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)*

Number plates, also known as license plates or registration plates are typically manufactured using a combination of digital printing technology and specialized equipment. Your guardian has three taxis that travel along Kampala−Gulu high way registered **UBA 443T**, **UBB 223R** and **UBD 132V**, the numerical digits on the number plates were found to be in quinary base and he is interested in knowing which vehicle has digits which are a multiple of three so that he can paint that vehicle with a red color for easy identification.

All the three taxis leave Namayiba taxi park at **6:00am** for their first route to different destinations, however they enter the after at different time intervals. The first taxi enters the taxi at **8:30am,** the second taxi at **9:00am** and the third one enters at **9:15am**. The fuel consumption rate for all the three taxis is the same and it was observed that when any of the taxi had covered **60km**, the fuel consumed costed **UGX160,000** and when the taxi had travelled **15km**, the fuel consumed was **UGX 40,000**.

Task:

(a)   Help your guardian know which taxi he will paint the red colour.

(b)   At what time will the three taxis enter Namayiba taxi park all at the same time.

(c)   What is the estimate cost on fuel consumption if the taxi plans to take your school for a tour to Jinja which is approximately 90km from Namayiba taxi park.

Item 2.   *(20 scores)*

A family of your friend agreed to have family planning so that they can effectively plan for their children. They agreed to have a child spacing of two years so that their business of drinks (water and soda) can pick up with time. They had their first born in 2020.

At their drinks shop they sell two types of water bottles, type A and type B and they make the water bottles by themselves. The same equipment can be used to make either water bottle. In making type A water bottles, one man can supervise 10 machines and this batch will give them a profit of **UGX 50,000** per day. Type B water bottles yield a profit of

UGX 250,000 a day using 25 machines and 8 men. There are 200 machines and 40 men available.

The produced water is parked in cartoons and your school had a thanksgiving function and budgeted for 5 boxes of water *type A* and 4 boxes of water *type B* at a cost of **UGX 92,500**. However, the boda boda man that was sent to buy the water brought 4 boxes of water *type A* and 5 boxes of water *type B* and was given a demand note of **UGX 4000** as balance remaining to be paid for what he bought.

Task.

(a)   In which year do you think your friend's family have their sixth born.

(b)   (i)   Show the feasible region of the relation on a Cartesian plane.

      (ii)   Help your friend's family determine the maximum profit they will receive from the sale of the water bottles.

(c)   What do you think is the actual price of each carton of each water type.

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SECTION B
This section has two parts; **I** and **II**
Part I
Answer **one** item from this part

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Task 3. *(20 scores)*

Your school demonstration farm holds monthly sales of cattle on the first Saturday of every month. How the farm care taker has noticed that there is a trend of the same animals remaining un sold every month because the farm attendants just select the animals which are near, and so he wants to obtain the average weight of all animals at the farm. He has agreed that this month all animals with a weight greater than the average weight of the animals be sold each at **UGX 890,000** per animal. The data in kg of the weights of the animals is given in the table below.

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

Additionally he is going to sell 15 goats, 25 sheep and 10 ducks each at $UGX140,000$ per goat, $UGX215,000$ per sheep and $UGX\ 36,000$ per duck respectively.

Task

(a) Giving a reason based on calculations, using the data collected, suggest the most minimum mass that can be accepted to be sold on this first Saturday this month.

(b) How many cattle will be sold on this first Saturday this month.

(c) Help the farm care taker know how much money he expects to get from the sales this month.

Item 4.   *(20 scores)*

Malaria is a life threatening disease spread through mosquitoes that feed on humans, with symptoms such as high fevers and shaking chills. As one of the top diseases impacting Ugandans, it is at a risk to cover 90% of the Ugandan Population and is a leading cause of sickness and death especially in children. The mosquitoes breed easily in bushy areas and in stagnant water and in order to prevent it, health official have advised that we sleep under a mosquito net, slash all the bush around us and remove all stagnant water around us.

In a bid to curb the disease, health officials from your district visited your village to distribute mosquito nets, however they found that some homes were harboring mosquitos around us.

Fifty two homes were visited in your village, it was found that only four homes had mosquito nets, had cleared all the bushes around and had no stagnant water around and thus had managed to control malaria, the other homes had problems of malaria. It was found that *equal number* of homes had neither mosquito nets nor had slashed their bushes, of which *twelve* homes had no mosquito nets and had not slashed their bushes round them, thus harboring mosquitoes. *Twenty four* homes all together had stagnant water available in their soak pits and open manholes, of whom *eleven* had neither mosquito nets nor removed the stagnant water. *Thirteen* homes had bushes around and also had stagnant water present in their homes. *Eight* homes had no single mosquito net, had huge bushes around and had stagnant water in their homes.

Task:

(a) Determine the number of mosquito nets to be distributed, if each home that lacked a mosquito net was to be given exactly four nets.

(b) Calculate the probability that a home visited needed also to have their bushes slashed.

(c) Display the data on a statistical diagram.

(d) Advise the district officials with reason based on calculations to come up with control measures for malaria.

Part II

Answer **one** item from this part
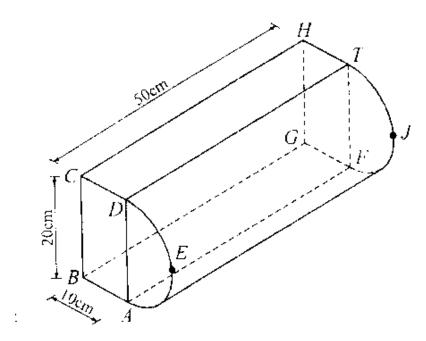
Item 5. *(20 scores)*

National Medical Stores (NMS) is a government parastatal mandated to procure, store and distribute essential medicines and medical supplies to all public health facilities in the country. It uses trucks and lorries to do the distribution. However there is concern about delay of the trucks to return to the parking lot in Wandegeya. On a particular day a lorry and a truck are sent to deliver drugs to Hoima Regional referral hospital and Kiryandongo hospital respectively. They were expected to return to the parking lot in Wandegeya which is exactly half way between Hoima and Kiryandongo. Both vehicles drive at a steady speed of $80km/hr$ and set off at $3:00am$ from the NMS offices in Entebbe. From the point of setting off the lorry turns in the direction of 060º and drives with a steady speed reaching Hoima at $6:00am$. The lorry sets off from NMS offices and moves to Kiryandongo whish is 330km the offices in the direction of 200º. each spends averagely two and half hours off loading the drugs.

Task.

(a) Help the manager record the time each vehicle is expected to return to the parking lot in Wandegeya.

(b) What is shortest distance between Entebbe and Wandegeya.

(c) In your view how can the health system be improved in your area.

Item 6. *(20 scores)*

Your neigbour is starting a poultry farm after getting funds from the parish development model (PDM). Your neighbor borrowed **UGX 48.52 millions** from **PDM** to be returned after one and half years at a rate of **0.5%** per month simple interest a so he has ordered for chicken drinkers from Biyinzika Poultry Farmers with the shape *ABCD* in which *ABCD* is a rectangle and *ADE* is a semi-circle of diameter *AD*. $\overline{BC}$ = 20cm, $\overline{AB}$ = 10cm and $\overline{CH}$ = 50cm.

Biyinzika Poultry farmers sells the each drinker at **UGX 21,500**, but offers a discount of 10 percentage on the total cost for every fifty drinkers and an additional 5% on the total cost on any excess of 50 drinkers bought. Because your neighbor is buying five hundred birds, he intends to buy 80 drinkers but does not know the capacity of each drinker which will help him buy water tank to harvest the water for the business.

Task:

(a) Help your neighbor estimate how much money he will return to the PDM after the one and half years.

(b) How much will he spend on buying the drinkers.

(c) Estimate the capacity of each drinker and advise your neighbor, with reasons on the capacity of the tank to buy. **END**