456
MATHEMATICS
Paper 1
Nov./Dec. 2024
2 ¼ hours.

ACHOLI REGIONAL SESEMAT EXAMINATION

Uganda Certificate of Education

S.2 MATHEMATICS

Paper 1

Time: 2 hours 15 minutes

INSTRUCTIONS TO ITEM TAKER:

Anthis paper has two Sections; A and B. It consists of six examination items.

Section A has two compulsory items.

Sectin 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 papers.

Graph Paper is provided.

Silent, non – programmable scientific calculators and mathematical with a of formulae may be used.

SECTION A

Answer **both** *items in this section*

Item 1

At the beginning of the year, Vani Savings and Credit Association intends to construct within the first three months, a rectangular Kraal for their cattle which length is $\sqrt{2}$ times as it's width. The perimeter of the Kraal is $(6 + 4\sqrt{2})$ units. In order, to implement this project, the Association requires a 80% collection rate from the members. By the end of the first month, two – third of the members had contributed towards the project. In the subsequent month, an additional 50 members had paid resulting into a significant increase in the proportion of members who contributed, reaching three-quarters of the total population.

Task

a) Guide the Association to determine the land area used, ensuring a surd form solution, rationalised numerals and simplified radicals.
b) Ascertain the precise number of members in Vani Savings and Credit Association.
c) Guide the Association on whether the construction can be undertaken, with supporting reasons.

Item 2

A factory production line requires material p and q to produce an item B. To produce the item, it requires 2p and 3q materials, Material p cost UGX 1,500 and material q costs UGX 1,000, the parking labour for each item is UGX 500. In the month of January, the factory produced 200 items, in February it produced 250 items, in March it produced 270 items, in April it produced 300 items and, in the month of May it produced 400 items.

Task

a) (i) Determine how much it would cost to produce an item.
   (ii) In a certain month, the factory has UGX 1,300,000. Advise the Managing Director on how many items the factory can produce.
b) How can the monthly expenses be presented on an arrow diagram?

SECTION B

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

Part 1

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

Item 3

Okello wants to visit his friend Omony who is at some distance from his home. Okello made the first part of his journey by a motorcycle and walked the remaining distance. He started walking at 11:10am and reached Omony's place at 11:40am. Okello travelled a distance of seven kilometer by a motorcycle and three-kilometer walking.

Task

a) Draw a graph to show Okello's journey on foot.
b) How far was Okello from Omony's home at 11:30am?
c) What was the speed of Okello in km/h as he walked?

Item 4

During training for youth livelihood program (YLP) in Karamoja region, the arrival time of the trainees was not uniform and it affected training. Below are their arrivals after 08:00am.

21	24	27	20	24	25	27
23	28	22	29	23	26	21
25	26	28	21	23	20	22
26	25	28	23	26	21	26
27	26	24	26	22	26	29

Task

a) If the training is to be conducted in your area, help the organisers to set an appropriate starting time for the training.

b) Present the above data on a bar chart and use it to determine the minutes most trainees took to arrive for training after 08:00am.

c) Given that serving morning tea stopped at exactly 08:25am, how many trainees missed tea?

Part II

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

Item 5

A tourist vehicle leaves corner Kamdini and travels North to Gulu city for 65km. it then changes course and travels 55km on a bearing of 229° to Nwoya district. On realizing the great distance and much time taken, via Gulu city route, the tourist returned to corner Kamdini by travelling directly from Nwoya to corner Kamdini at 60km/h but they do not know how far it is from Nwoya to Kamdini.

Task

a) Advice the tourists on how far corner Kamdini is from Nwoya describing it's direction from Nwoya.

b) Determine how long the tourist will take in travelling from Nwoya direct to Corner Kamdini

Item 6

Rwotomiya is a renowned businessman in Kitgum municipality. In the month of September, he bought 20 bags of sugar at UGX 3,500,000 and hired a lorry at UGX 500,000 to transport the sugar he bought from the supplier. He sold each bag at UGX 250,000. He also got a loan of UGX 4,000,000 on simple interest at a rate of 5% payable twice a year from some micro-finance.

Task.

a) (i) Help Rwotomiya to compare what he spent in buying 20 bags of sugar and what he got after selling the 20 bags of sugar.

(ii) If he paid a withholding tax of 6%, determine how profitable his transaction has been.

b) Determine how much he will pay after two years to the micro-finance.

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PHYSICS
Paper 1
Nov. 2024
$2\frac{1}{2}$ hours.

ACHOLI REGIONAL SESEMAT EXAMINATIONS

Uganda Certificate of Education

S.2 PHYSICS

Paper 1

2 hours 30 minutes

INSTRUCTIONS TO ITEM TAKER:

*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** assessment items in all.*

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

All answers must be written in the Answer papers.

Turn Over

SECTION A

*Answer **all** the items in this section*

Item 1.

Two boys, Andrew and David, went to the saloon to shave their hair on a Sunday evening. On the way, they reached in front of a church with glass windows. Andrew viewed his image in the glass and realized that his right hand is the left hand in the image. He wondered and called his friend, David to come and see. David simply said the glass is acting like a dressing mirror. That their teacher told them about the images formed in plane mirrors as having many characteristics, and that there are many applications of such mirrors in life we shall learn. In the shalloon, the mirrors are placed on the two walls perpendicular to each other, Andrew saw many images of his. He got puzzled and wanted to know how the many images came about. The boys came back home and narrated the stories to you.

Task;

As a physics learner,

(a) (i) explain to Andrew what puzzled him in the saloon.
(ii) help the two boys to understand what the teacher told David.
(b) describe to Andrew how the scary scene came about.

Item 2.

Linda, one of your village mates got a scholarship and went to study Astrophysics in another country abroad. After few weeks of settling down in her studies, she called home one evening at 9:00 pm. The mother received the call and she greeted her mother "Good morning mom, the sun is just rising from here". The mother kept wondering how one place can be in daytime and another in the night. During their conversation, Linda was excited to tell her mother that their first lecture was on the phases of the moon in a monthly cycle and what causes it. The mother was impatiently waiting for her daughter, Linda to come and explained to her why that is so.

Task:

As a student of physics;

(a) explain to the mother what she wonders about.
(b) help the mother to wait for Linda patiently.

SECTION B

Part I

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

Item 3.

A team from a company dealing in solar stoves visited your home one morning selling their products. They told your mother that their products use renewable energy sources, unlike others that use non-renewable energy sources. These terms confused your mother so much, but she is willing to buy one of the products. She sent your sister, Alaro who weighs **55 kg**, to run to the father in the garden **500 m** away to ask him for the money. Alaro was putting on high heeled shoes which she removed and ran barefooted. She took **4 minutes** to reach the father, experiencing a cold ground. On her way back, she got a log, **25 kg**, good to be split for firewood and carried it home, arriving **10 minutes** after leaving the home. Her mother praised her for having done a great job. She was sweating and said she was very tired, feeling hot and drew water, poured on her head while bending forward.

Acceleration due to gravity = 10 ms^{-2}.

Task:

As a learner of physics;

(a) explain to your mother the two terms confusing her.
(b) explain what Alaro did and why she felt so, while going to the father.
(c) support the mother's praises to Alaro and explain why she did what she did after coming back from the garden.

Item 4.

Jonathan prepares to go fishing in a nearby river using a hook, one day during the holiday. He intends to use a Float (Bobber) of volume **2 × $10^{-6}m^3$** and density **600kgm^{-3}**. Depending on luck, he wishes that the top part of the bobber at worst should be on the same level as the surface of the river water when the system of string, hook and bait is dropped in the water.

Back at school, Jonathan's S.1 teammates proposed a project for making a water thermometer to measure the body temperature of their fellow students who frequently suffer from fever.

Density of river water = 1000kgm^{-3}
Acceleration due to gravity =10ms^2

Task

As a student of physics, you have been asked to;

(a) help Jonathan establish the maximum weight of the hook and bait that he should attach to the free end of the string so that the bobber does not sink.
(b) (i) guide Jonathan and his teammates to develop the water thermometer, which is operational.
(ii) explain the challenges the team is likely to face when using the thermometer.

Part II

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

Item 5.

You have two sisters Norah, in P.7 and Rita, in S.2. They were conversing and Rita told her sister that their physics teacher told them that their next lesson would be on magnets.

(i) That magnets are very important in life, having many applications.
(ii) That there are ways of making and destroying magnets.
(iii) That the materials that can be made into magnets have their special properties.

And the teacher gave an activity on "**making a magnet by single stroke method**" to be presented in the next lesson.

Task:

As a learner of Physics;

(a) help your sister to be well versed with (i), (ii) and (iii) before the next lesson.
(b) Explain the process of the activity given to your sister.

Item 6.

One of the most interesting topics in Physics is Electrostatics. The phenomenon associated with this has a lot of arguments, such as Lightning and thunder, use of sprayers in painting, photocopier work, smart screen sensitivity, and many others. Your younger brother in S.1said their teacher in primary instructed them to rub a Bic pen with their hair vigorously and bring closer to pieces of paper. When they did the pen picked the pieces of paper. They were all astonished and asked the teacher how that thing happens, what makes it to happen, and what prevents it from happening.

Task:

As a physics learner;

Explain to your brother what the class wanted from the teacher.

END

ACHOLI REGIONAL SESEMAT EXAMINATIONS

Uganda Certificate of Education

S.1 MATHEMATICS

Paper 1

Time: 2 hours 15 minutes

INSTRUCTIONS TO ITEM TAKER:

Anthis paper has two Sections; A and B. It consists of six examination items

Section A has two compulsory items

Sectin 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 papers

Graph Paper is provided

Silent, non – programmable scientific calculators and mathematical with a list of formulae may be used.

SECTION A

Answer **both** *items in this section*

Item 1

At Malaba boarder Town, Business transaction takes place among the nationalS of Uganda, Kenya, Somali and Ethiopia. For every cow sold, a buyer pays UGX. 1,000,000 or 35,000 Kenya shillings. Somalis are fond of using Uganda shillings while Ethiopians are fond of using Kenya shillings. The animals are sold by the Somalis and Ethiopians.

FAO a UN agency has been permitted to restock Northern Uganda. Families **A, B, C, D,** and **E** in Agoro have been allocated money to buy 1,4,3,2 and5 cows respectively. However, URA levies 6% withholding tax for every cow bought. Villages **A, B** and **C** bought cows from Somalis while Villages **D** and **E** bought cows from Ethiopians.

Task:

a) Advise FAO on how much they should prepare to support the villagers.

b) Determine how much URA will get from villages D and E.

c) What overall percentage of money will be spent on villages A, B and C.

Item 2.

Jason wants to contract a gardener to work on his rectangular tomatoes plot whose length is $(x + 3)$m with perimeter 25m and an area of $25m^2$. He expected the work to finish in one day and the gardener brought two other men working at the same rate as his rate. However, they only mange to work on $5m^2$. In order to get the contract, the gardener is required to make a clear diagram of the plot showing its numerical dimensions. He however comes to you to help Jason to plan pay for his worker.

Task

a) (i) Help the gardener to know the dimensions of the plot.

(ii) Make a sketch of the plot the gardener can present to Jason

b) (i) Determine the number of workers needed to complete the work in one day if they all work at the same rate as the group Jason has ever used.

(ii) Help Jason to know how much he needs to secure for the work.

SECTION B

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

Part 1

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

Item 3

To enhance language development at city Hall Academy, the Board of Directors intend to recruit Kiswahili, Leb Acholi and English language teachers. They plan to offer permanent positions to candidates who teach all the three subjects, while those who can teach one or two

subjects will be hired on contract basis. Out of the applicants, 17 teach Kiswahili, 22 teach Leb Acholi and 26 teach English language. The number of those who teach Leb Acholi and English language only is four times as many as the number of those who teach all the three subjects, 7 teach both Kiswahili and English language, and 5 teach both Kiswahili and Leb Acholi, and the number of those who teach solely Leb Acholi is 9. The Board of Directors will only consider those who are proficient in at least two languages for oral interview. Your friend has been tasked with identifying the eligible candidates and needs your assistance in analysing the data to determine the number of candidates who meet the criteria.

Task

a) Using your mathematical expertise, help your friend know the number of candidates
   (i) Who applied for the job.
   (ii) Who are eligible for an oral interview.

b) The school has a program for teachers who can teach all the three languages to be rotated among classes and paid more. What is the likelihood of a random applicant being in this program?

Item 4

A group of senior three students went for a Geography field trip to a nearby goats' farm. The farm manager showed them records of the masses of goats being kept in the farm. The farmer would make profit if the average weight of goats is at least 30kg. the following were the masses of the goats in the farm.

15	18	20	22	17	25	23	28	26	21
30	33	35	32	36	39	42	37	41	28
45	48	29	31	26	27	30	33	34	31
28	35	40	42	37	39	36	38	29	43
46	47	30	32	31	45	27	44	46	49
52	53	55	51	50	56	57	58	59	51

Task

a) Determine whether the farmer would make profit and give reason.

b) What is the medium weight of the goats in the farm?

Part II

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

Item 5

Taban and Andrew were assigned to come up with two models of containers in form of cuboid and cylinder respectively. Taban designed a cuboid measuring 20cm by 10cm by 40cm while Andrew designed a cylinder with dimensions, radius, r = 7cm and height, h = 30cm. A manufacturing company is to make a cuboid container and a cylinder container from the models such that their capacities are $8m^3$ and $2.31m^3$ respectively. It costs UGX 100,000 to paint $1m^3$.

Task

a) Determine the actual dimensions of the two containers that the manufacturer will make.
b) Help the company to plan for the materials necessary to make the two containers.
c) How much would the company spend on painting the two containers.

Item 6

In order to boost business in Gulu city, there are three micro-finance A, B and C mandated to give loans on compound interest terms. Micro-finance A gives at the rate of 2% after every two months, micro-finance B gives at the rate of 5% after every six months and micro-finance C gives at a rate of 10% per annum.

Mr. Onen Henry bought a used car at UGX 10,000,000 and the car depreciates at the rate of 2% after every 6 months.

Task.

a) Advise Mr. Onen on the Bank he should go to for the loan.
b) How much would Mr. Onen pay to the bank that offers favourable interest rate at the end of two years.
c) Determine how much he would sell the car after three years.

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PHYSICS
Paper 1
Nov. 2024
$2\frac{1}{2}$ hours.

ACHOLI REGIONAL SESEMAT EXAMINATIONS

Uganda Certificate of Education

S.3 PHYSICS

Paper 1

2 hours 30 minutes

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 papers.

Turn Over

SECTION A

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

Item 1.

Two Siblings went on vacation to their village. One evening during a rainstorm they saw a curved band of colours across the sky opposite the direction of the Sun. Their Grand Mother explained that a big ancestral snake in the village was puffing off the colours. The two though, tried but unsuccessfully agreed on the exact number of the colours. Suddenly, there was a lightning flash in the sky followed by a loud sound after **49 seconds**, prompting the children to rush into the house. Grand Ma consoled them that the lightning occurred a long distance away from their home.
The following clear evening, their Grand Father entertained them with a single – stringed instrument. The children wondered how a one- stringed instrument can give sound of different frequencies.
The speed of sound in humid air is 340 ms^{-1}
The farthest recorded lightning strike occurred in Florida USA in 2019 at a distance of 16km

Task

As a learner of Physics

(a) (i) Explain whether the story of the Grand Ma about the curved light that appeared in the sky is a correct explanation of what happened.

(ii) Explain why the children could not count exactly the number of colours produced in the sky.

(iii) Determine whether or not the Grand Ma's house will be safe in case of a lightning strike similar to the one the children experienced.

(b) Explain how a single-stringed instrument can be made to produce sounds of different frequencies.

Item 2.

Kibwota and Nokrac were watching a live English Premier League match on a television at 10:00 pm in the night. As they were watching, they noticed that there was sunshine in the pitch, indicating that it was day in England. It confused them and they developed interest in knowing why it was like that. As time went on, the commentators announced that "summer is soon ending and we are soon starting winter, people should prepare for it".
Upon hearing that, Nokrac asked Kibwota what summer and winter means and Kibwota responded that they are seasons and that we don't experience them here in Uganda. That left Nokrac in amusement and questioned what causes the two seasons and why in Uganda we don't experience them.

Task:

As a physics student,

(a) help the two people to know what causes the people in England to experience day yet in Uganda its night.

(b) explain to Nokrac what causes seasons and why Uganda doesn't experience those the commentator told people to prepare for.

SECTION B

Part I

Answer one item from this part

Item 3

[illegible] elder brother's spouse in her first pregnancy, was under the monitor of a Traditional Birth Attendant (TBA) in your village whose home is **975 m** from your home. Labour pain started she concealed it [illegible] her mother-in-law pretending not to be feeling any pain. The pain intensified, her mother-in-law [illegible] and at once sent your younger brother on a bicycle to go and carry the TBA to come for [illegible] monitoring and further management. The boy started from rest and accelerated at **0.5 ms^{-2}** for [illegible]. He maintained the velocity reached for **3 minutes**, then decelerated uniformly to rest. At the TBA's home, the boy took **30 minutes** then he rode back carrying the attendant, taking twice the time he took to reach the attendant's home. On coming back, the boy was sweating seriously, panting, and [illegible] removed his jacket as well as shirt.

The maximum time to find the mother still in labour is ***40 minutes***

Task

As a learner of physics;

(a) ascertain whether the TBA got the mother before delivery.

(b) explain what happened on the boy and why he did so after coming back.

Item 4

It is sports day in your school. As part of the concluding events, Tom, a Senior three student offered to exhibit his skills in riding a bicycle within the school playground. A friend started to time when his velocity had reached **5ms^{-1}**. Tom creatively accelerated for **5 seconds** up to a velocity of **20ms^{-1}**. He then maintained that velocity for **6 seconds** before dramatically slowing down to rest in **4 seconds**. Tom repeated the exercise a second time, upon applause and demand by the crowd. However, this time round he attempted to bring the bicycle to a stop within just **1 second** instead of **4 seconds**; this caused the tyres to skid off the ground and burst. Luckily enough, both he and the onlookers were not injured.

Task

As a student of physics:

(a) give a full account of the first motion by Tom.

b) explain what happened in the last part of the second Tom's motion.

SECTION B

Part I

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

Item 3.

Your brother's spouse in her first pregnancy, was under the monitor of a Traditional Birth Attendant (TBA) in your village, whose home is **975 m** from your home. Labour pain started she concealed it from her mother-in-law, pretending not to be feeling any pain. The pain intensified, her mother-in-law noted it and at once, sent your younger brother on a bicycle to go and carry the TBA to come for close monitoring and further management. The boy started from rest and accelerated at **0.5 ms^{-2}** for **10 s**. He maintained the velocity reached for **3 minutes**, then decelerated uniformly to rest. At the TBA's home, the boy took **30 minutes** then he rode back carrying the attendant, taking twice the time he took to reach the attendant's home. On coming back, the boy was sweating seriously, panting, and he removed his jacket as well as shirt.

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As a learner of physics;

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Task

As a student of physics:

(a) give a full account of the first motion by Tom.

b) explain what happened in the last part of the second Tom's motion.

Part II

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

Item 5.

Safina, a cook in your School got terrified one early morning in her dark room while lifting her hair using a plastic comb, flashes of light around her head as she combed her hair literally lit the whole room. She, nevertheless, continued to prepare herself to go for work that morning, that was expected to be more tedious since there was a claim that beans that were recently supplied was contaminated with fragments of metals

The School Laboratory Technician later that day told her that the combing flash of lights is a normal and harmless occurrence; that the phenomena Safina experienced is similar to the formation of flashes of light normally seen in the sky during a thunder storm, except that the latter can be very destructive.

Task

Using your knowledge of Physics

(a) Explain to Safina to a better detail, what happened as she combed her hair, and calm her down.
(b) (i) Explain how the flashes of light formed across the skies during the thunderstorm.
(ii) Show how destructive the flash of light can be.
(iii) Demonstrate how Humans and Property can be safeguarded from the devastation the sky flashlights can cause.
(c) Help the school Kitchen Staff find out if the claim that the freshly supplied beans was contaminated with metal fragments.

Item 6.

A friend of your brother came for a visit from the mountain area of Western Uganda reaching home in the night. In the morning, he got mixed up to see the sun rising in the direction unfamiliar to him. He said he was lost. He didn't know the direction and not sure whether where the sun rises from is East. As a way of familiarizing him in the area, you took him for a walk, through streets in the town. You happened to visit a garage where cars are sprayed to look new, the visitor was amazed to see that no paint is getting wasted. He asked how that could be beneficial to the community.

The following items are available; *a sewing needle, a bar magnet, a cork, medium sized bowl, and water.*

Task;

As a physics learner;

(a) use the available items to help the visitor to be free of any confusion and sure of what is to be done.
(b) explain to the visitor the process of the action that amused him.

END