456/2

MATHEMATICS

Paper 2

July/August 2017

2 ½ hours

ASSHU – RWENZORI REGION ACADEMIC BOARD (ARRAB)

Uganda Certificate of Education

MOCK EXAMINATIONS

MATHEMATICS

Paper 2

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

*Answer **all** questions in section **A** and any five from section **B**.*

*Any additional question(s) answered will **not** be marked.*

*All necessary calculations **must** be shown clearly with the rest of the answer. 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.

©Asshu- Rwenzori Region Academic Board – Mock 2017

SECTION A (40 MARKS)

*(Answer **all** questions in this section).*

1. Given that h(x)= $2x^2 - bx + 3$ and h(2) = 13, find the value of b. (04 marks)

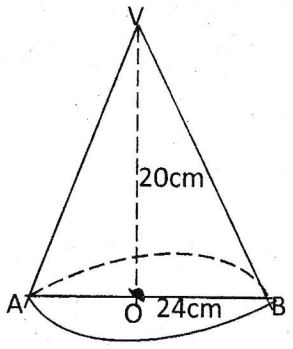
2. Find the distance between the points **A** (-1, 3) and **B** (-5, 6). Given your answer to one decimal place. (04 marks)
3. Given that $n(\varepsilon) = 24$, n(p') = 15, n(Q) = 11 and n(p'∩Q') = 8. Find n(p∩Q') (04 marks)

4. Solve for x in $log_{10}^{(x^2-9)} = 1 + log_{10}^{(x-3)}$ (04 marks)

5. Express $\frac{2}{\sqrt{5}-\sqrt{3}} - \frac{1}{\sqrt{5}+\sqrt{3}}$ in the form $\frac{a\sqrt{b}+\sqrt{c}}{2}$ (04 marks)

6. If vectors $\boldsymbol{p} = \begin{pmatrix}3\\2\end{pmatrix}$ and $\boldsymbol{q} = \begin{pmatrix}\frac{3}{2}\\3\end{pmatrix}$, find the length of $\frac{1}{2}\boldsymbol{p} + 3\boldsymbol{q}$. (04 marks)
7. Line AB passes through points A(P, 4) and B(2, 6) and is perpendicular to line 4y + x = 8. Find the value of P. (04 marks)
8. If an area of 4cm² on a map represents an area of 576km² on land. Find the representative fraction (R.F) of the map. (04 marks)
9. A cylindrical tank of radius 0.7m has a capacity of 2700m³. Find the radius of a similar tank of capacity 100m³. (04 marks)

10.



The figure above shows a cone whose diameter AB is 24cm and perpendicular height $\overline{Ov}$ is 20cm. Determine the slant height BV. (04 marks)

SECTION B (60 MARKS)

*(Answer any **five** questions from this section. Questions carry equal marks).*

11. (a) Given that $f(x) = \frac{x^2}{3} + 5$, find

(i) $f(2)$ (02 marks)

(ii) the value of x for which $f(x) = 17$ (03 marks)

(b) Given that $g(x) = x^2 + 1$ and $h(x) = x - 3$. Find the value of x for which $gh(x) = hg(x)$. (07 marks)

12. In a certain training institution, students must take atleast one of the following subjects Art (A), Music (M) and Physical education (P). Of the 70 students in first year, none takes physical education and music. 26 take Physical education only. Out of the 35 taking Art, 20 have specialized in this subject alone. The number of students taking physical education and art is three more than the number taking Art and Music.

(a) Using a Venn-diagram, find the number of students taking Art and Music. (06 marks)

(b) Determine the number of students who take music. (04 marks)

(c) What is the probability that a student picked at random takes only one subject. (02 marks)

13. (a) If the exchange rate of Kenyan shilling to Ugandan shillings is 1k shs = 24Ug. shs and an American dollar to Ugandan shillings is 1$ = 1950 Ug.shs. How many American dollars would one get in exchange for Kshs. 24375? (03 marks)

(b) A man bought 3 cows at 580,000 each. He sold one cow at 15% profit. He sold the second cow at 10% profit and he sold the third cow at a loss of 12%. Find the percentage profit on the whole deal. (09 marks)

14. It is estimated that the distance from Kabale town to Kagadi town is 360Km. A Kalita express bus leaves Kabale town at 6:30pm and travels at a steady speed of 80km/hr towards Kagadi town. At the same time a Horizon coach bus leaves Kagadi town travelling nonstop towards Kabale town at a steady speed of 100km/hr.

(a) On the same axes draw distance time graphs for Kalita express bus and a Horizon coach bus. (Use the scale 2cm: 1 hour on the horizontal axis and 2cm: 40km on the vertical axis) (06 marks)

(b) Use your graph to find:

(i) when and at what distance from Kabale town the two buses meet. (02 marks)

(ii) the difference in times of arrival of two buses. (04 marks)

15.(a) Evaluate $\dfrac{2\frac{3}{4}+7\frac{2}{3}\div 3\frac{5}{6}}{3\frac{1}{2}-1\frac{5}{6}\,x\,\frac{3}{11}}$ (04 marks)

(b) The daily cost per teacher in Kabarole district is partly constant and partly inversely proportional to the number of teachers in school. Given that the cost per teacher in a school of 10 teachers is sh. 4500 and for a school of 20 teachers it is sh. 4000. Find the cost per teacher for a school of 50 teachers. (08 marks)

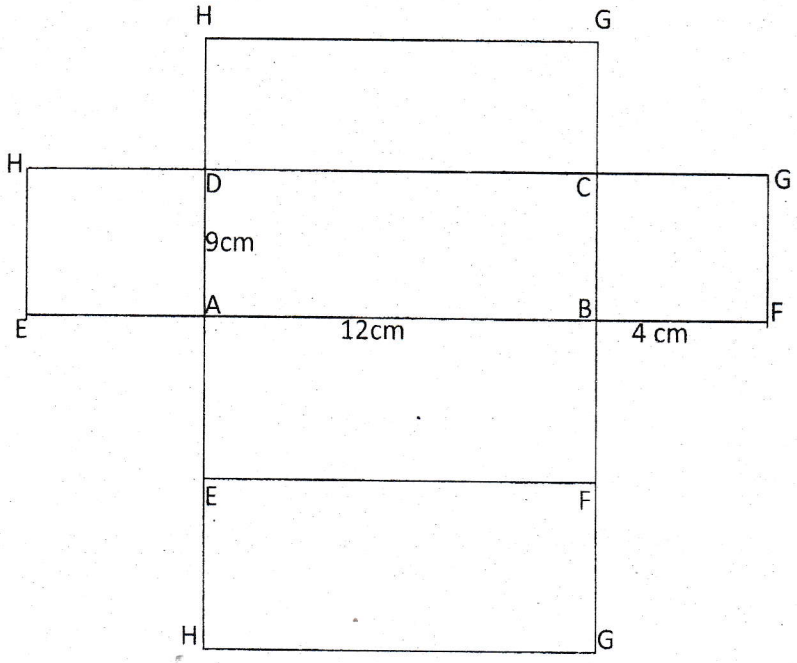
16. In a triangle OAB, M is a point such that **OM** = $\frac{2}{3}$ ***OA*** and N is the mid point of **AB**. The point L on OB is such that **OB = BL**. Given that OA = **a** and OB = **b**

(a) Determine in terms of vectors **a** and **b**

(i) **OM** (ii) **ON** (iii) **MN** (iv) **NL** (09 marks)

(b) Hence show that M, N and L lie on a straight line. (03 marks)

17.The diagram below is a net of a cage used to keep puppies on a given farm.



(a) Given that AB = 12cm, AD = 9cm and BF = 4cm. construct a well labeled cuboid from the net above given that ABCD is made the base. (02 marks)

(b) Calculate the following lengths in the cuboid.

(i) AG (ii) AF (04 marks)

(c) Find;

(i) the angle between line AG and the plane ABCD. (02 marks)

(ii) The angle between AGF and EFGH. (04 marks)

END