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Physics paper 1

May-2026

TORORO MIXED SS PRE-MOCK EXAMINATION-2026

Uganda certificate of education

Physics

Paper 1

2 hours 30 minutes

Instructions to candidates:

- *This paper consists of two sections; **A** and **B**. It has seven examination items.*
- *Section **A** has three compulsory items.*
- *Section **B** has two parts; **I** and **II**, answer one item from each part.*
- *Answer five items in all.*
- *Any additional item(s) answered will not be scored.*

SECTION A

(All items in this section are compulsory)

ITEM ONE

Two siblings, Apio and Akello had a visit to their maternal grandmother who lives in one of the villages along Tororo-Jinja highway. On their way they experienced a strange phenomenon of what seemed to be a huge pool of water ahead of them on a tar marked road during a hot sunny day. As they approached the point the water disappeared and instead the same was seen ahead as before. However the two siblings could not explain this.

Upon reaching the grandmother's home, they were told that one of their uncles had organized a party where the music system was to play the whole night. This made them very excited and ready to seize the moment. At night as they were going, their grandmother gave them to choose from an open bulb connected to two dry cells in a cell holder and a torch with one pair of dry cells to provide them with light since it was already dark. However they could not choose out of the advantages.

At the ground where the system was placed, the DJ had decorated the whole place with disco lights flashing different colors of Red, Blue, and Green each at a time. Akello was putting on a yellow dress with white spots while Apio was putting on magenta dress with black spots. The two siblings were surprised to see their clothes kept changing but could not explain how and why it had happened like that. On their way back home after the dance they could hear the same sound similar to that from the music system 2s in front of their grandmother's house but none of them could explain.

Task: help the two siblings to;

- a) Explain the phenomenon they experienced.
- b) Select with reason the most suitable light they should get from their grandmother.
- c) Explain why and how their clothes were changing colors.
- d) Explain why they were able to hear the sound in front of the house and estimate the distance between them and the house.

ITEM TWO

The Uganda government has announced its intentions to begin mining the newly discovered earth element called uranium. However there is an ongoing disagreement as to whether it should be exported in its raw form or be put a more valuable use within the country since scientists have advised that it can provide an alternative source of energy.

However there is no one to give a compounded explanation to the government in regards to this.

One of the local radio stations has invited physics students from your school to go and take part in the radio talk show meant to highlight to the members of the public how uranium can provide an alternative source of energy. On their way to the station the students got to a point where an accident had just occurred. The relative of one of the injured victim had opted to take him to one of the traditional healers for massage on his injured limbs. However one of the students from your school advised that they need to establish the extent of the injury using X-ray machine from any medical facility. This did not make any sense to the relatives since they do not know how the X-ray works to determine the extent of the injury. However the student also could not give a convincing explanation in regards to this.

TASK; You have been approached to provide your friends with a written presentation that would be used to give explanation to the public on:

a)

- i. How the earth element discovered can be used to produce electricity
- ii. The possible social, environmental, biological, and political dangers of this project.

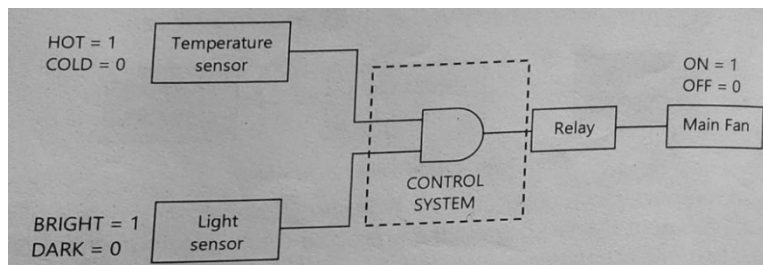
b) How X-ray machine works and how it's used to determine a broken bone.

ITEM THREE

Early this year Tororo mixed secondary school science students association (TOMSSA) was invited by Muni girls' secondary school in Arua city to go and take part in their science exhibition day. This invitation was through email. However the students of TOMSS did not know exact location of this school. One student had proposed that, the hosting school sends them a guide who would help them reach the school. However the

driver the driver of the school van rejected this saying that, with his smart phone he will be able to take the students safely up to the school though he had never reached the place. This brought doubt among the students who wondered how this will be possible.

At the exhibition, there was a hawker, who was selling a cooling fan and claimed that the fan can switch on and off automatically when temperature rises and drops respectively. However one of the students refuted this upon seeing the manufacturers menu which had a logic circuit diagram as shown below;



Furthermore the students had one of the most interesting moments when they were told that in 2011, the area experienced a natural total blackout during a day time for some few minutes. However there was no more explanation that was given to the student about this experience. This left the students wondering what could have happened.

TASK; As a physic learner help the students understand;

- a) How it would be possible for the driver to use his phone to move with learners from Tororo to Arua.
- b) Explain to the students how the fan is able to perform its function automatically using the truth table and the possible limitation of the fan.
- c) Explain the phenomenon that saw the area experience darkness during daytime.

SECTION B

Part I

(Attempt one item from this part)

A mother to a newly born 5kg child was advised to always bathe her child with water at temperature ranging from 32⁰c to 38⁰c. She instructed her maid of mass 55kg to boil some water and keep it in a vacuum flask during evening hours of a particular day. In the morning of the following day, she got 1.5litres of water from the flask and instructed the maid to mix it with 4litres of cold water at a temperature of 25⁰c in a basin. However the maid was surprised when the water from the flask was still hot in the morning and she did not understand how the flask prevented it from cooling. The maid complained of getting tired whenever she carries the baby to the second floor of the house 9m high in 2mins.

Hint;

Temperature of hot water =70⁰c

Mass of 1litre of water =1kg

Heat capacity of the basin= 1500JK⁻¹

Specific heat capacity of water =4200JKg⁻¹K⁻¹

Tasks

Use the physics knowledge;

- (a) With an illustration, help the maid understand how the vacuum flask was able to keep the water hot
- (b) Determine whether the water mixture in the basin was safe for the baby's bath, stating any assumptions made.
- (c) Help the maid to understand why she feels tired.

Item five

An employ drives from home to his work place every day and the meter of his vehicle is faulty. Therefore he cannot tell the distance he covers on daily basis. One day he asked his son to escort him from home but before he started the engine of the car he poured 4litres of water at 30°C into the car radiator which was painted black and had a net work of small metallic rods. The son asked his father to explain why he used water but not any other liquid and the importance of the black component. However the father just responded that my son it's along story. When he started to drive from the compound the son realized that his father accelerated the car to a speed of 72km/hr for 4mins, he maintained this speed for 6mins. Realizing he would be late he increased the speed to 90km/hr in a period of 10mins and finally decelerated to stop at his work place for a further 5mins. You are a friend to this family.

Tasks.

(a) Explain to the son;

- (i) The importance of car radiator and why its painted black
- (ii) The importance of the small rods in the car radiator.
- (iii) Why water was used but not any other liquid.

(b) Help the employ to find out how far his home from his work place.

Part II

(Answer only one item from this part)

Item six

In a certain town the landlord noted the tenants were consuming a lot of electric power, yet he had warned the tenants against using devices that have high power ratings. There are 4 tenants and it was discovered that they use 2 light bulbs rated 100W for 15hrs every day. One tenant has a flat iron rated 2500W which is used for 20mins each day and other

2 tenants each uses a loud speaker rated 1800W for 5hrs and 1 other tenant uses a refrigerator rated 1000W for 1hr each day.

The tenants kept disagreeing with the landlord claiming that he over charge them for the electric power. As the tenants were arguing one of the with refrigerator gave them cold juice and all the other were happy

Hint;

1 unit of electric power costs shs 900

The monthly bill of electricity that is paid to the landlord is shs 860,000

Tasks.

- (a) Find out whether the landlord was over charging the tenants
- (b) Advice the tenants on what can be done to pay small bill

Item seven

The welders in a certain workshop are troubled with their tools being shocked by electricity from a generator of 240V. When they visited a technician, they were advised to wind a copper wire to 300 turns around a soft iron ring on the receiving part so as to achieve an output of 120V suitable for their workshop operations. However the welders seem bothered of how this will be of help.

Tasks

As a learner of physics;

- (a) Explain to the welders how the above design will produce power corresponding to their consumption.

- (b) Help the welder to determine the number of turns to be wound on the output part of the device
- (c)
- (d)
 - (i) Comment on how efficient the device if the ratio of current output to current input is 0.75
 - (ii) Advise the welders on how to improve the efficiency of the device.

END