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MATHEMATICS
Paper 1
2024
$2\frac{1}{4}$ hours

Uganda Certificate of Education
MATHEMATICS
Paper 1
2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

*This paper 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 sheets provided.*

Graph paper is provided.

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

SECTION A

Answer **all** items in this section.

Item 1 *(20 scores)*

You decided to have a joint graduation party with your family members which will cost a total of Uganda shilling four million. You are nearing a D-day and you want to find out whether you have enough required amount of money or not. And below are the contributions.

- your parents promised to contribute **30%** of the money.
- Your friends promised **10%** more than that your parents promised.
- And since you are the owner of the party, you contributed **20%** of the required amount.

When you went for shopping, you moved **6*km*** due East from your home and the **8*km*** due South to reach the market, but the old man on the way told you that there is a shortest route you would use to reach the market directly to save time. And you made a booking of shillings, one million, seventy five thousand for all items required for the party.

Task

a) How far is it from your home to the market if you used the shortest route as the old man told you?
b) Make a simple budget for the party according to the booking.
c) Do you have the required amount for the party? Justify.
d) How much would you remain with according to the budget?
e) What advise can you give the party organizing committee?

Item 2 *(20 scores)*

Your friend would like to continue with his studies at A-Level. But he is challenged with raising tuition of UGX 200,000. He is gifted with a skill of making jewelry craft. He has saved some money that can only help him buy glue and strings. So moves to different homes requesting for old calendars from which he makes jewelry. A necklace takes him an hour to make and sells a profit UGX 800. The pair of earrings takes him two hours to make but he gets a profit of UGX 2000. He likes to make a variety by making at least as many necklaces as pairs of earrings. He has approximately 40 hours per week for creating jewelry. He also knows that the crafts vender wants sellers to have more than 20 items on display at the training of the show, he likes to make a variety by making at least as many necklaces as pairs of earrings. Assuming he sells all his inventory. Help your friend to find:

Task

a) How many of each of the necklace and earrings he should make so as to make as more profits as possible?
b) How much profit he makes a week?
c) How many weeks he requires to raise his tuition?
d) Which amounts will you choose to charge amongst the above and why choose that?

SECTION B

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

Part I

Answer **one** item from this part

Item 3 *(20 scores)*

So as to boost the mathematics performance in your class, the head of mathematics department want to motivate learners but she wants to set a pass mark such that **most** of the learners are awarded the mathematics test was given and the following are the marks scored. It was noted that 60% of the students failed.

86	85	56	59	67	62	63	50	91	62
56	27	50	54	80	61	52	52	16	28
66	46	55	58	56	77	26	40	42	51
35	45	68	51	49	40	93	84	79	63
52	53	25	93	27	71	66	52	30	12

The motivates as shown in the table below.

On the day of the academic assemble, the class teacher went for shopping and he found out that it is possible to buy 5 counter books and 7 rulers at a total cost of 11,800 from the staff stationary shop or 6 rulers and 8 counter books at a total cost 14,000 from the same the staff stationary shop. The teacher is interested in buying 5 counter books and five rulers.

Task:

a) Help the head of mathematics department determine the score to base on.
b) Assist the departmental head find the pass mark for the class.
c) help the head of department to determine the items.

Item 4 *(20 scores)*

The Ministry of Health in Uganda is conducting a survey about the existence of malaria in three districts: A, B and C. The ministry will then come up with control measures if the chance of a person testing positive having visited at least one of the districts is above 50%. The Ministry has intentionally selected a sample of people who visited the three districts and tested them for malaria. The test results have revealed that 50 people who visited district A, 60 people who visited district B and 40 people who visited district C tested positive for malaria. Additionally, 20 people who visited both districts A and B, 10 people who visited districts A and C, and 15 people who visited districts B and C tested positive for malaria. The Ministry has also discovered that 20 people who only visited district C tested positive for malaria and 40 people who visited the three districts tested negative for malaria.

Task:

(a) Determine the number of people that were tested for malaria by the ministry of health.
(b) Calculate the probability of a person testing positive having visited at least one of the three districts.
(c) Advise the Ministry of health, with a reason based on calculation, whether to come up with control measures or not.

Part II

Answer **one** item from this part

Item 5 *(20 scores)*

In preparation for S.4 prom party, you were chosen by your fellow candidates to be a chairperson of organizing committee. You moved from school to Town **A** for shopping of party items which is *160km* north of your school. From town **A** you moved west wards *150km* to town **B**. from **B** you headed to town **C** in the direction **S75^{O}W** which is *90km* from B. from **C** you continued to town **D** which is *148km* and south of **B**. but after you discovered that there is the shortest route you could use to move directly from school to town **D**.

In the shopping, you bought 400 chicken and each cost UGX 35,000. The farmer gave you 2% discount on each chicken. You also bought two identical jerry cans of cooking oil. The larger being of height 30cm and smaller of 25cm. the larger has a capacity of 10 liters and the smaller 5 litters. And you bought 4 smaller and 2 larger jerry cans.

Task

a) With relevant sketch and calculations, determine how far you would move if you used the shortest route.
b) Determine the total cost incurred in purchasing chicken.
c) What is the maximum amount of cooking oil you bought for the party?

Item 6 *(20 scores)*

The youths of a certain village have been playing football on Mr. Kizito's land. Of recent, Mr. Kizito has decided to cultivate his land to plant cassava and the youths are no longer having where to play football from. On reporting to the chairperson and the aspiring M.P of their area, the chairperson has promised them land that measures 60m by 120m and the aspiring M.P, a tractor to level this land into a football pitch. The youths are therefore to contribute for the fuel to be used by the tractor.

Support material

- The dimensions of the pitch should be 100m by 50m.
- Scale 1cm represents 10m
- The cost of fuel by liter is 5000/=
- The tractor uses 10 liters every after 30minutes.

Task:

(a) Help the youth leader of the village to:
  (i) Design the given piece of land.
  (ii) Determine the area of the proportion of land that remains after the construction of the football pitch.
  (iii) Decide on what the remaining land should be used for
(b) If the tractor levels $100m^2$ in one hour, how much money should be raised by the youth to level the ground.

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