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Mathematics
Paper 1
2024
2 ¼ hours.



NAMIREMBE DIOCESE COUHEIA SECONDARY
MOCK EXAMINATIONS 2024
Uganda certificate of Education

MATHEMATICS

Paper 1

2 Hours & 15 Minutes

INSTRUCTIONS TO LEARNERS

- 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) and you are required to answer only 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 are provided.
- Silent, non-programmable scientific calculators and Mathematical tables with a list of formulae may be used.

For Examiner's use	
Question	Marks
Section A	
Section B	
TOTAL	

SECTION A

(Answer all items in this section)

Item 1:

Mrs. John, a tomato seller in Kibuli market, has a challenge of high prices of tomatoes from the whole sellers. This limits her from making progress in her business and she has failed to raise enough money to buy herself a plot of land that is sold at UGX. 10,000,000 at Kinoni village. She decides to shift to Usafi market in search for favorable prices. To get there, she boards a taxi from Kibuli Depo, which is (1, 2) km from home and (4, 3) km from the Depo to Usafi.

At Usafi market, she found two traders with fair prices as shown in the table below. She decided to buy from both sources.

TRADER	QUANTITY	COST
1 ST	2 boxes	▪ Each box of 5 baskets of 5 tomatoes costs UGX. 25000.
	4 baskets	▪ Each basket of 5 tomatoes costs UGX. 2300.
	2 tomatoes	▪ Each tomato costs UGX. 500.
2 ND	6 boxes	▪ Each box of 8 baskets of 8 tomatoes costs UGX. 27000.
	6 baskets	▪ Each basket of 8 tomatoes costs UGX. 3500.
	4 tomatoes	▪ Each tomato costs UGX. 450.

On reaching home, Mrs. John mixes all the tomatoes and packs them into packs of 3; and sells each pack at UGX. 2000. She budgeted for transport costs, packing bags and refreshments. She bought from the market and she got a total of UGX. 25000. Then she discovered that she had used all the capital she had.

Task:

- Help Mrs. John determine the exact location of Usafi market from home.
- With evidence, determine the profit she made in one day if she sold all the tomatoes that day except the 10 that she found rotten.
 - What proportion of profits must she save daily if she must buy the plot in two years without working on Sundays?

Item 2:

Marvin is in partnership with a hotel and he supplies chairs depending on the amount of money deposited on his account. However, he has a problem of not knowing the exact quantity of furniture to supply, which causes shortfalls. This weakness is a major source of dissatisfaction to the hotel manager.

In his factory, Marvin produces two types of chairs, namely; the classic and modern types. Each classic chair require 3 hours of woodwork and 2 hours of furnishings; while each modern chair require 2 hours of woodwork and 3 hours of furnishings. The factory has 120 hours of woodwork and 100 hours of furnishings available per week. Each classic chair generates a profit of \$ 50 and each modern chair generates a profit of \$ 60.

The maximum profit made in the first week of every month is reinvested back into three departments of woodwork, furnishings and marketing. The woodwork department receives half of the profits, furnishings receives two-thirds of the remainder, while the rest is for marketing. According to the order he has received, he must receive a profit of \$ 2,200.

Task:

- a) Determine the number of chairs of each type he must deliver to the hotel.
- b) Help Marvin to determine the amount of profit that each department must receive.
- c) According to your own reason, was the distribution of money fair? Why?

SECTION B

This Section has two Parts; I and II.

Part I

(Answer one item from this part)

Either Item 3:

A group of friends planned to go for a trip to three cities; 'A', 'B' and 'C'. they failed to agree on the type of car to use in order to reach earlier. They divided themselves into two groups. One group used a drone, while the other used a costa. The drone set off at 8.00 a.m from their village to town 'A' where they spent 2 hours; and continued to town 'B' where they spent 3 hours; and finally proceeded to 'C', where they spent 4 hours. The Costa set off at 8.05 a.m to town 'A' where they spent 1 hour, then to town 'B' where they spent 4 hours; and finally to 'C', where they spent 4 hours and drove back home.

The distances between home, town 'A', town 'B' and town 'C' were 20 km, 120 km and 80 km, respectively. Below is the summary of the time that the different groups arrived at different cities and the corresponding expenses per hour:

	A	B	C
Costa	8.35 a.m	12.00 p.m	5.00 p.m
Drone	8.30 a.m	1.30 p.m	5.05 p.m
Expense	\$ 10,000	\$ 20,000	\$ 1,5000

Task:

- With evidence, advise the group about the type of car they should always use to arrive on time.
- Which of the two groups spent more money and by how much?

Or Item 4:

Mr. Muyanja was preparing for a wedding and he wanted to know the quantities of different kinds of drinks that his guests would take. On consultations, Mr. Namwiga gave them the following information:

He needed to buy Soda (S), Juice (J) and Water (W) depending on the preferences of the people. The number of people to drink both Soda and Juice only should be one fifth of those who are to drink all the three categories. Those who are to drink all the three categories are also to be 20 times those to drink Juice and Water only, and 10 times those to drink Soda and Water only. Also the numbers of people to drink Soda only are to be 5 times those to drink juice only. Also the numbers of people to drink Soda only are to be $2\frac{1}{2}$ times those to drink Water only.

Suppose that 41 people won't drink any type of drink and 200 people are expected of whom 24 people are likely to take only one type of drink.

Task:

- Help Mr. Muyanja to determine the number of bottles of each type of drink that would be taken.
- Determine the type of drink that would be most taken. What would be the cause for this preference?

- c) If a guest would be picked at random from the group, determine the probability that he/she would drink utmost one type of drink.

Part II

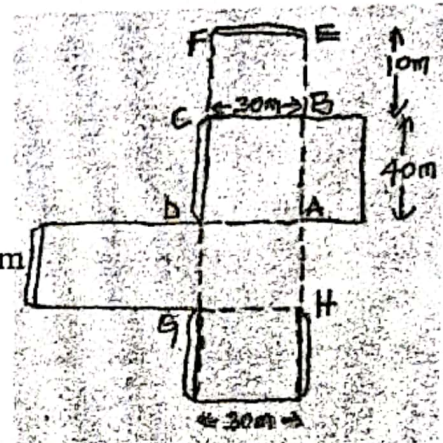
(Answer one item from this part)

Either Item 5:

Mr. Otim is one of the senior consultants in JOMAI Construction Company Limited. Your uncle who desires to build a new house has reached out to him for a house plan. Through their conversation, he was told that one of the master bedrooms looks like the figure below when dismantled.

The original plan was presented to the cite engineer and for proper planning, he had to fold the given figure to obtain the exact shape of the bedroom with floor ABCD and ceiling EFGH.

It was discovered after construction that the bedroom had to be tiled using tiles of dimensions 4 metres by 3 metres.



Task:

- a) (i) Help the cite engineer to sketch the actual shape of the master bedroom with its ceiling.
- (ii) The engineer needed to buy a wire that connects corners 'A' and 'C' during construction. Provide him with the exact units in centimeters of the desired wire.
- (iii) Suppose the engineer wanted to climb to the ceiling using a ladder with its bottom at corner 'A' and its top at 'F'. To what angle with the floor should the ladder be inclined?
- b) A box of tiles costs UGX. 4000. Based on calculations, advise your uncle on the amount of money that is needed to be saved for buying boxes of tiles for the bedroom.

Or Item 6:

During the previously held National Population Census, one of the enumerators was sent to Kalangala district to carry out the exercise.

One day during the exercise, he had to travel from town 'A' to town 'B'. These towns have a big island between them. Due to the poor topography of the place, the enumerator was disturbed with movement between the two towns.

Fortunately, one of the citizens of Kalangala advised the enumerator to first move to Kalangala S.S, from which he should proceed eastwards for some distance until he reaches the first trading centre and then branch off to the final destination.

Kalangala S.S is known to be 200 km at the bearing of 150° from town 'A'. The trading centre is 300 km from the school, while town 'B' is 400 km away $N 20^\circ E$ of the trading centre.

However, due to increased degree of insecurity, the body of National Bureau of Statistics employed two people who used to travel in an aeroplane monitoring the movement of the enumerators. One day, they observed two enumerators on the same side of the road walking at a distance of 25 metres between them viewed at angles of 60° and 40° , respectively.

Task:

- a) Assume that the Island was not in place. Help the enumerator to determine the distance (in km) of the shortest direct route between towns 'A' and 'B'.
- b) If in the near future the government decides to construct a bridge linking Kalangala S.S and town 'B', what would be the length of the bridge?
- c) Based on calculations, determine the vertical distance between the plane and the ground at an instant when the enumerators were observed walking.

END