

456/1
Mathematics
Paper 1
August 2024
2 ½ Hours



ASSOCIATION OF SECONDARY SCHOOLS HEADTEACHERS OF UGANDA

(ASSHU)- NTUNGAMO

NTUNGAMO DISTRICT JOINT MOCK EXAMINATIONS 2024

Uganda Certificate of Education

MATHEMATICS (456/1)

PAPER 1

TIME: 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 examinations items in all.
- Any additional item(s) answered will not be scored.
- All answer must be written in the Answer booklet(s) provided.
- Graph paper is provided.

SECTION A

Answer **all** items in this section

Item 1:

The police officer in your area plans to visit station **A** that is $2\sqrt{5}$ km south of his work station and then station **B** that is 5 km east of station A and after drive back to his work station using a direct route. He is to use his motorcycle that consumes **0.035 liters** of fuel per km and he wants to know how much fuel he will need for the whole journey.

The police uniform department in your area is also launching the Uniform Distribution project to distribute new t-shirts to its officers. The large-scale distribution is **$3D4_{16}$** , where **D** represents fourteen in the base sixteen system. While the distribution to each officer operates in base three. The department is challenged with handling large-scale to small-scale distributions to ensure efficient allocation of uniforms.

The police station in your area has two patrol police teams operating on different schedules at a certain bank from **8:10pm**. The first team, patrols the bank every forty-five minutes and the second team patrols every seventy-five minutes. the officer in charge of security at the bank is tasked to meet both teams at the same time.

Task:

- How much fuel will the police officer need for the whole journey?
- How many t-shirts will be distributed?
 - Make a representation of a distribution that each officer will receive.
- Based on calculations, will the officer in charge of security at the bank meet the police patrol teams before mid-night?

Item 2:

A blood bank has **UGX. 1,000,000** and needs to use it produce two types of blood units, Type **A** and Type **B**. Each unit of blood type requires specific resources, and the goal is to minimize the total cost of production while meeting the demand for both blood types. The production involves two main resources: Resource **1** and Resource **2**. The cost and availability of these resources are limited, and each type of blood requires different amounts of these resources.

Given Data:

- Cost per unit of Resource 1: UGX.5000
- Cost per unit of Resource 2: UGX.7000
- Resource requirements per unit of Blood Type A:
 - Resource 1: 3 units
 - Resource 2: 2 units
- Resource requirements per unit of Blood Type B:
 - Resource 1: 4 units
 - Resource 2: 3 units
- Availability of resources:
 - Resource 1: 100 units
 - Resource 2: 80 units
- Demand:
 - Blood Type A: At least 10 units
 - Blood Type B: At least 15 units

Task:

- (a) Write the constraints for resource limitations and demand requirements.
- (b) Show the feasible region of the constraints on the Cartesian plane.
- (c) How much can the blood bank save on production costs based on calculations?

SECTION B

This section has two parts; I and II

Part I

Answer one item from this part

Item 3

A particular organization is to launch a stop smoking campaign this year in your village due to increased smoke-related diseases among the people. The ages of the smokers sampled in your village are summarised below;

40 31 52 70 77 55 46 47 21 27

56 56 47 39 32 37 66 24 51 45

41 77 86 32 46 51 44 31 28 91

65 41 39 63 74 61 22 34 81 44

33 23 45 28 47 58 39 26 35 82

53 48 32 29 22 73 23 49 50 66

The organization noted that forty-one smokers sampled had lung cancer. Among the sampled smokers with lung cancer, twenty were female. Two smokers will be sponsored to further study at the cancer institution and head the organization's cancer department when they complete studies in given time.

TASK

- (a) What is the minimum age distribution of smokers with lung cancer?
- (b) What is the probability that the two members will be men and have lung cancer?(justify your response)

Item 4

The local government surveyed a hundred sixty traders to highlight the distribution of crop sales among the traders in order to address issues of crop sustainability in a particular market. The survey revealed that 70 sell **maize**, 90 traders sell **cassava**, and half of the traders sell **yam**. It was noted that some traders in the market sell more than one type of crop: 26 traders sell both cassava and maize, 30 sell both cassava and yam and 40 sell both yam and maize.

TASK

what is the chance of traders selling two or more crops in the market?(Justify your response)

Part II

Answer one item from this part

Item 5

The university owns a triangular piece of land in a particular community, and people have been encroaching on it. The land measures 650 meters by 720 meters, with an angle of 75 degrees between these sides. To address this problem and clearly define the boundaries, the university council has constructed a circular fence that touches each vertex of the triangular land. The fence's labour cost is 12 US dollars per meter, and the construction materials amounted to UGX. 10, 567,800. Use exchange rate \$1=UGX.3916.2

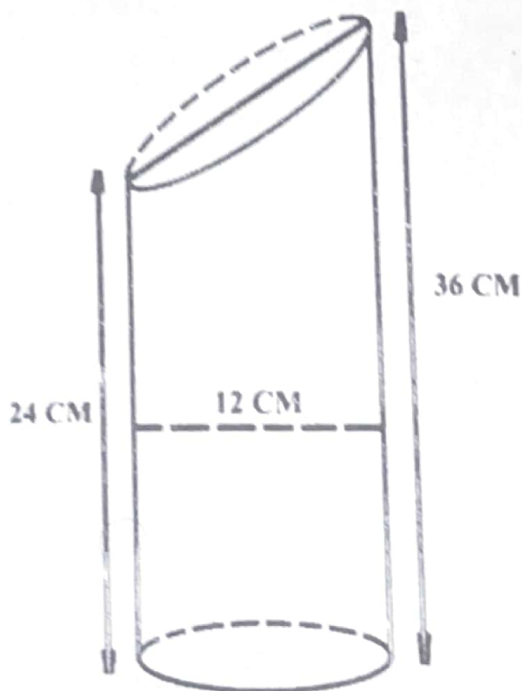
Task

- (a) What is the area of the piece of land owned by university? (justify your response)
- (b) How much will the university spend on constructing the fence?

Item 6

A certain shopkeeper plans to either make a cylindrical container or buy a ready-made one for scooping sugar from the storage sack, as shown in the figure.

Each square centimeter of the material costs UGX 250. The shopkeeper needs to know the maximum amount of sugar the container can hold and decide whether to make it or buy a ready-made container. The labor cost for making the container is UGX 12,000. The ready-made container costs UGX 119,500.

**Task:**

- (a) What is the maximum amount of sugar the cylindrical container can hold?
- (b) Based on the calculations, should the shopkeeper make or buy the ready-made container?