456/1

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)*

A group of Canadian visited your village and were all aboard a bus. **60**% of the passengers on the bus were females and $\mathbf{16\frac{2}{3}\%}$ of the females are students doing their internship. **12**½% of the males are students. There are four male students on the bus.

There are **420** people in your village. A civil society organization wants to distribute books and novels about life skills. It found out that *three fifths* of the people in the village are children, a *seventh* of the children can read and write while $\frac{\mathbf{1}}{\mathbf{28}}$ of the adults cannot read or write.

In your village your guardian has farm land for cultivation. *Six* men can cultivate an area of $\mathbf{280}\boldsymbol{m^2}$ in **2** hours.

Task.

(a) How many people in the village will get the reading material?

(b) Find the number of:

(i) Passengers on the bus that visited your village

(ii) Students on the bus.

(c) What area would **5** men cultivate in **3** hours working at the same rate.

Task 2 *(20 scores)*

Towards the end of the second wave of **COVID-19** the president opened up schools in a phased manner. As a requirement and as a standard operating procedure, all schools were required to measure the temperature of all students and visitors that came in and visited the schools. This was done using temperature guns. The data below shows the temperature recorded over a period of 8 days.

Day	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Temperature (^{o}c)	20	24	36	32	28	38	34	26
Number of people	280	360	450	420	400	500	475	320

The head teacher bought two types of temperature guns, the pyrometer type and the Infrared type both bought from the same shop. He bought two pyrometer temperature guns and three infrared guns for the O level section of your school at $\mathbf{UGX730,000}$. He also bought three pyrometer guns and two infra- red temperature guns and paid $\mathbf{UGX720,000}$. When the UCE results were released, the head teacher held a thanks giving ceremony and all guests were to be served with water and soda. At least twice as any cartoons of water as crats of soda were needed. A carton of water contains 25 bottles and a crate of soda contains 24 bottles. More than 200 bottles of drinks were required. A cartoon of water costs $\mathbf{UGX20,000}$ and a crate of soda costs $\mathbf{UGX8,000}$. A maximum of $\mathbf{UGX180,000}$ has been allocated to be spent on drinks.

Task.

(a) How many people in the school had a temperature of **30^{o}c.**

(b) How much would he pay for 5 pyrometer and 4 infrared temperature guns.

(c) Find the number of cartons of water and crates of soda that should be bought in order to keep the cost as low as possible.

SECTION B

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

Part I

Answer **one** item from this part

Item 3 *(20 scores)*

Your school in Kampala has qualified for the Fresh Dairy games to take place in Soroti this year. However as are requirement, all participating schools were required to submit the average weight of all the participants. Below are the weights in kg of the students in the team.

83	83	85	88	89	91	94	60	47	37
72	74	74	74	75	77	81	94	62	48
64	65	65	67	67	68	69	81	70	63
52	54	54	56	57	59	60	69	81	71
38	39	40	40	43	45	46	47	94	83
24	30	31	31	32	33	34	34	35	97

Only students with a weight above $\mathbf{87}\boldsymbol{kg}$ qualified to participate in Javelin.

The school is using a bus to transport the students and a luggage coaster to carry the team's luggage from Kampala to Soroti SS which is $\mathbf{340}\boldsymbol{km}$. at $\mathbf{7}:\mathbf{00}\boldsymbol{am}$, the luggage coaster travelling at a non stop speed of $\mathbf{60}\boldsymbol{km}/\boldsymbol{hr}$ leaves Kampala for Soroti. One and three quarter hours later, the school team bus leaves Kampala for Soroti travelling at a constant speed. After one hour of travelling the bus gets a puncture at Kitogoma 100km from Kampala. It took 45 minutes to fix the tyre and then resumes travelling at a steady non stop speed so that it reaches Soroti at half past midday.

Task

(a) Find the school's average age.

(b) How many students will represent the school in Javelin.

(c) Find the difference in the times of arrival.

Item 4. *(20 scores)*

Your has organized inter class competitions and this will take place after examinations. All the four classes in O level are to participate in Netball, Football and Volley ball. The S.4 class of 87 students has fielded all the students to participate in the games. Some will participate in one game others two and others all the games. Of these 43 paly Netball, 42 paly Football and 47 play Volleyball. 15 play Netball and Volleyball, 17 play Volleyball and Football while 21 play Netball and Football. Only winners were awarded points. When the games were played S.4 class won 1 Netball game, 2 Volleyball games and 2 Football games. S.2 won 1 Netball game, 2 Volleyball games and 1 Football game. S.1 won 2 Netball games, 1 Volleyball game and 1 Football game while S.3 won 1 Netball game, 2 Volleyball games and 2 Football games. Each win in Football is awarded 3 points, each win in Netball is awarded 4 points and each win in Volleyball is awarded 2 points. The overall winner will have a bull roasting.

Task

(a) If a student is selected at random from your class, find the probability that the student plays only one game.

(b) Which class will take the bull.

Part I

Answer **one** item from this part

Item 5 *(20 scores)*

Your area MP in Entebbe is organizing a thanks giving function at the sub-county headquarters. He has just realized that he needs sixty hand washing tanks of different sizes; and visits your neighbor's hardware. He has exactly five hours remaining for the function to start. Unfortunately, the tanks are out of stock and an order has to be placed in Durban South Africa and the tanks have to be transported by an air cargo. From Durban it flew west at a speed of $\mathbf{280}\boldsymbol{km/hr}$ for ¾ hours before reaching Addis Ababa. It then altered its course and flew North-west to Nairobi at $\mathbf{220}\boldsymbol{km/hr}$. From there it flew on a bearing of 060° to Entebbe at $\mathbf{240}\boldsymbol{km/hr}$ for 1 ½ hours. The total time of flight between the four places was 4 ½ hours.

The tanks have two sizes, a smaller tank with a base radius of 40cm and a larger tank with a base radius of 60cm. the capacity of the small tank is 120 litres.

As a token of give back for the community. Your area M.P gave out houses valued at UGX 5million. He asked everyone who wanted the houses to make a down payment of UGX 1.5 million and balance be taken as a loan at a compound interest of 5% per annum from the village SACCO. The loan was to be repaid over a period of 10 years.

Task

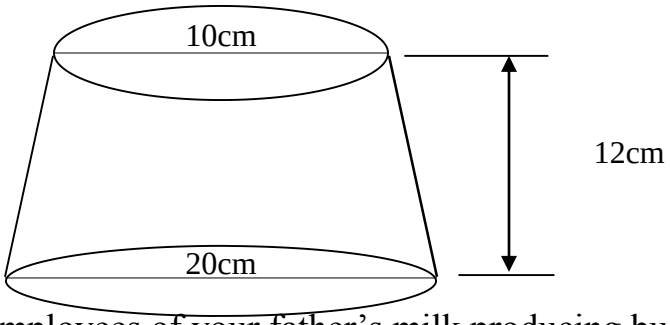
(a) If the air cargo flew directly back to Durban at a speed of $\mathbf{200km/hr}$, determine how long it took to fly back to Durban.

(b) Find the capacity of the larger tank.

(c) Find the cost of the house.

Item 6 *(20 scores)*

Your father has a milk producing business. The bucket below has a height of 12cm. It's upper and lower diameters are 10cm and 20cm respectively. He always gets 25 of these buckets daily of milk.



Mary and James are employees of your father's milk producing business.

Mary is paid a monthly gross income of shs 500,000 while James is paid shs 650,000. The gross includes non-taxable allowances shown below.

Transport	shs 480,000 per annum.
Housing	shs 600,000 per annum
Medical	shs 30000 per month
Children:	
Below 10 years	shs 5000 per month
Above 10 years below 18years	shs 3000 per month

Mary has 2 children aged 5 years and 9years.

James has 5 children aged 8,13,17,19 and 21 years. The company taxes the workers using the system below.

Taxable Income shs			Rate (%)
0	-	50,000	5%
500001	-	120,000	10
120001	-	200,000	15
200001	-	And above	20.

Task

(a) Find the daily amount of milk that can be milked in a day.

(b) Determine each employee's net income.

END