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**MATHEMATICS**

**Paper 1**

**2024**

$2\frac{1}{4}$  hours

**Uganda Certificate of Education**

**MATHEMATICS**

**Paper 1**

2 hours 15 minutes

**INSTRUCTIONS TO CANDIDATES:**

*This paper 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 sheets provided.*

*Graph paper is provided.*

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

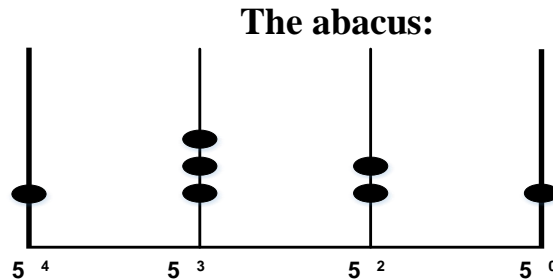
## SECTION A

Answer **all** items in this section.

### Item 1:

(20 scores)

Two twins A and B were presented with an abacus to write the number on it. A wrote one thousand fifty-five and the other wrote one thousand fifty-one. They need your help to know who amongst them is correct.



Twin A was sent to buy 2kg of sugar. He did not find sugar at the usual shop so he bought it at another shop and was given a balance of Ugx.37, 000 on the UGX.50,000 he went with. The mom asked him how much he was charged for each kg but unfortunately, he did not ask the shop attendant.

Both twins have to go to school. They usually pay 60% of the school fees at the beginning and the rest on Visitation day according to school policy. School fees were increased to UGX.600, 000 and now the parents need to know the school fees they are to pay for both of them at the beginning.

### Task:

- Who amongst the two twins was correct about the number presented on the abacus?
- How much was Twin A charged for a kg of sugar?
- How much will the parents pay at the beginning for both twins?

### Item 2:

(20 scores)

A man wants to construct single rooms and double rooms in his plot of land. He wants both to cover a space that is less than  $6ft^2$ . He wants the double rooms to cover a space of at least  $3ft^2$ . The space covered by single rooms should be three times less than the space of double rooms. He wishes to maximize income by charging each single room at Ugx.200,000 and each double room at Ugx. 300,000. So he needs to decide on how many rooms of each category he should construct to match his specifications and at the same time maximize income.

**Task:**

- (a) Write down mathematical statements that shows the relationship between the single rooms and double rooms.
- (b) Show the feasible region of the relation on the Cartesian plane.
- (c) Help the man to determine the number of double rooms and single rooms to construct hence help him determine maximize the income.

**SECTION B**

This section has two parts; **I** and **II**

**Part I**

Answer **one** item from this part

**Item 3:**

*(20 scores)*

Your guardian operates a catering company. He gave you a list of major ingredients he will need to cook beans and beef at the two occasions he was called at such that you help him account for how much he will need in total for both.

**OCCASION ONE:**

BEEF: 1 bucket of tomatoes, 2 bunches of onions and 2 liters of cooking oil.

BEANS:  $\frac{1}{2}$  bucket of tomatoes, 1 bunch of onions, and 1 liter of cooking oil.

**OCCASION TWO:**

BEANS:  $\frac{1}{2}$  bucket of tomatoes, 1 bunch of onions, and 1 litre of cooking oil

BEEF:  $1\frac{1}{2}$  bucket of tomatoes, 3 bunches of onions and 2 litres of cooking oil.

**UNIT PRICES:**

A bucket of tomatoes is Ugx.10,000, a bunch of onions Ugx.5,000 and a liter of cooking oil at Ugx.7,000.

**Task:**

- (a) What are the total quantities of each ingredient he will need for beef and beans respectively for both occasions combined?
- (b) How much money will he need for both beef and beans respectively for both occasions combined?
- (c)
  - (i) If the total amount on the budget for both occasions is Ugx. 400,000. what percentage of that amount will go on ingredients?
  - (ii) According to the percentage, should he cut the budget for ingredients or not? Justify your answer.

**Item 4:***(20 scores)*

A Company holds daily morning briefings at 8:05 am for all its workers who walk to work from different places of residence. The company supervisor notices that some workers miss important communication because they arrive late. He decided to collect data about their time of arrival so that he can make necessary adjustments and also help some of them to become residents near the company premises. The collected data of their time of arrival in minutes from the start of the briefing was as follow;

52	49	11	16	32	28	32	55	38	24
15	23	33	20	40	39	22	37	53	30
27	38	41	59	33	52	27	36	46	28
46	32	47	54	34	21	58	37	26	42
51	49	35	24	47	34	48	44	55	19
29	58	38	44	31	21	18	39	25	47

**Task:**

- With a reason based on the calculation from the data above, suggest the appropriate time when the morning briefs should always start.
- The company manager suggests that the first 25% of the workers be given transport refund, between 25% and 75% be given accommodation and the rest be stopped.
- Determine the maximum time of arrival one should not exceed to qualify for;
  - Transport refund
  - Accommodation
- How many workers would be stopped from work?

**Part II**Answer **one** item from this part**Item 5:***(20 scores)*

An international businessman who operates in United States of America (USA) has recently relocated his family to your village and settled near your home as your immediate neighbor. After a week, his wife realizes that her P.5 boy needs a boarding school. Your Cousin who is well informed about primary education offers to help her by driving them as they search to find a better school for her child. He drives them to the nearest Pearl Hill Junior school 40km away due East of their home.

Your Cousin drives at his usual average speed of **40 kmh<sup>-1</sup>**. His car's fuel consumption is **8 km/litre**.

The Boy's father who is in USA, agrees to refund your cousin all the fuel costs and allowance of **5 US dollar per hour** spent during the entire process and Journey. A litre of Petrol costs shs **5,750/=** and **1 US dollar = Ug.shs 3,800/=** and Uganda is **7 hours** ahead of USA.

On reaching Pearl Hill Junior School at **9:20 am**, she finds out that it is a purely day school. After 15 minutes of interaction, the Headteacher refers them to Full Care Primary School (**FPS**) a good boarding school in the locality and gives your cousin the following directions:

- From Pearl Hill Junior School, take the southern direction and reach the Community Library that is 70 km away.
- From there, then take the South Eastern road and drive for half an hour to reach Full Care Primary School (**FPS**).

After reaching **FPS**, the boy was subjected to an interview for  $1\frac{1}{4}$  **hours** and later admitted. Before leaving **FPS**, they are informed of a direct route back home which they take after a quarter of an hour of consultation.

### **Task**

- (a) (i) Describe the direction of your neighbor's home from Full Care Primary School.
- (ii) At what time would they have reached Full Care Primary School after leaving Pearl Hill Junior School.
- (b) Help your cousin to determine;
- (i) When he should communicate with the boy's father in USA upon reaching home immediately after the journey. (Give the time basing on USA time-zone)
- (ii) The duration of the entire journey
- (iii) How much money in US dollars he should demand from the boy's father upon returning home?

### **Item 6:**

*(20 scores)*

A bucket of homogeneous paint is in shape of a frustum with an open end of diameter 28cm, bottom diameter of 18 cm and 22cm deep. The bucket of paint is used to paint a cylindrical pillar of a storeyed building. The pillar measures a diameter of 100m and is 140m high.

Two hundred thirty five litres of the paint is made by mixing three paints A, B and C. The ratio by amount of paint A to B is 4:5 and that of B to C is 6:8. Paint A costs shs. 7200 per litre, paint B costs shs. 18,000 per litre and paint C, shs. 6375 per litre.

**(Take  $\pi = \frac{22}{7}$ , 1 litre of paint can paint 440 square meters)**

**Task:**

**Determine;**

- (a) (i) the number of litres of paint needed to paint the cylindrical pillar.
- (ii) the capacity of the bucket in litres.
- (iii) the number of buckets of paint required to paint the pillar.
- (b) (i). the amount of each paint in the mixture.
- (ii). how much is 1 litre of mixture.

**END**