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MATHEMATICS
Paper 2
AUGUST, 2019
$2\frac{1}{2}$ *hours*

JINJA JOINT EXAMINATIONS BOARD

Uganda Certificate of Education

MOCK EXAMINATIONS – AUGUST, 2019

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.

 Turn Over

SECTION A (40 MARKS)

Attempt all questions.

1. The gradient of a line passing through points K (-4, 16) and L (12,2t) is ½.Find the value of t. **[04 Marks]**
2. Given that $p(x) = log_3\ x \quad and \quad q(x) = 9^x \quad find\ pq(6)$ **[04 Marks]**
3. In a school of 270 students, 110 are girls and 210 students stay at school for lunch. If 50 of the girls go home, how many of the boys do not stay at school for lunch? **[04 Marks]**
4. Mwenekira High school is located on a stretch of land of area 45 km^2.On a map, its area is7.2cm^2.Determine the scale of the map. **[04 Marks]**
5. Given that; $T = R + \sqrt{3 + 2P}$,express P in terms T and R hence evaluate P if T=6 and R=2 **[04 Marks]**
6. The points A and B are position vectors, **OA**=$\begin{bmatrix}2\\8\end{bmatrix}$and **OB**=$\begin{bmatrix}8\\6\end{bmatrix}$. M is a point on AB such that $\overline{AM}$: $\overline{AB}$ =1:2 .Find the vector **OM.** **[04Marks]**
7. Akiteng's net income per month is 417,000/=. She is entitled to an allowance of 45,000/=per month and she pays a tax of 23,000/=. Calculate her:
   (i) Gross monthly income
   (ii) Taxable income **[04 Marks]**
8. A motorist travels 100km at 40km/hr then 40km in 1 hour 40minutes.Calculate the average speed for the whole journey. **[04 Marks]**
9. A pyramid on a rectangular base measures 5cm by 4cm, the vertical height is12cm . Draw the pyramid and find the angle between the opposite faces with base 5cm. **[04 Marks]**
10. From the height h metres above sea level, it is possible to see a distance of approximately d kilometres, where d and h are connected by the formulae $3d^2 = 37h$.What distance can be seen from a height of 20m? (Give your answer to 2 significant figures). **[04Marks]**

SECTION B [60 MARKS]

Answer **only** five questions in this section

11. (a) Given that $f(x) = 2x + 8$ *and* $fg(x) = x - 3$. Find ;

(i) $g(x)$*hence* $g(15)$

(ii)$g^{-1}(x)$

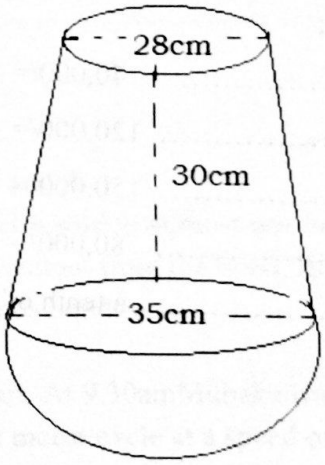
(iii) $gf(x)$ **[08Marks]**

(b)Find the value of x when ;

(i $f(x) = g(x)$

(ii) $\frac{f(x)}{g(x)}$is meaningless. **[04 Marks]**

12. The figure below shows two solids a frustrum from a cone and a hemisphere joined together. The diametres of the top and bottom of a frustrum are 28cm and 35 cm respectively. The frustrum is 30cm high. As shown below.



Calculate;(a) The original height of the cone **[03 Marks]**

(b)Volume of the solid **[09 Marks]**

13. (a) Solve for y if $81^{\frac{1}{4}} \div y^{\frac{1}{3}} = 6$ **[04Marks]**

(b) The fare (F) for a person in Iganga Bus going to Kampala is partly constant and partly varies as the square root of the passengers (n) in the bus. If the fare of 12,300/= is paid when there are 100 passengers and 14,700/= when there are 144 passengers. Find how much is paid when the bus takes 81 passengers. **[08 Marks]**

14. The tax structure in a certain country on taxable income is as follows:

Taxable Income (shs)per month	Tax Rates (%)
120,001 – 280,000	9.5
280,001 – 480,000	12.5
480,001 – 880,000	20
Above 880,000	28

Mr. Anguyo's gross monthly income is 850,000/=. He is entitled to the following allowances;

Transport..... 40,000/= per month

Medical ..... 120,000/= per annum

Insurance ..... 150,000/= per annum

Housing ..... 80,000/= per month

Family ..... a tenth of gross pay.

Calculate;

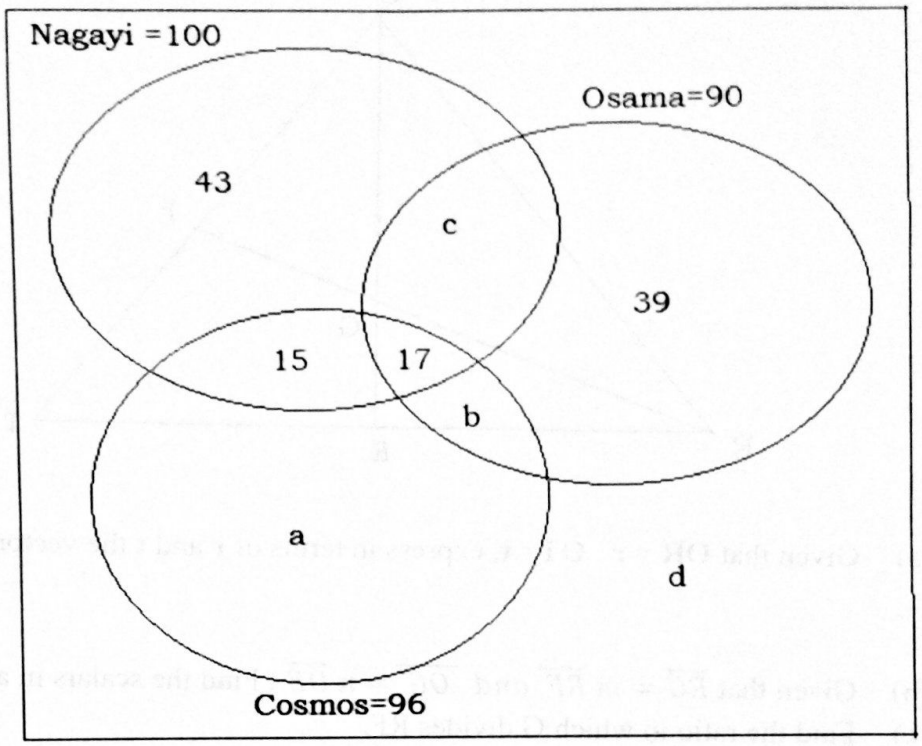
(a) His monthly taxable income

(b) Tax paid annually

(c) His monthly net income to the nearest dollar if

1$(US dollar) =UGX.3650/=. **[12 Marks]**

15. The Venn diagram below shows 250 types of vehicles being sold in 3 bonds in Uganda, namely in Nagayi, Osama and Cosmos bonds.



(a) Find the values of a, b, c and d. **[08 Marks]**

(b) Find the number of vehicles sold in at most one bond. **[02 Marks]**

(c) If a vehicle is picked at random from the bond, find the probability that it is Nagayi and Osama but not Cosmos bond. **[02 Marks]**

16. Town A and B are 600km apart. At 9.30amMubaka was120km away from town A moving towards Town B on a motor cycle at a speed of 80km/hour, when Byakuno set off from town A in a saloon car moving nonstop at 100km/hour towards town B. At 2.42pm Byakuno overtook Mubaka and they continued their journey. By using calculations without drawing the graph, determine;

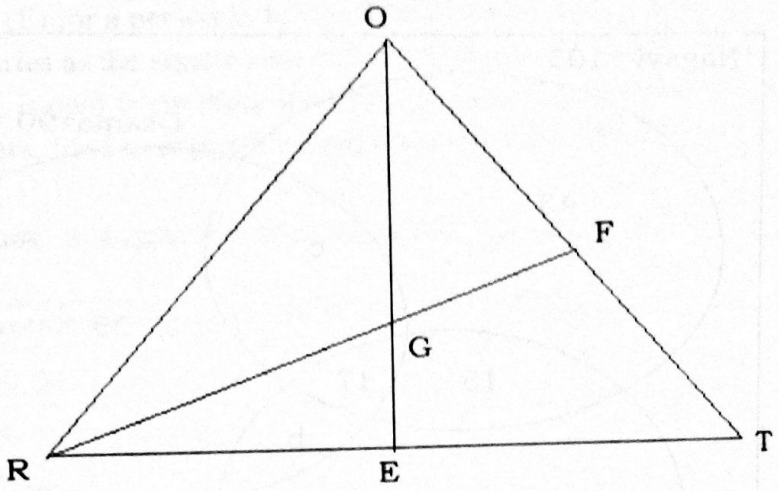
(i) The distance from A when Byakuno overtook Mubaka.

(ii) The time when Mubaka set off from town A.

(iii) The time(s)when Byakuno and Mubaka arrived at Town B.

(iv) Difference in time(s) of arrival of the two men. **[12 Marks]**

17. In the figure, E is a midpoint of RT, F is on T such that $\overline{OF}:\overline{OT} = 3:5$ and G is the point of intersection of lines OE and RT.



(a) Given that **OR** = **r** , **OT**= **t**, express in terms of **r** and **t** the vectors $\overrightarrow{OE}$ and $\overrightarrow{RF}$ **[04 Marks]**

(b) Given that $\overrightarrow{RG} = m\,\overrightarrow{RF}$ and $\overrightarrow{OG} = n\,\overrightarrow{OE}$. Find the scalars m and n. **[05Marks]**

(c) Find the ratio in which G divides RF. **[03 Marks]**

End