MATHEMATICS
456/1(B)
April/May, 2025
2 ¼ hours

Uganda Certificate of Education

PRE-MOCK EXAMINATIONS 2025

MATHEMATICS

Paper 1(B)

2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

- *Answer **ALL THE 4 ITEMS** in this paper.*
- *All necessary calculations must be done on the same page as the rest of the answer. Therefore, no paper should be given for rough work.*
- *Graph paper is provided.*
- *Silent, non – programmable scientific calculators and mathematical tables with a list of formulae may be used where not prohibited.*

ITEM 1

Joan travels to work daily by train. On Tuesday when he started the journey, there were **240** passengers in the train. One hundred and forty-four of them were adults and the rest were children. The journey took 7hours and **20** minutes and this was **10%** more than the previous day.

At the first stop, **0.375** adults and one third of the children got off the train. The total ticket collection from the adults and children who got off was **Shs. 124,000.**

Twenty adults and some children boarded; bringing the total number of passengers in the train to **300.**

After the second stop, out of three hundred passengers in the train the ratio of men: women: children was **6:5: 4.** The total ticket collection from adults and children was **Shs. 480,000.**

TASK

a) How many minutes longer was Tuesday's journey than Monday's journey.

b) After the 1st stop, determine the number of adults and children who:

   i. got off the train.

   ii. were on the train as it set off.

c) After the second stop, how many men, women and children are in the train.

d) How much was a train ticket per adult and per child?

ITEM 2

Two brothers Tom and Steven each want to acquire a phone by saving money monthly. Steven wants a phone worth one million three hundred and ten thousand shillings and Tom wants one worth seven hundred and seventy thousand shillings. Steven so far has one hundred and fifty thousand and intends to save forty thousand shillings every month while Tom has two hundred thousand shillings and wants to save thirty thousand shillings every month.

TASK

a) Write down mathematical relations between each brother's savings (**S**) and the number of months (**n**) that money was saved.

b) After how many months will each of them afford a phone.

c) Who will acquire a phone first? Justify your answer.

ITEM 3

Paul was given the following information in an assignment. He was not sure about the mathematical concepts to use so he seeks guidance from you.

a) Matrix $A = \begin{bmatrix} 1 & 3 \\ 1 & 2 \end{bmatrix}$

b) The functions; $x = 11 - 3y$ and $x = 16 - 2y$ represent model equations of 2 straight roads R_1 and R_2 whose junction an engineer identified as point J.

c) Paul got orders for three flavours of juice namely; Strawberry, Mango and Apple from Mbale city and Lira city. The following table shows the distribution of the orders from the 2 cities.

	No. of cartons of each flavour		
	Strawberry	Mango	Apple
Mbale city	40	30	20
Lira city	30	20	10

The factory price per carton of Strawberry, Mango and Apple is **Shs. 1,000, 2,000** and **3,000** respectively. Paul sold all the cartons of Strawberry, Mango and Apple each at **Shs. 2,500, 3,000, 4,000** respectively.

TASK

Help Paul;

a) Determine A^{-1}

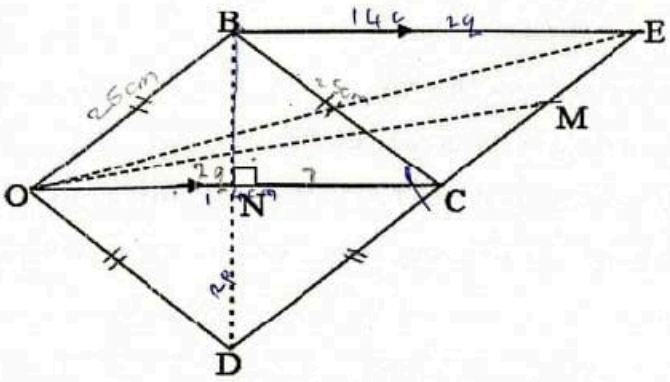
b) Use A^{-1} to find the coordinates of the junction J.

c) Form a matrix D for the orders and matrix P for cost price and selling price of each carton in Mbale city and Lira city.

d) Know how much profit he made in Mbale and Lira cities by finding the product of the 2 matrices above.

ITEM 4

Below is a plan for a house in which ABCD is a rhombus. OC=14cm, DB = 48cm OB = 25cm, OC is parallel to BE, M is a point on CE such CM: ME = 2:1, **DB**= 2**p**, **OC** =2**q**.



TASK

a) What is angle; (i) BCN (ii) OBC

b) Express in terms of **p** and **q**.

(i) **OB** (ii) **OD** (iii) **OE** (iv) **OM**

c) If **O** is the origin and point **C** lies on the x-axis, DB is vertical and $\mathbf{q} = \begin{pmatrix} 7 \\ 0 \end{pmatrix}$,express **p** as a column vector.

d) Determine **|DE|**