456/1
MATHEMATICS
PAPER 1
AUG, 2025
2½ HRS

# UNNASE MOCK EXAMINATIONS

*Uganda Certificate Of Education*

**MATHEMATICS**

**Paper 1**

**Time: 2Hours 15Minutes**

**INSTRUCTIONS TO CANDIDATES:**

- *This paper has two sections **A** and **B** with a total of six items.*
- *Section A has **two compulsory items.***
- *Section **B** has **two** parts: **I** and **II**. Respond to **one** item from each part.*
- *Respond to **four** items in all.*
- *Any additional items Responded to, will **not** be scored.*
- ***All** responses **must** be written in answer booklets provided.*
- *Graph papers should be provided.*
- *Silent non-programmable scientific calculators and mathematical tables with a list of formulae may be used*

## SECTION A

*Respond to **all** items in this Section.*

**ITEM ONE:**

Stella received a business grant from a certain organization worth forty million shillings for business growth. She allocated 15% of the grant money towards furniture, two-fifth of the grant money towards buying more laptops for use in the business, 0.16 of the grant money towards advertisement. Part of the remainder is for re-painting the office, installing the floor carpet in the office and saving for future un-certainties in the ratio of 4:3:7 respectively.

To avoid errors in decimals, she expressed the length and width of the rectangular floor of his office on which he is to install the floor carpet in the form $(3\sqrt{8}+3\sqrt{6})m$ and $(3\sqrt{8}-3\sqrt{6})m$ respectively. The carpet she is to buy is sold in square meters. Each square meter is sold at *Shs.* 85,000. The labor for installing the carpet is *Shs.* 10,000 per square meter. She is not sure whether the money she allocated towards carpet installation will be enough.

She also needs to report back to the organization on the percentage of grant amount that was un-used or saved for accountability reasons.

**TASK:**

a) How much did Stella allocate towards carpet installation?

b) How much is Stella to actually need for carpet installation according to the dimensions of the office and the provided prices?

c) Will the money she allocated towards carpet installation be enough? (Justify your answer)

d) What percentage of the un-used grant is Stella to report back to the organization?

**ITEM TWO:**

Lady M has a circular garden that currently has a radius of $40cm$. She wants to expand in such a way that it occupies a new space area of $15400cm^2$. She is unsure of the centimeters she is to instruct the gardener to add on the existing radius of the garden to achieve the desired area. $(\pi = \frac{22}{7})$

She asked the gardener about the kg of black soil they will need for the garden as well as the sachets of flower seeds and he gave the following estimates in terms of quantities and their costs:

- The garden is to require at least 1sachet of flower seeds but less than 3.
- It is to require at least 50kg of black soil.
- Since each kg of black soil costs *Shs.* 400 and each sachet of flower seeds costs *Shs.* 20,000, it will require a total amount of at most *Shs.* 100,000 to buy them both.
- The soil is sold in only *kgs* but not grams and sachets of flower seeds are sold as whole.

Lady M needs assistance the determine the actual *kgs* of black soil and sachets of flower seeds she is to buy with not less than but not more than *shs.* 100,000.

**TASK:**

a) Determine the centimeters of radius that Lady M is to instruct the gardener to add on the flower garden in order to achieve the desired area.
b) Form linear inequalities from the estimates given by the gardener about the *kgs* of black soil and sachets of seeds needed.
c) Create a feasible region that satisfies all the linear inequalities.
d) Help Lady M to determine the actual *kgs* of black soil and sachets of flower seeds she is to buy with not less than but not more than *shs.* 100,000.

## SECTION B

### PART I

*Respond to only **one** item in this Part.*

**ITEM THREE:**

The head teacher in school X allocated a team of teachers to fight vernacular speaking in the school. The team currently reported an average number of 16 vernacular speakers within the current 150-days they have operated.

The head teacher needs to determine whether the average number of vernacular speakers reduced depending on that reported in the previous 150days before the appointment of the team.

She also needs a report on number days with in which the number of vernacular speakers was 50 and below in the past 150-days before the appointment of the team.

Within the past 150-days, the number of vernacular speakers registered within the cumulative number of days were recorded in the table below:

| Registered vernacular speakers. | 9.5–19.5 | 19.5–29.5 | 29.5-39.5 | 39.5-49.5 | 49.5-59.5 | 59.5-69.5 | 69.5-79.5 |
|---|---|---|---|---|---|---|---|
| Cumulative number of days | 30 | 46 | 70 | 102 | 130 | 142 | 150 |

The team is finding it challenging to generate a frequency table from the table above that they are to use to determine what the head teacher needs to know.

**TASK:**

a) Help the team to generate a frequency table from the table above.
b) Determine the average number of vernacular speakers reported in the past 150-days.
c) Was there a reduction in the average number of vernacular speakers or not?(justify your answer)
d) Determine the number of days with in which the number of vernacular speakers were 50 and below in the past 150days before the appointment of the team.

**ITEM FOUR:**

After a test that was given to select only two students that were to represent the school in the international mathematics quiz competitions, it was realized that 6girls and 4boys qualified.

The mathematics teacher prefers a boy and a girl. To avoid bias, he was given names on folded papers. He is supposed to randomly pick two papers without replacement. He is un-certain of the chances that he will have preference.

For purposes of revision, the school provided the teacher Shs. 250,000 to buy each of the two selected students 2books, 1 calculator, 1 geometry set, 1 long ruler, 1 graph ~~paper~~.book

The stationery shop he plans to purchase them from, sells each calculator at Shs.55,000, each book at Shs.15,000, each ruler at Shs.2,000, and each graph book at Shs.10,000. He is un-sure whether the money he was given will be enough. Geometry set. Shs. 5000

**TASK:**

a) Help the mathematics teacher to determine the chances of him having his preference during the random picking of names.

b) (i) Arrange the requirements that the teacher is to buy for the two learners and their respective unit prices within rows and columns in two respective brackets.

(ii) Use the arrangements to help the teacher determine whether the money he was given will be enough or not.

**PART II**

*Respond to only **one** item from this Part.*

**ITEM FIVE:**

Tom marked an area within his compound using three stones A, B and C that he joined with a wire. He plans to create a largest circular flower garden that can fit within the enclosed area.

Stone B was planted at $040^0$ from stone A. Stone B is also $050^0N$ ~~W~~ E from C. Stone C was planted $7ft$ ~~West~~ East of stone A.

Tom plans to plant grass in the parts of the demarcated area where the flower garden won't reach. He is unsure of the space area where grass is to be planted yet he wants to base on it to estimate the seedlings of grass he will need to cover it.

**TASK:**

a) With aid of a scale drawing, illustrate for Tom how the entire garden is to appear.

b) According to the scale drawing, what is the shape of the area demarcated with stones and wire? (Justify your answer)

c) Determine the space area that Tom is to buy grass seedlings for.

**ITEM SIX:**

Godfrey works for company M. To save transport, he bought a bicycle at Shs.1,200,000. He has been using the bicycle for 3years now. He plans to sell the bicycle and top up on the money earned to buy the motorcycle that his friend is selling to him at Shs.2,500,000. Given that the depreciation rate of his bicycle per year is valued at 10%, he needs help to determine how much he is to sell the bicycle and amount he is to top up to buy the motorcycle.

The salary he has been earning was tax free. However due to his excellent performance at the workplace, he was promoted to a position where he is to earn Shs.600,000 as gross salary per month. This is to include transport and housing allowance of Shs.150,000.

He needs to determine how much he is to receive as net salary at the end of each month. Given that below are the tax bands that apply to his taxable income:

| **Monthly taxable income (Shs.)** | **Rate (%)** |
|---|---|
| 0 – 200,000 | 0 |
| 200,001 – 300,000 | 5 |
| 300,001 – 400,000 | 10 |
| 400,000 - above | 12 |

**TASK:**

a) How much is Godfrey to sell his bicycle basing on his its depreciation rate?
b) How much is he top up in order to buy the motorcycle the friend is to sell to him?
c) How much is he to be paid as net salary at the end of the month?

**END**