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MATHEMATICS
Paper 1
July/Aug. 2024
$2\frac{1}{4}$ hours

HOIMA DIOCESE EXAMINATIONS BOARD

UCE Mock Examination, 2024

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.*

Any additional item(s) answered will **not** *be scored.*

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.

Turn Over

SECTION A

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

Item 1

Two friends formed a partnership and agreed to deal in animal feeds. Ben contributed seven hundred and fifty thousand shillings while Carey contributed UGX.900,000. They agreed to save $\frac{1}{5}$ of their gross profit in their joint account and further use 20% of the remainder to buy materials for new products and there after, share the net profit in the ratio of their initial contribution.

At the end of their first year of operation, they made gross profits amounting to UGX. 3,160,000 and Carey deposited Bens share on his account but Ben was not sure if it was the actual amount he was supposed to get so he sought for your help to avoid biasness.

Ben sent you to withdraw some money from his phone but had forgotten the pin however he remembered that he had saved it as 179 in decimal base which he converts to base five to get the actual pin.

Task

(a) Show Ben how to determine the actual amount that was to be deposited in his bank account.

(b) How did you manage to get the actual pin in order to make the withdrawal from Ben's phone?

Item 2

At the beginning of the term, your school welfare department had stocked enough food for its enrollment of 2068 students for the 91 days of the term, but in the second week of the term they were told that the school had received 376 new students and they do not know how long the food will last so one of the teachers asked the S. 4 students to help them solve their puzzle in order to plan well.

The Geography department wants to take the candidates for a tour but each is required to pay and so far they have 336 students who have paid for the trip but more are promising to pay on the day they are to go. However, the teacher in charge wants to plan for their transport, he plans to hire some buses and coasters from a transport company. He has been told that a bus can carry 56 students while a coaster can carry 28 students. Each bus costs UGX. 500,000 while each coaster costs UGX. 250,000. He wants to use at least 4 coasters but there are 10 drivers available at the company on that day. The teacher wants to minimize the cost of transport but cannot decide how to do it.

Task

(a) How would you determine the number of days the food will last?

(b) (i) Write down the mathematical inequalities and expressions to show the above information.

(ii) Using your mathematical skills determine the possible combination of buses and coasters that the teacher can hire so as to minimize transport cost and find this minimum cost.

(iii) Determine the number of vehicles of each type that can be hired so as to maximize the number of students transported and find this greatest number.

SECTION B

This Section has **two** *Parts;* **I** *and* **II**

Part I

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

Item 3

A certain district has a temporary bridge that is used over a certain section of a small river. However, the engineers want to build a stronger bridge that can carry more weight. So, they asked the area leaders to do a study showing the average weight of the mass that uses the bridge and the mass of the majority of people using it so they can determine the new materials to be used. The leaders decided to carry out a research where they randomly chose and measured the mass of each person with their property for 30 people who passed on that bridge that day. Their masses are shown below. They need to summarize the data but don't know how.

60	50	45	57	51	41
80	77	48	98	49	58
53	46	36	63	61	32
74	93	78	66	42	75
38	55	58	66	60	83

Task

(a) Using your mathematical skills, show the leaders how to determine the average mass for the data they collected.

(b) By using an appropriate graph, estimate the mass of majority of users of the bridge.

(c) What maximum mass would you advise the leaders to consider when choosing the materials for making the new bridge and why?

Item 4

Your uncle is an agricultural officer and has advised farmers in the village to grow some other crops to boost their income. These food crops include melons, cassava and pumpkins because they are bought at higher prices. In the next planting season, 120 farmers decided to grow at least one of the crops.

62 farmers decided to plant pumpkins, 83 planted melons and 60 planted cassava. 20 planted pumpkins and cassava, 30 planted pumpkins and melons while 40 decided to plant melons and cassava. 18 families planted melons only. The officer wants to order for pesticides that will be used when in need and to get for them a collective market so that they will gain more from their harvest so he needs to summarize the data.

Task

(a) As a Mathematics student, help your uncle to summarize the data using a suitable drawing.

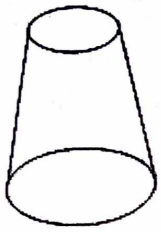
(b) If a farmer is to be selected at random from the village, what is the chance that he will need pesticides for at least two crops?

Part II

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

Item 5

Davis was given a job at a crafts workshop. His first assignment was to make 100 lamp shades for bedside lamps with the diameters 5 cm and 7 cm for the upper and lower circular parts respectively. The slant height is required to be 8 cm. The lamps are supposed to be placed ¾ way along the vertical height of the lampshade. He needs to determine the least amount of material that he needs to make one lamp shade so as to determine the cost for the whole job.



At the shop, they sell each lampshade at UGX 350,000 but can give a discount of 5% if one is paying cash or one can pay UGX 100,000 cash and then pay the rest in 4 monthly installments of UGX 80,000 each.

Task

(a) (i) You are required to show Davis how to determine the position of the lamp as instructed.

(ii) Help Davis to determine the least amount of material that will be needed for one lampshade.

(b) Which option would you use if you wanted to buy a lampshade and why?

Item 6

Your aunt has started a baking business and she wants to make a new cake base that will be in a pentagon shape. Its sides must be of equal length of 4 cm the cake base will be cut from a circular piece of cardboard, so she asks you to accurately draw for her the cake base.
The first customer to order for the new design asked for 10 cakes, each was priced at UGX 150,000. The production cost per cake is UGX 100,000 but has promised the client a discount of 2%. She is also required to pay tax on sales of UGX 1000 for every UGX 10,000 she earns from her sales. Thereafter, she deposits the rest in the bank. She needs your help to determine how much she will have to deposit in the bank when the client pays.

Task

(a) Show accurately how you would draw the edges of the new cake base.

(b) As a student of Mathematics, show your aunt how to determine the amount of money that she needs to deposit on her bank account.

END