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MATHEMATICS
Paper 1
2025
$2\frac{1}{4}$ hours

MATIGO EXAMINATIONS BOARD

PRE MOCK EXAMINATIONS
Uganda Certificate of Education
MATHEMATICS

Paper 1

2 Hours : 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 calculations and mathematical tables with a list of formulae may be used

Turn Over

SECTION A

Answer **both** *items from this section.*

Item 1

Three barbers, Simon, Tom, and Sulaiti, are hired by a school to cut the hair of 77 students. They start working at 7:30 am and work continuously until they take a break, which occurs when each of them finishes a student's haircut at the same time. Each barber takes a different amount of time for a student's haircut: Simon takes 20 minutes, Tom takes 25 minutes, and Sulaiti takes 30 minutes. They want to know the first time when they will get a break together and also the total number of students they will have finished to trim by then.

Students pay school fees of Shs. 2,200,000 per term. The school pays the barbers Shs. 3000 per haircut of a student. The school allocates 0.5% of the school fees paid by each student for haircuts for the whole term and 10% of the remaining fees for food.

Since students get their hair cut four times per term, the school wants to know if they are setting aside enough money for hair cutting.
The school also wants to know if they are setting aside enough money for food, given that each student eats food worth Shs. 300,000 per term.

Tasks:

a) (i) At what time will all the barbers first get a break together?
   (ii) How many students will the barbers have cut hair before their first break?
b) (i) How much will the school spend on each student for only hair cutting for the whole term if every student cuts hair only four times as planned by the school?
   (ii) Is the school budgeting enough for haircuts? Explain your answer.
   (iii) Is the amount set aside for food enough, basing on how much food each student eats per term?

Item 2

J.C. Factory Limited employs 200 workers who specialize in producing roofing and non-roofing materials. Among the male staff, 3/5 are skilled in manufacturing roofing materials and 5/7 of the female staff also excel in producing roofing materials. The remaining 68 workers are involved in creating non - roofing materials. The factory is set to update its Information Document and thus needs to know the ratio of male to female staff.

A self- employed carpenter from J.C. factory earns ∈ 180 for the sale of a rocking chair and ∈ 90 for the sale of a table. It takes 2 hours to make a rocking chair and 5 hours to make a table. He is limited to working 40 hours per week. The average manufacturing cost is ∈ 15 per rocking chair and ∈ 45 per table. He wishes to keep his manufacturing costs at almost ∈ 315 *per week*. The carpenter wants to know the weekly number of rocking chairs and tables that the he should manufacture in order to maximize his weekly sales.

Tasks:

a) Help the J.C. Factory to know the ratio of its male to female staff.

b) (i) What are the linear inequalities and equations that satisfy all the conditions about the self-employed carpenter in J.C factory.

(ii) Show the feasible region of the self-employed carpenter's conditions on the Cartesian plane.

(iii) Help the carpenter to know the weekly number of rocking chairs and tables that he should manufacture in order to maximize his weekly sales.

SECTION B

This Section has two *Parts:* I *and* II.

Part I

Answer only one item *from this part.*

Item 3

Kalama and Hazen are participating in a 200km driving event from town A to town B and vice versa. Kalama leaves town A at 7: 00 am, driving at 50km/hr. After one hour, he stops for 15 minutes due to a mechanical issue. He then resumes driving at the same speed of 50km/hr. until he completes the remaining distance.

Meanwhile, Hazem leaves town B at 7:30 am, driving towards town A at 40km/hr. After $1\frac{1}{2}$ hours of driving, he takes a 30-minute break to refuel and buy water. He then completes the remaining distance at steady speed and reaches town A at 11:30 am. The two drivers meet at some point during their journey. The event official

wants to determine the distance from town A and town B to the meeting point, as well as the time of their meeting. This information will be used to calculate the partial payment for each driver, which is UGX. 7000 per kilometer based on distance each has travelled up to the meeting point.

After the competition, the organizers conducted a survey on the types of water consumed by the participants and spectators. The data was summarized as follows:

Type of mineral water	Rwenzori	Yaket	Highland	Hill water
Number of bottles	24	10	15	23

The organizers plan to display this information on a pie chart to better visualize the people's preferences.

Tasks:

a) (i) Illustrate the journeys of Kalama and Hazen on a distance-time graph for better visualization. (use a scale; 4 cm: 1 hour and 2 cm: 20 km) (ii) What time did Kalama and Hazen meet?
(iii) How much will each driver receive as partial payment based on the distance each travelled up to the meeting point during their journey?

b) (i) Display the information about mineral water on a pie chart to better visualize the preferences.
(ii) Which mineral water type had the highest preference, and what angle would it occupy on the pie chart?

Item 4

The traders of Naalya market order their produce from Namugongo village as listed below:
On Easter day, the following purchases were made: Kasoma bought 1 bag of Posho, 5 bags of millet, 2 bags of Sorghum and 2 bags of rice; Bella bought 5 bags of posho, 8 bags of millet, and 4 bags of rice; Alex bought 4 bags of posho and 8 bags of rice; and Kyeswa bought 3 bags of rice, 4 bags of Sorghum, 3 bags of millet and 2 bags of posho.
The cost per bag of the items bought was: Posho at UGX. 100,000, Millet at UGX. 60,000, Sorghum at UGX.200, 000, and Rice at UGX 75,000 per bag.
Two customers Nakato and Kizza went to Naalya market and made the following purchases:

- Nakato: 4kg of posho and 2kg of rice, costing UGX 28,000.
- Kizza: 2kg of posho and 3kg of rice, costing UGX 26,000.

Tasks:

a) (i) Assist the traders in representing the purchases and their costs in two separate matrices. (ii) Using matrix multiplication, how much did each trader spend on their purchases?

b) Using knowledge of determinant of matrices, what are the prices per kilogram of Posho and rice at Naalya market?

PART II

Answer **only one** *item from this part*.

Item 5

Simon is a sales representative at NICO Traders, a cosmetics company that produces Vaseline. The company offers a commission structure based on sales performance, with the following rates:

- 5% commission on sales up to UGX 200,000.
- 7% commission on sales between UGX 200,001 and UGX 400,000 inclusive.
- 10% commission on sales between UGX 400,001 and UGX 600,000 inclusive. - 12% commission on sales above UGX 600,000.

Simon received a total commission of UGX 215,000 today and wants to save the commission earned on sales above UGX 600,000.

As part of his job, Simon is also responsible for managing the manufacturing process of the containers (buckets) used to package Vaseline. The current container is in the shape of a frustum of a cone, with a top diameter of 30cm, a bottom diameter of 20 cm, and a vertical height of 42cm. The bucket is used to fill an empty cylindrical tank with a diameter of 1.8m and a height of 1.2m.

In addition to his work with Vaseline, Simon also buys and sells lipsticks. He buys lipsticks at an unknown price and sells them for UGX 45,000 per box, incurring a 10% loss on the buying price.
Simon aims to sell the lipsticks at a price that will give him a 12% gain on his buying price per box.

Tasks

a) (i) How much will Simon save?

b) (ii) Help Simon to determine his total sales.

b) How many buckets of Vaseline should Simon plan to fill one cylindrical tank?

c) Help Simon know the original buying price of the lipsticks and the selling price needed to achieve a 12% gain on each box.

Item 6

A chapatti seller in a busy town has been struggling with excessive sunshine affecting her outdoor seating area. To address this issue, she has decided to purchase identical triangular tables with each of the tables having two of its sides, each measuring 10 m and intersecting at a 75° angle. The tables will feature a central hole to accommodate a circular umbrella, providing shade for her customers. The tables will be used to serve delicious chapattis to her loyal customers.

The chapatti seller is interested in buying 80 tables for her expanding business, which will be sold to her at UGX 21,500 each. The furniture maker offers a discount structure for bulk purchases as follows:

- 10% discount on the total cost for every 50 tables.
- Additional 5% discount on the total cost for any excess of 50 tables.

Tasks:

a) By applying construction skills, assist the furniture maker in drafting accurate design for the table surface that meet the chapati seller's requirements.

b) What minimum radius is required for a circular umbrella to fit around the vertices of the triangular tables?

c) What will be the total cost of 80 tables with the applicable discounts?

END

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