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MATHEMATICS
Paper 1
July/Aug. 2025
 $2\frac{1}{4}$ hours

INTERNAL MOCK EXAMINATION TERM II 2025

Uganda Certificate of Education

MATHEMATICS

Paper 1

2 hours 15 minutes.

Item 1	
Item 2	
Part 1	
Part II	

INSTRUCTIONS TO CANDIDATES

*This paper has **two** sections **A** and **B**. it consists of **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 booklets or sheets provided.*

Graph paper is provided.

Silent non-programable scientific calculators and mathematical tables with a list of formulae may be used.

SECTION A

Answer both items in this section.

Item 1.

Three friends Peter, Adam and Jane agreed to save periodically in a saving scheme on the understanding that at the end of the cycle when all pool-in their savings, the total amount of money collected will be used to buy a large piece of land on which eucalyptus trees can be planted. Peter agreed to save after every 4 days an amount that is $\frac{2}{5}$ of what Adam saves. Adam agreed to save after every 5 days an amount that is 70% of what Jane saves. Jane who owns a software programme that stores information in base Six, agreed to save Sh.800,434 after every 6 days.

At the end of the cycle, the large piece of land was bought. 15 men could dig the land in 8 days but after 3 days, 3 more men joined. The work would then be required to be completed in not more than 5 days when all of them work together at the same rate.

Task:

- Help the group to determine their total savings at the end of the cycle.
- What digits regarding the number of the days of a full saving cycle that are stored by the software programme.
- Comment with evidence whether the work would be completed in not more than five days after 3 more men joining the group.

Item 2

A winding road in form of a quadratic curve connects two towns Katuna and Kabale in Western Uganda. The winding road is modeled by the equation of the curve $y = 2x^2 - 12x + 28$; however, there is a straight direct gravel road $y = -2x + 28$ that connects the two towns. A civil engineering company was contracted to tarmac the section of the gravel road from Katuna to Kabale.

The Municipal council last year allocated Sh.80,000,000 in the budget for the tarmacking of the gravel road. The engineering company charges Sh.7,339,500 for each kilometer tarmacked.

Kabale Municipal council wants to preserve the wetland area located in the space bound between the two roads.

Task:

Taking a scale of 1cm for 2km on the y – axis and 2cm for 1km on the x – axis, and the domain $-1 \leq x \leq 7 \text{ km}$,

- a) Help the engineering company to make an informed decision on whether to take the contract or not.
- b) By shading the region bound between the roads, indicate clearly the area to be preserved as wetlands by the Municipal council.
- c) Write down the grid coordinates of Katuna and Kabale in kilometers with reference from the origin.

SECTION B

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

Part I

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

Item 3.

A survey was conducted by Ministry of Information Communication, Technology and National guidance in which 175 people were asked if they get their news from any of the following sources; Television, Radio, or Newspapers. The survey indicates that;

101 people said they get their news from Television, 63 get their news from Radio, and 61 get their news from Newspapers. 22 said they get their news from Television and Newspapers only, 26 get their news from Television and Radio only, while 27 said they get their news from Radios and Newspapers. Those who have no access to news from any of the three sources were found to be 8 more than those whose source of news is Television only. The Ministry plans to give out free Radios if the probability that a person chosen at random can not access news from any of the three sources is greater than 0.2

Also, if the probability that a person chosen at random receives news from Radio or Television is less than 0.6, the Ministry will introduce Free-to-Air services and cancel all subscription fees.

Task:

With evidence, suggest how the Ministry will proceed with its decision in regard with how people get their news?

Item 4.

From Mulago Cancer Institute, the analysis of age of Cancer patients reveals the nature of cancer incidence, and trend of mortality rates. It also reveals the age that faces unique challenges related to diagnosis, and treatment. If the ratio of the age of the majority to the average age is less than 1.2, then the cancer incidence is more among the middle age adults, otherwise among teenagers or elderly people over 40years.

A sample of 50 patients had their ages collected as follows;

36	22	23	31	35	56	41	47	47	51
24	24	37	58	40	38	42	50	50	51
28	16	24	20	19	16	20	28	45	27
49	25	46	34	35	31	36	27	46	28
26	27	40	34	32	31	39	38	30	37

Patients over 46.9 years are provided with specialized care while those below 28 years are encouraged to seek for chemotherapy as a conduct of treatment.

Task:

As a student who has acquired sufficient knowledge on Data Collection and Analysis,

- Help Mulago Cancer Institute with a well-organized table showing the age frequency distribution starting with the class of 16 – 20 years.
- With reason and evidence, state the age group with more cancer incidences.
- Using a suitable statistical graph, estimate the number of patients recommended for cancer specialized care, and chemotherapy treatment.

Part II

Answer one item from this part.

Item 5.

A Bus leaves Kampala at 0800 hours and travels on a bearing of 010° with a speed of 200km/hr and manages to reach Gulu town at 0930 hours. While at Gulu, the Bus rests for 5 minutes after which it departs on a bearing of 110° traveling at a speed of 180km/hr to reach Lira town at 1020 hours. At 1030 hours the Bus leaves Lira and maintains a bearing of 110° and manages to reach Soroti town at 1240 hours.

The distance between Gulu and Soroti is however 230km. The Bus stays at Soroti for 20 minutes after which it heads back to Kampala via the direct route arriving at 1810 hours. This direct route is prone to accidents and the Bus driver is not allowed to exceed a speed of 60km/hr according to the traffic rules.

Task:

- a) Basing on evidence, suggest whether the Bus driver was compliant to the speed limit traffic rule.
- b) Write a time table for the entire journey of the Bus starting from Kampala.

Item 6.

Peter, Tonny and Ann are employees at Bwanda sister's school Kalungu. Peter and Tony are teachers in the school who earn gross monthly salaries of Sh.1,500,000 and Sh.975,000 respectively. Ann is a support staff and she pays Sh.70,000 as income tax.

To boost her income, Ann operates a private business that deals in roasting coffee, a cup of which is sold at Sh.10,000. However, to add value to the roasted coffee, Ann grinds it and sells a cup at Sh.10,800 eventually paying a VAT of Sh.144 per cup.

The teachers are also given the following allowances.

Allowance	Amount (Sh.)	Period
Medical	3,600,000	Three years
Food	130,000	Monthly
Transport	1,080,000	annually

Being a religious school, each employee pays $\frac{1}{10}$ of his net pay as tithe and saves 5% of the net pay as NSSF.

All workers are taxed according to the following rates.

Taxable income (Sh.)	Rate (%)
01 – 235,000	0
235,001 – 335,000	10
335,001 – 1,335,000	20
Over 1,335,001	30

Task;

- a) You are required to determine Ann's Gross salary
- b) How much money is deposited to each worker's bank account at the end of each month.
- c) Calculate how much more money Ann made from adding value to the coffee instead of selling them simply roasted coffee

END.