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PHYSICS PAPER 1

(THEORY)

MOCK 2024

AUGUST

TIME:2HRS:30 MIN



# MEBU EXAMINATIONS CONSULT

## Uganda Certificate Of Education

MOCK ASSESSMENTS 2024

PHYSICS PAPER 1

(THEORY)

TIME:2HRS:30 MIN

### 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.

All answers **must** be written in the answer sheets provided.

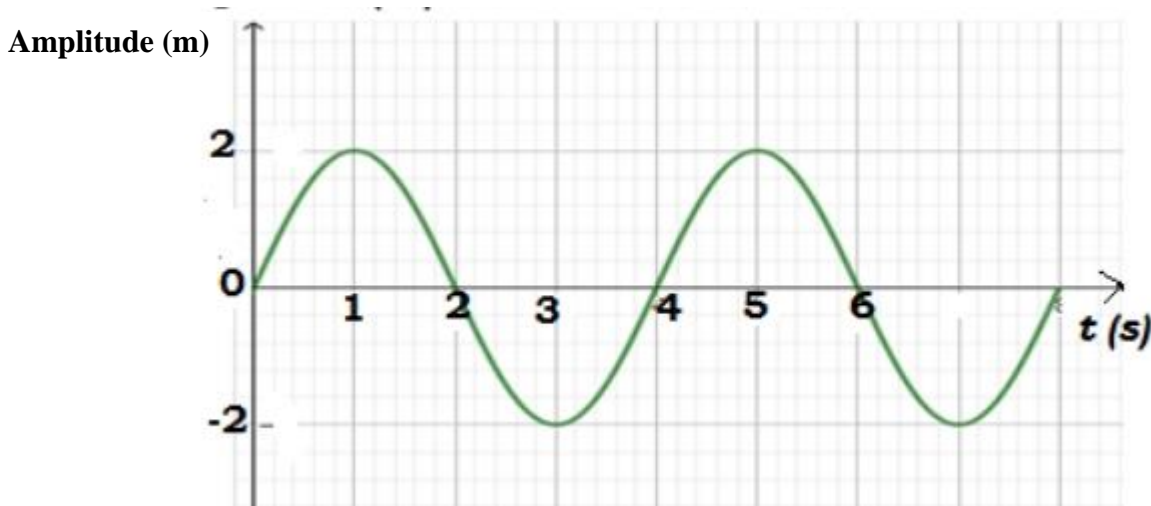
## SECTION A

### ITEM 1

A war erupted in a certain mountainous area surrounded by a small water body where soldiers only communicated by throwing a stone in water to alert their colleagues of danger ahead. Instead, this alerted their enemies. One of the soldiers had small pieces of plane mirrors and a torn paper box in his bag. Their leader sent spies to pop behind the hills to see if the enemies were hiding there, but many were captured and killed. They totally lacked knowledge on how to solve this problem. The enemy troops had a radio call that they used for communication and wave forms of wave length were produced on the receiver's computer clearly indicating the amplitude, period and time taken for the wave to reach the receiver at the headquarter. One afternoon, it threatened to rain and bright colours of different kinds spread in the sky. This scared the soldiers even more.

### HINT

A graph obtained from the receiver's computer



### TASK;

As a physics learner, help the soldier to:

- (a) Understand why the throwing of the stone in water always alerted their enemies.
- (b) Know the best way they could reduce the rate at which their spies were being killed and captured.
- (c) Understand the strange appearance of the sky that sent them to hideouts.
- (d) Determine the frequency at which the waves reached the receiver at the home base of the army.

### ITEM 2

A certain town experienced an atomic bomb blast, many people were killed in the incidence and others survived with serious injuries. The government advised those who survived to relocate to other places of the country because this village was not safe for them at that time.

The scientists carried out a scientific investigation using detectors of radiations and found out that the environment was still radioactive as shown below.

Time(days)	0	22	42	62	82	102	122	142	162
Count rate (min-1)	106	83	66	56	47	36	31	26	15

The scientists recommended that the environment would be safe for use again when they obtained half-life value which was less than 60 days and they will need like one year (356 days) for the environment to be free from radioactive wastes and materials.

### **TASK:**

As a learner of Physics, use your knowledge to;

- Help the people know the half life value and advise them accordingly.
- Sensitize the people about the risk associated with radioactive materials and how they should be handled.
- Help the people understand the value of neutrons of the nuclide Y formed when a radioactive substance of mass number 208 and atomic number 104 decays by emitting 3 alpha particles, 4 beta particles and gamma rays to form a nuclide Y.

### **ITEM 3**

During a news bulletin broad cast live at night from America, viewers watch from Uganda during day time on TV. The reporters show live images of an eclipse happening, which is something the viewers had never seen.

Task.

Use your knowledge of Physics to help the viewers understand;

- Why it is day time where they are and night time on a live broad cast on TV?
- What an eclipse is?
- How it's possible for a live broadcast to happen in one country and be watched in another country?

## **SECTION B**

### **Part I**

Answer **ONE** item from this part

#### **Item 4**

Students in a certain school are going for a trip in a mountainous area where the maximum height one is allowed to climb is 1km per day. They were allowed to have stop overs at specific points for various reasons. They had also been warned of the possibility of nose bleeding while climbing the mountain. Another group of students who had visited the same place earlier told them their first stop over was at a place B where a barometer reads 68.2cmHg, while it read 75.7cmHg at a place A which was going to be their starting point. The students were told that the cooking would be done at place A but they couldn't understand why that was so. Use your knowledge of physics to help the students:

- Determine if they will be allowed to climb beyond point B.
- Identify when they were more likely to nosebleed.

(c) To explain why the cooking had to be done at Point A.

### Item 5

Eunice is required to bathe her younger brother James as instructed by her mother. According to the advise from the family doctor, the bath should be between  $40^{\circ}\text{C}$  and  $42^{\circ}\text{C}$ . Eunice has two litres of hot water at  $100^{\circ}\text{C}$  and 6litres of water at  $20^{\circ}\text{C}$ . Eunice has to do mixing in an Aluminium saucepan of mass 3.5kg and specific heat capacity  $650\text{JKg}^{-1}\text{K}^{-1}$

Task;

As a learner of physics,

- (a). Help Eunice establish whether water is warm enough for James to bathe after mixing.
- (b). In what ways would you prevent the water from cooling very fast?

## PART II

Answer **one** item from this part

### ITEM 6.

A home owner was recently told electricity from a power substation is transmitted at 12 KV using thick aluminium cables to be used in a house at 240V. The home owner is however confused by how the electricity changes voltage from one value to another and says the thick cables are a waste of money. Inside the house are two sets of appliances of resistance  $20\Omega$  and  $30\Omega$  but the house owner is not sure of how they should be connected to ensure they work effectively. Use your knowledge of physics to;

- (a) Help the home owner understand how the electricity changes from 12 KV to 240V.
- (b) Why thick aluminium cables are used?
- (c) How the appliances should be connected to ensure that they work effectively with a high amount of current.

### ITEM 7

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 **3000** turns around a soft iron ring on the receiving part so as to output **120V** suitable for their work shop operations fixed in a box. However, the welders seem bothered of how this will be of help.

**Task**

As a learner of physics,

- (a) Explain to the welders how the above design will produce power corresponding to their consumption.
- (b) Help the welders to determine the number of turns to be wound on the output part of the device.
- (c) Comment on how efficient the device if the ratio of current output to current input is **1.5**.
- (d) Advise the welders on how to improve the efficiency of the device.

**END**