 1:2, where; **WX = c, WZ = d,**

WQ = m **(WX + XB), ZQ** = n **(ZW + WA)**



Express in terms of **c** and **d**;

(a)

(i) $\overrightarrow{ZB}$

(ii) $\overrightarrow{WB}$

(iii) $\overrightarrow{ZA}$

(b) If $\overline{ZQ}$ and $\overline{ZA}$ intersect at Q ,find the ratio of ;

(i) $\overline{ZQ} : \overline{ZA}$

(ii) $\overline{WQ} : \overline{WB}$

[12marks]

End