WESTERN JOINT MOCK EXAMINATIONS
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 item~
   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.

(20 Scores)

Item 1:

Simon is the District Inspector of schools in Mitooma District own a farm that measures 308ft by 228ft. He plans to put fencing posts along its sides at equal distances apart. One day, Simon discovered that the casual labourers he hired had used one third of his farm for banana growing, one quarter for coffee growing. Two fifths of the remainder were used for mixed farming.

Mahyoro senior secondary school has a student population of 1200 students. On a particular day, Simon invited the entire school on his farm for a field study. 55% of the students who attended the study were boys. In his interview, Simon told students that the price of his farm was valued at forty five million shillings. It increased by 25% after the first year but in the second year, the value of the farm reduced by 10%.

Task:

(a) Help Simon know the greatest distance between the fencing posts.

(b) Help Simon to know the type of farming that takes the biggest percentage of his farm.

(c) Find;
  (i) the number of girls that attended the field study on his farm.
  (ii) the value of Simon's farm at the end of the second year.

Item 2: **(20 Scores)**

Mr. Kafeero wants to start a new business. He needs at least 5 buses and 10 lorries to use in transportation of goods. He does not want to have more than 30 vehicles altogether. A bus takes 3 units of garage space and a lorry takes up 1 unit of garage space. Mr. Kafeero has 54 units of garage space available. He is to spend 15 million as running costs a day for a bus and 8 million for a lorry.

Task:

(a) Write down the set of mathematical expressions representing restrictions on Mr. Kafeero.

(b) Show the feasible region of the relation on a Cartesian plane.

(c) Help Mr. Kafeero find the maximum daily cost and the corresponding number of buses and lorries.

SECTION B
*This section has **two** parts: I and II*

PART I
*Answer **one** item from this part.*

Item 3: **(20 Scores)**

In your class, there are 50 students. On a particular visiting day, your class was tasked to collect the empty bottles of mineral water dumped in the school compound. The number of empty bottles collected were as follows;

25	30	29	60	72	59	40	40	62	70
30	39	62	65	40	59	39	43	80	21
58	29	19	25	30	32	56	59	40	55
69	90	81	50	31	45	20	51	51	49
31	30	56	58	50	50	60	40	40	70

The class teacher grouped the students according to the brand of empty mineral water bottle collected, Rwenzori (R), Nivania (N) and Aquasipi (A). It was noted the

24 collected Rwenzori bottles, 26 collected Nivana bottles and 29 collected Aquasipi bottles. Nine students collected both Rwenzori and Aquasipi bottles, 13 collected Nivana and Aquasipi while 11 collected both Rwenzori and Nivana bottles. Each of the students collected at least one of the three brands of mineral water bottles.

Task:

(a)(i) Help the class teacher group the number of bottles collected beginning with the 15 – 24 group.
  (ii) Find the mean and modal number of bottles collected.

(b)(i) Help the class teacher know the number of students who collected all the three brands of bottles.
  (ii) If a student is selected at random, what is the probability that the student collected only two brands of bottles?

Item 4:   (20 Scores)

A farm has three poultry units; **A, B** and **C**. Unit **A** produces 30 trays of eggs and 20 broilers every month. Unit **B** produces 40 trays of eggs and 15 broilers and unit **C** produces 35 trays of eggs and 10 broilers during the same period. A tray of eggs costs sh. 13000 and a broiler is at sh. 18,000.

The owner of the farm decided to deposit the total sales from the poultry units in Centenary bank for 24 months at 3% simple interest rate.

Task:

(a) Display the information given in the easiest way.
(b) Using the information provided; find the total amount of money the owner of the farm would find in his Centenary bank account after 24 months.

PART II
Answer **one** item from this part.

Item 5:   (20 Scores)

During a football training; the coach marked three points on the ground forming a triangle **OXY**. He labelled the displacement **OX** as vector **x** and displacement **OY** as **y**. he further placed points **A** on **OY** such that $\overline{OA}:\overline{AY}=1:3$ and **B** on **XY** such that $\overline{XB}:\overline{BY}=2:3$.

Task:

(a) Using the knowledge of vectors; express **OA, XY, XB, OB** and **AX** in terms of vectors **x** and **y**.
(b) Given that **OC=hOB** and **AC=kAX**, express the position vector of **C** in terms of ;
   (i)   **h, x** and **y**
   (ii) **k, x** and **y**
(c) Find the values of **h** and **k** and determine the ratios $\overline{AC}:\overline{CX}$.

Item 6:   (20 Scores)

Mr. Tumusiime wishes to fence his courtyard to prevent goats from destroying his vegetable garden. He decides to use three posts **A, B** and **C**. he discovers that the distance $\overline{AB}=100m$, $\overline{BC}=92m$. His daughter, Susan discovers that angle **ABC** is **105°**.

Task:

(a)(i) By scale drawing, help Mr. Tumusiime come up with a circular fence inside all the three posts.
  (ii) Measure the distance **AC**.
(b) Determine the area of the part within the three posts that was not fenced.