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MATHEMATICS
Paper 1
July/Aug. 2024
2 ¼ hrs

UGANDA TEACHERS' EXAMINATIONS SCHEME

Uganda Certificate of Education

JOINT MOCK EXAMINATIONS

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**.

All answers **must** *be written in the answer booklet(s) provided.*

Graph paper is provided.

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

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SECTION A

Answer **all** *items in this section.*

ITEM 1

Musoke is a retired worker who was saving with NSSF. He has got his savings of 120 millions. He wants to use his savings to construct single and double room rentals from which he wants to collect a minimum of shs 540,000 monthly. He intends to charge rent of shs 90,000 monthly from each double room and shs 60,000 monthly from each single room. He wants less than six double rooms. He also wants to construct at most twice as many single rooms as double rooms. It will cost him shs 12 millions to construct each double room and shs 10 millions to construct each single room.

TASK:

(a) Write down mathematical statements which relate the number of double rooms and single rooms.

(b) With the aid of a cartesian Plane, advise Musoke on how to maximize monthly rent collection.

ITEM 2

Your family wants to develop the family land by using 0.666..... of the land for agriculture, selling $\frac{1}{2}$ of the remaining land at shs 50 millions per hectare and keeping the rest of the land for family members who are out of the country. Your father has recently got a title for this land from a surveyor you don't trust. He kept it in a suitcase and locked it with a 2-digit PIN in base ten.This PIN is three times the sum of the digits but its second digit is five more than the first digit. When you got your father's PIN, you opened the suitcase and found out that the title was showing only 13.5 hectares which is 10% less than the real area of land.

TASK

Help the family members to know the;

(a) Real area of the land

(b) 2-digit PIN for the suitcase

(c) Simplified fraction of the whole land used for agriculture and hence determine the real area of the land for agriculture

(d) Amount of money to get from the sell of land.

SECTION B

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

PART I

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

ITEM 3

A thief steals a motorcycle at 8:00pm from your town and rides away at a constant speed of 50km/h.

The police patrol from the same town follows him after 30 minutes. The commander orders the driver of the patrol to drive at a steady speed of 75km/h. He tells the driver to just overtake the thief when they find him. After overtaking the thief, he should drive for only 15 minutes and take cover to catch the thief.

TASK:

With the aid of a graph paper, help patrol to determine;

(a) Where the thief is, as the patrol is setting off.

(b) When and where they will overtake the thief.

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(c) The distance from your town where the thief will be caught.

(d) The time they are likely to catch the thief.

ITEM 4

A manager of a wholesale shop wants to recruit only 10 workers. He advertised these vacancies and got 40 applications. He subjected the applicants to an interview and they performed as follows;

3 applicants got from 20 to 24 points, 9 applicants got from 25 to 29 points, 9 applicants got from 30 to34 points, 10 applicants got from 35 to 39 points, 7 applicants got from 40 to 44 points and 2 applicants got from 45 to 49 points.

TASK:

(a) Advise the manager on the pass mark so as to get only the required number of workers.

(b) Your friend was an unsuccessful applicant because she did not raise the pass mark. The manager told her that her score is what most applicants got, but she could not understand.

Help your friend to know her score.

PART II

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

ITEM 5

A man wants to paint the walls and the ceiling of his bedroom. It has a floor of 4 metres by 5 metres. It has a door of size 2.5ft by 6ft and a window of 3ft by 4ft. the ceiling is 10 feet above the floor. The paint he wants to use, is sold in full tins and full jerrycans. A tin which can paint $250ft^2$, is sold at shs 14000. A jerrycan which can paint $300ft^2$ is sold at shs 18,000. He must buy either tins or jerrycans but not both. (NB: 1m = 3.3ft).

TASK:

Basing on calculation, advise the man on the paint he should buy to minimise the expenditure.

ITEM 6

Your father wants to make a triangular camping tent with a carpet on the floor. Each of the rectangular faces should be 5ft by 8ft where the shortest side of this face lies along the slanting edge of the tent. He wants the rectangular faces to make an angle of 45^0 with the carpet. Your father wants a tent similar to that in the figure below.

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TASK:

Help your father to;

(a) Draw the frame of this tent.

(b) Determine the size of the carpet required to cover the floor of the tent

(c) Determine the size of the cloth required to cover the entire frame (excluding the floor)

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