456/1

MATHEMATICS

Paper 1

Jun/Jul. 2024

2 ¼ hours

DIOCESE OF KIGEZI

CHURCH OF UGANDA

Uganda Certificate of Education

MATHEMATICS (456/1)

TIME: 2hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

This paper consists of **two** *sections;* **A** *and* **B**. *It has* **six** *examination items.*

Section **A** *has* **two** *compulsory items.*

Section **B** *has* **two** *parts;* **I** *and* **II**. *Answer* **one** *item from each part.*

Answer **four** *examination items in all.*

Any additional item(s) answered will **not** *be scored.*

All *answers* **must** *be written in the Answer booklet(s) provided.*

Graph Paper is provided.

Silent, non-programmable scientific calculators and mathematical tables with a list of formulae may be used.

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SECTION A

All questions are compulsory

Item one:

John plans to visit the shop that is **12km** south of his home and then the boutique that is **5km** east of the shop and after drive back home using a direct route from the boutique to home. He is to use his motorcycle that consumes **0.035liters** of fuel per km and he wants to know how much fuel he will need for the whole journey.

He has seven hundred fifty thousand Uganda shilling. He plans to use part in the shop and part in the boutique in the ratio of **3:2** respectively. He wants to spend **UGX.210,000** to buy shirts and **UGX.120,000** to buy trousers. However, he is not sure if his budget for the boutique will be enough.

From the shop, he is to buy **24** packets of cooking oil, **12** packets of sugar and **30** packets of salt. All of these are to be used to make packages for some of his family members in the village. He wants each package to have an equal number of items in it. He needs to know the highest numbers of packages he can make from them.

Task:

a) How much fuel will he need for the whole journey?

b) Will the money he plans to use in the boutique be enough for what he plans to buy? Justify your answer.

c) How many packages will he make from the items he plans to buy?

Item two:

A certain catering and decoration company was called to cook **100kg** of rice at a certain party. According to their cooking notes, they put **22.5 liters** of water in **10kg** of rice and **67.5 liters** 0f water in **30kg** of rice. They want to use those notes to know how many liters to use in the rice they are ordered to cook but they are finding it hard.

The customer wants a tent at less than **UGX.250,000** and chairs at**UGX.200,000** at most. However, to maximize profit, the company wishes to provide both at **UGX.400,000** at least. The company is finding it hard to decide on how much to charge the customer for the two items respectively.

Task:

a) (i) Form a mathematical relationship between the quantity of rice and liters of water used to cook it according to their notes.

(ii) Use the relationship developed to help them determine the liters they will use in the rice they are ordered to cook.

b) (i) Form inequalities that are making it hard for the company to decide on how much to charge the tents and chairs respectively.

(ii) Use the inequalities, to help them decide on how much to charge for the tents and chairs respectively.

SECTION B

PART ONE (Attempt one item from this part)

Item three:

Your friend wants to sell dresses in your home area according to age. She requests you to recommend the dresses of a specific age he can display for most.

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You gathered and summarized data to use it and find out the age of the majority of people in the community such that you recommend that. Below is the summery of your data:

Age groups (years)	30 – 34	35 –39	40 – 44	45 – 49	50 – 54	55 – 59
Number of people.	6	3	13	7	4	3

Task:

a) (i) What age is the majority of the people in the community?
(ii) What is the probability that your friend will succeed if he sews the dresses of that specific age?
(iii) According to the probability, is your recommendation a good choice? (Justify your answer).

Item four:

For your leaver's party campaign, members suggested that you buy and put on T-shirts as a class. You have three suggestions of sizes of T-shirts you can buy these are; Small size(S), Medium size (M) and Large size (L) T-shirts.

You will only buy the suggestion as the captain if **70%** of your fellow students can fit in at least two sizes. Below are your findings that you are going to base on to make a decision:

- The number of students who fit in medium size is equal to those who fit in large size and they are **100**.
- The number of students who fit in small size is **76**.
- Those who fit in small size and large size are **50**.
- Those who fit in medium size and large size are **70**.
- Those who fit in small size and medium size are **60**.
- Those who fit in none of the sizes are **4**.
- Some students fit in all the three sizes.
- The class is made up of **140** students.

Task:

a) Will you buy the suggestion of buying and putting on T-shirts as a class for your leaver's party campaign? Justify your answer.

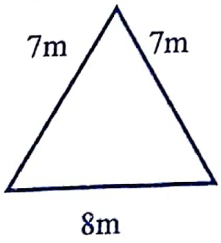
PART TWO

Attempt **one** item from this part

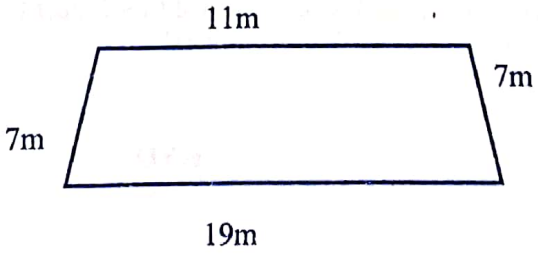
Item five:

A friend was given sketches below of the rooftop he plans to put on his house;

TWO SIDES



TWO SIDES



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The builder recommended iron sheets of **3ft** by **4ft**that cost **UGX.40,000**per sheet. Your friend needs to know how many iron sheets to buy and how much it will cost him. He requested for your help as a mathematics student.**(1ft = 0.3)**

He also plans to get a loan of **UGX. 4,000,000** that he plans to pay back in**3 years** to finance his other projects. One bank offers the loan at a simple interest rate of **10%** and the others offers the same loanat a compound interest rate of **5%**. He is finding it hard to decide which bank to get a loan from.

Task:

a) How many iron sheets will he need to buy and how much will he need to buy them?
b) Which bank do you recommend him to get a loan from and why?

Item six:

Mary usually sets off from a landing site that is located on coordinate $O(-9, 7)$ on her grid map to island Awhich is located at coordinate $A(-6, 3)$ on her grid map during her day off. Island A is south east of landing site O. This time she plans to extend her tour from island $A$to another island B that is **9km** north east of island A and then sail back to the landing site through the direct route.

She plans to tour around island A for **3hours** and around island $B$for **4 hours**. Her journey is to start at 10:00am. She hopes to be back by 20:00hours since she has work the following day. She wants to know if it's possible to return by that time but she does not know the time the ship will take to sail the whole journey. The boat is usually ridden at an average speed of **64km/hr**.

She is in charge of paying her fellow workers. Some workers were given a salary increment to **UGX.650,000**. This includes allowances of **UGX.120,000**. She needs to know how much income tax she is to deduct from them and the net amount she is to pay them using the tax bands below:

TAXABLE INCOME (UGX)	TAX RATES (%)
0 – 200, 000	0
200, 001 – 400, 000	10
400, 001 – 600, 000	15

Task:

a) (i) What is the total distance they are to sail?
(ii) What is the total time the entire tour will take inclusive of the time the boat will take to sail the whole journey?

(iii) Will she make it back at the planned time? (Justify your answer)
b) How much will she pay her fellow workers?

END

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