

535/1  
PHYSICS  
Paper 1  
July/August 2024  
2 ½ hours



**RWENZORI REGION SESEMAT AND ASSHU**  
**(RRSA) MOCK EXAMINATIONS**

**UGANDA LOWER SECONDARY CERTIFICATE OF EDUCATION**

**PHYSICS**

**Paper 1**

**Theory**

**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) will not be scored

## SECTION A

Answer **all** items in this section

### Item I

Your friend uses eye glasses to read in class but your class teacher thinks she has no eye problem. She is just pausing to appear more pretty. When she brought the paper from the doctor (eye specialist) to the class teacher as proof of her problem, you realized that the eye glasses are lenses labeled **+5D** (equivalent to convex lenses of focal length 20cm).

Recently during a physics lesson, your friend realized she had not carried her eye glasses. There were two seats remaining as she entered the physics laboratory, one in front close to the board and the other behind far from the board. The teacher emphasized the fact that **“Both light and sound are waves”** yet your friend can **hear properly** but has problems with seeing

After the lesson, as the two of you discuss preparing for the activity of integration, you realize there is convex lens in a packaging labeled **focal length =20cm**

### Task

As a student of physics, assist your friend to;

- a) In three (3) ways understand that indeed light and sound being waves is a fact but they also differ.
- b) Choose a more convenient seat of the two.
- c) Determine whether or not she can opt to temporarily use the available lens to read by holding it above the words in the book.

## Item 2

Your neighbour wants to start large scale Agriculture on his 5 acres of land. He decides to spray the land with a new herbicide (used to destroy weeds) so as to clear the land cheaply and faster. However, a number of medical related complaints have come up from the neighboring country where the herbicide originated. Therefore, some researcher made some tests and found out that the herbicide contained some radioactive substance whose activity varied with time according to the table T1 below;

Time (days)	0	10	20	30	40	50	60	70
Activity (counts per second)	8000	4880	2960	1760	1120	640	400	

These researchers also determined that since the land had already been exposed, it needed to be fenced off until the activity was less than 500 counts per second, to protect the users from effects of the substance.

### Task:

As a student of physics, assist the;

- a) Community to determine possible complaints in the country of origin of the herbicide
- b) (i) Researcher to predict the value of activity that makes the table complete  
(ii) Farmer to estimate when it will be safe to reopen the land.
- c) Community members to understand how the effects such substance in the herbicide can be avoided.

## Item 3

A football fan in Uganda read in the sports column that a match he planned to watch was meant to be screened at 4:00pm. When he checked on internet (on sky sport news), the match was meant to be starting at 1:00m in Britain. He was now

confused at what exact time to wait for it. Actually the match ended up being screened at 4:00pm. During the match, as he listened to BBC live and watching on the TV screen, the commentator signaled that a certain team had scored. He waited and only saw the goal a minute later.

### **Task**

As a student of physics, assist the football fan to understand how;

- a) A live match runs at different times of the clocks in different countries
- b) The goal appeared to have been scored on the T.V screen later after the commentator had declared it.
- c) How a match in one country can be broadcast in another country?

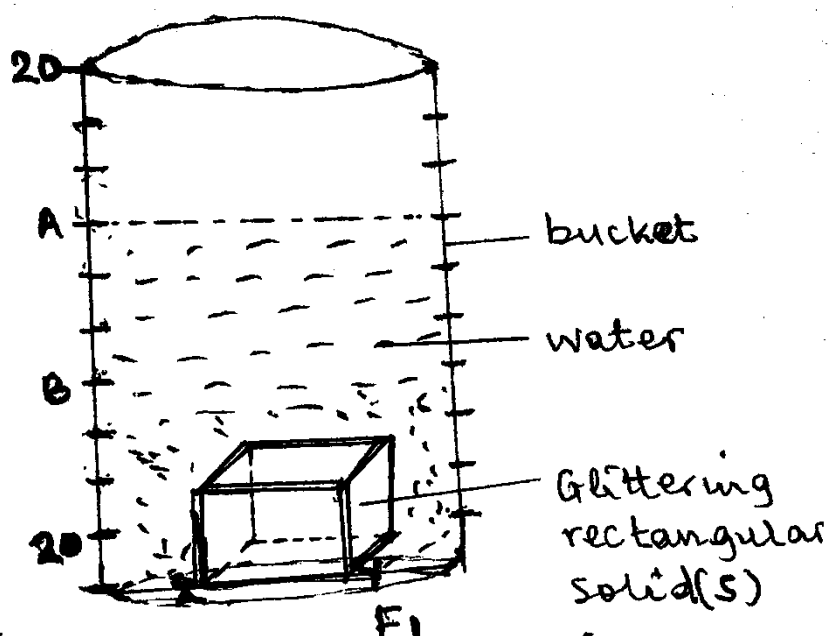
## SECTION B

### PART 1

Answer **one** item from this section

#### Item 4

Your guardian whose son Xa is your class mate bought a cylindrical transparent bucket with graduations (where readings are supposed to be). However, the factory that made the bucket forgot and only write 2 labels, as shown in figure F1.



You came from school with Xa, you found water in the bucket at level A with a glittering solid  $S$  of length  $ZY = 15\text{cm}$ , making contact with bucket. Xa suggests that  $S$  is a piece of diamond and may be sold for some money but you think it is a glass block that your younger brother stubbornly came with from school a week ago.

When Xa removes some water from the bucket, and the level falls from A to B, you realize that a label of 15Kg is on  $S$ .

**Hint:**

Density of glass =  $2500\text{kgm}^{-3}$ , density of diamond =  $3500\text{kgm}^{-3}$ ,  $1\text{L} = 0.001\text{m}^3$ , the 15kg label on solid  $S$  is accurate when suitably measured, acceleration due to gravity  $g = 10\text{ms}^{-2}$ ,

The bucket would crack if a pressure of more than  $4000\text{Pa}$  is exerted on it. The height and width (the other 2 sides of  $S$ ) are equal.

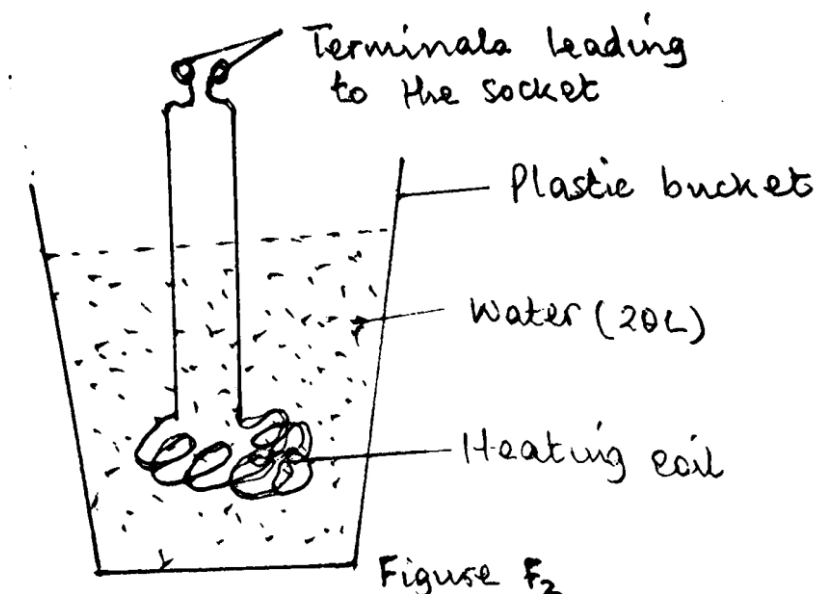
**Task;**

As a student of physics, assist Xa to determine;

- Which material  $S$  is and which one it is not.
- Whether or not the solid would crack the bucket

**Item 5**

A lady intending to have her children bath warm water at  $40^\circ\text{C}$  puts 20l of water in a plastic bucket whose temperature is  $10^\circ\text{C}$ . He put a heating coil rated at 800W in the water and connects it to socket to heat the water by electrical method. The heater fails to touch the base of the bucket as shown in figure.



Due to other duties she is carrying out, she forgets and the coil is for 1 hour and 45 minutes. In the process she realizes that the water is eventually getting hot throughout yet the heater stops short of reaching the bottom and she is surprised.

Meanwhile the water temperature has raised beyond the hotness she wanted. She is forced to mix in more water at  $0^{\circ}\text{C}$  to lower the temperature back to the hotness she wanted.

**Hint:**

Density of water =  $1000\text{kgm}^{-3}$ , specific heat capacity of water =  $4200\text{Jkg}^{-1}\text{K}^{-1}$ , IL =  $0.001\text{m}^3$

**Task:-**

Assist the lady to establish;

- a) The science behind her surprise
- b) The amount of water she needs to add

**PART II**

**Answer one item from this part**

**Item 6**

A trader in your home town grinds the maize flour he sells to the community. He realizes that the flour contains some metallic pieces of iron which makes the flour not safe for consumption. He is faced with two challenges namely;

- a) Removing the metallic pieces from the flour.
- b) Replacing the machine for grinding with a new one because he thinks the old one is aged and that's why it is spreading metallic pieces in the flour.

**Hint;**

In trying to solve challenge (b), he buys a machine that uses a voltage of  $200\text{V}$  and has a resistance of  $20\Omega$ . He decided to regulate its current system using an  $8\text{A}$  fuse.

**Task: -**

As a student of physics, assist him to determine;

- a) What to do with challenge (a)
- b) Whether or not the machine he bought will be effective.

**Item 7:**

A lady who has completed her house and installed electricity buys the following electrical appliances to use in the house;

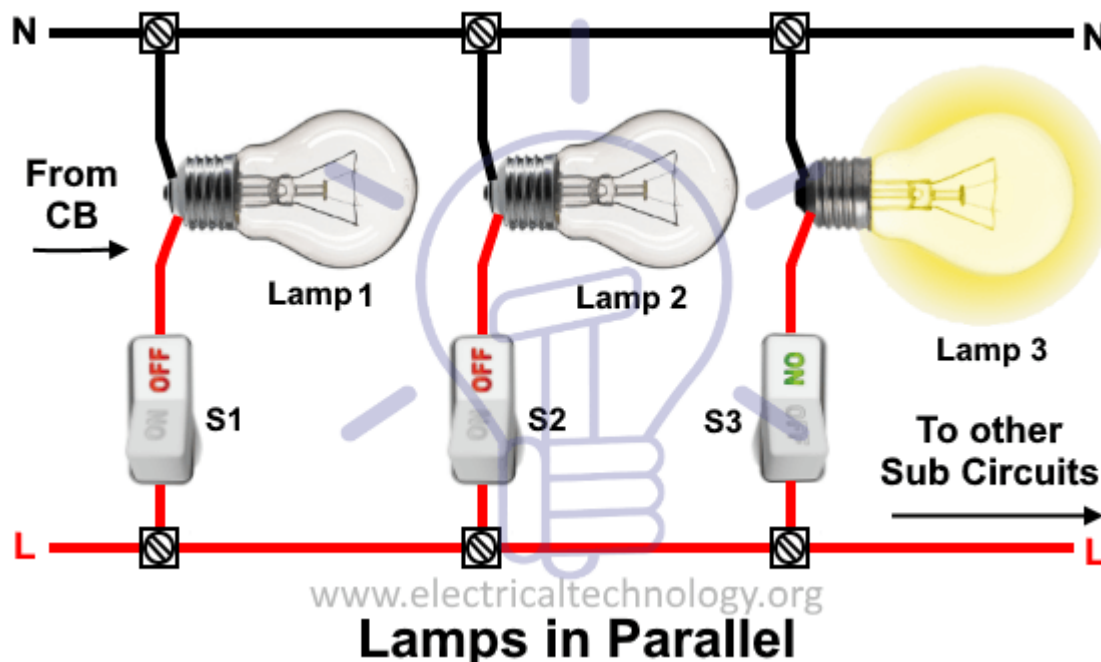
A refrigerator rated 0.3kW to run for 12 hours a day

5 bulbs each rated 0.1kW to run for 6 hours a day

A flat iron rated 0.6kW to run for 45 minutes a day

During a certain month, she and her house hold used the electricity as planned and they brought her a bill of Shs. 110,000=. In a bid to look for advice on how to regulate the use of electricity, she was advised by her electrician to have the bulbs connected in parallel instead of series. She was also reminded that her appliances needed to be safeguarded from effects of lightning and thunder and she didn't know what to do.

**Hint:**



One unit (1 kilo watt hour) costs Shs 500, the month has 30 days



**Task:**

As a learner of physics, help her to determine:

- a) Whether she had been cheated or not (by the bill)
- b) Why the electrician emphasized parallel over series connections
- c) How to safeguard the appliances?

**END**