



EXAMINATION NO.: \_\_\_\_\_

**THE MALAWI NATIONAL EXAMINATIONS BOARD**

**MALAWI SCHOOL CERTIFICATE OF EDUCATION EXAMINATION**

**SAMPLE PAPER**

**PHYSICS**

**Subject Number:**

**Time Allowed: 2 hours**

**PAPER I**  
**(100 marks)**

**Instructions**

1. This paper contains 12 printed pages. Please check.
2. Fill in your **Examination Number** at the top of each page.
3. This paper contains **two** sections **A** and **B**. In **Section A** there are **ten** short answer questions while in **Section B** there are **three** restricted essay questions.
4. Answer **all** the **thirteen** questions in the spaces provided.
5. Use of electronic calculators is allowed.
6. The maximum number of marks for each answer is indicated against each question.
7. In the table provided on this page, **tick** against the number of the question you have answered.

Question Number	Tick if answered	Do not write in these columns	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			



**SECTION A (70 marks)**

1. a. State any **two** safety measures to be followed when heating water in a boiling tube in a Laboratory.

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(2 marks)

- b. Mention any **one** way of presenting data in a scientific investigation.

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(1 mark)

- c. Explain any **two** ways of reducing errors in a scientific investigation.

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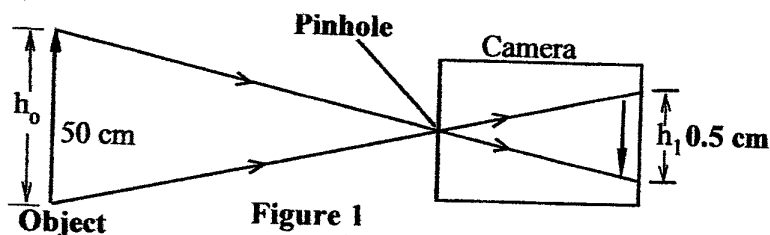
(4 marks)

2. a. State any **one** law of reflection.

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(1 mark)

- b. **Figure 1** is a diagram showing an **object** and its **image** as seen through a pinhole camera.



- (i) Why is the image upside down?

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(3 marks)

Continued/...



## 2. (Continued)

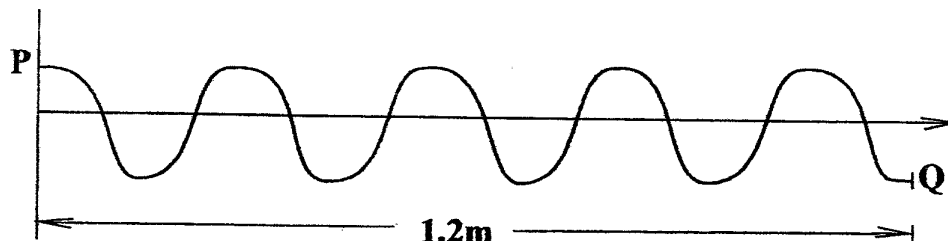
- (ii) Calculate the magnification of the image.

(3 marks)

- c. State any
- two**
- characteristics of a wave.

(2 marks)

- d.
- Figure 2**
- is a diagram showing waves on a string
- PQ**
- .

**Figure 2**

Calculate the average speed of the wave if the frequency of vibrations is 10Hz.

(4 marks)

Continued/...



2. (Continued)

e. Explain each of the following observations:

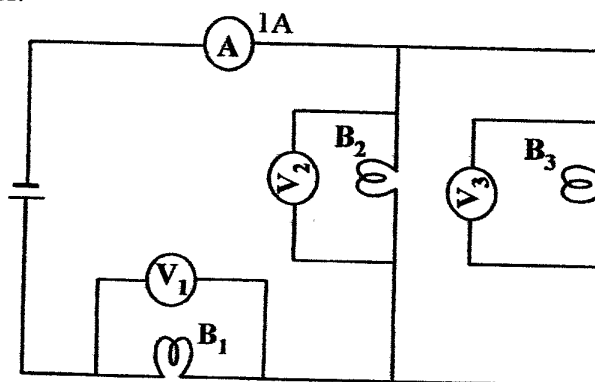
- (i) Speed of sound depends on the material through which it is passing.

\_\_\_\_\_  
\_\_\_\_\_  
(2 marks)

- (ii) In air the speed of sound increases with temperature.

\_\_\_\_\_  
\_\_\_\_\_  
(2 marks)

3. **Figure 3** is a circuit diagram. Each of the three bulbs  $B_1$ ,  $B_2$  and  $B_3$  has a resistance of  $2\Omega$ .



**Figure 3**

- (i) Which bulb will give brightest light?

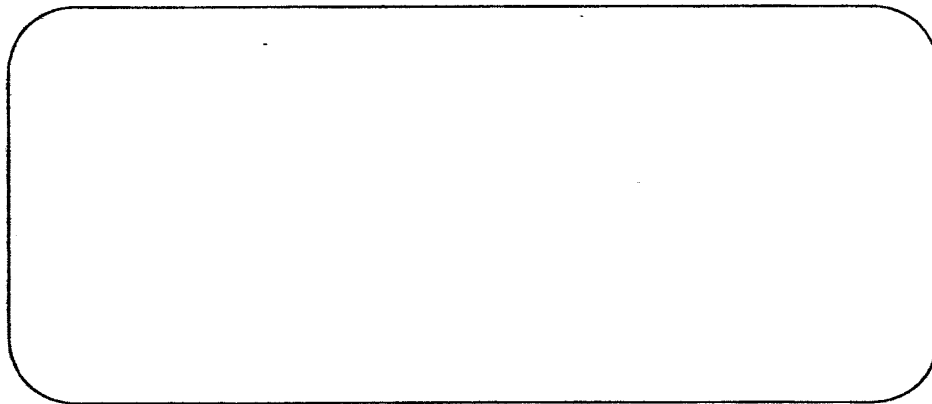
\_\_\_\_\_  
(1 mark)

Continued/...



## 3. (Continued)

- (ii) Calculate the value of
- $V_1$
- .



(3 marks)

4. a. Give any
- two**
- effects of heat on matter.

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(2 marks)

- b. Explain why temperature remains constant during the change of state of ice to liquid water.

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(3 marks)

5. a. Give any
- three**
- ways in which the mechanical advantage of an inclined plane could be increased.

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(3 marks)

Continued/...



## 5. (Continued)

- b. Figure 5 is a diagram showing an inclined plane being used to raise a 100 kg box from point A to B.

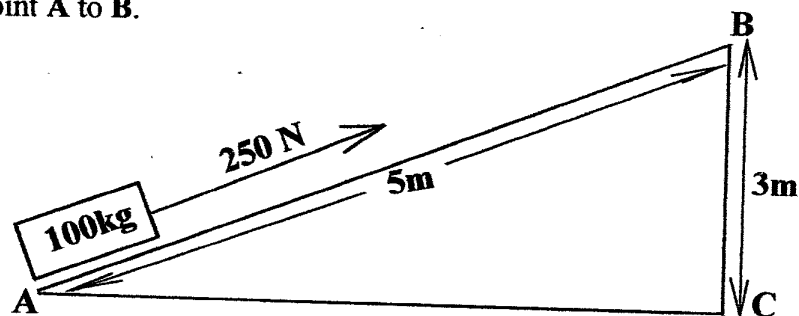


Figure 5

- (i) Calculate the mechanical advantage of the inclined plane.

(4 marks)

- (ii) Explain why there is more energy used in pulling the 100 kg box from A to B than lifting it vertically from C to B.

(2 marks)

6. a. Mention any **one** type of nuclear radiation.

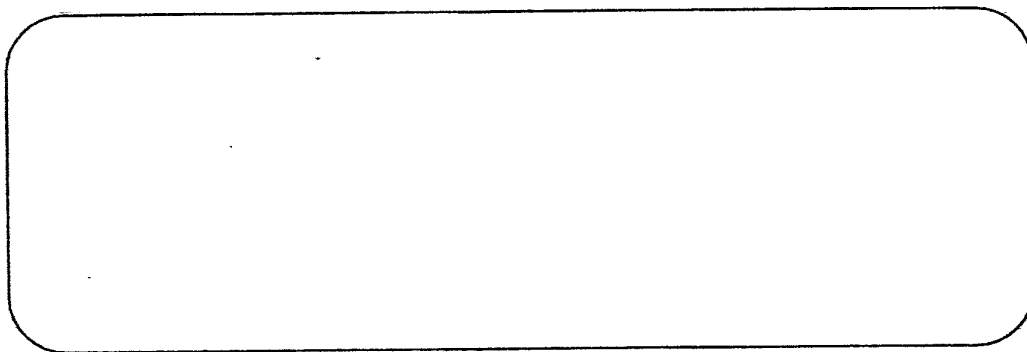
(1 mark)

Continued/...



## 6. (Continued)

- b. A radioactive sample has a half life of 60 minutes. Calculate the fraction left after 2 hours.



(3 marks)

7. a. Define average density.

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(1 mark)

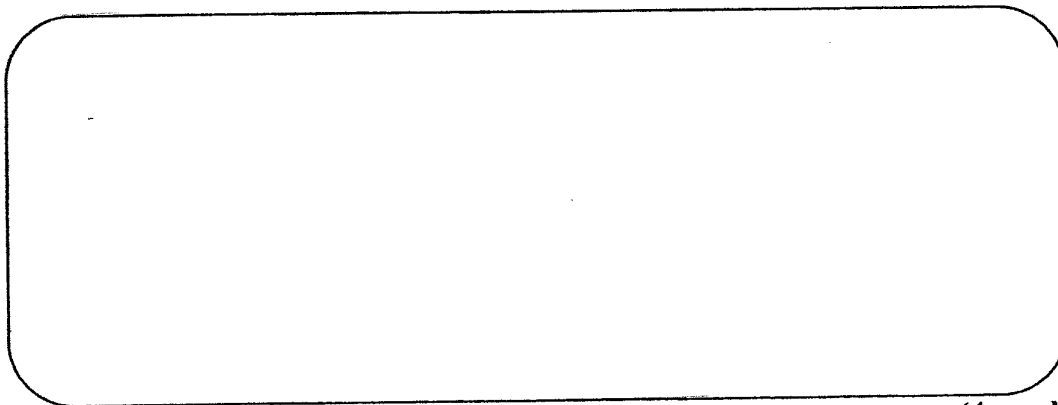
- b. Explain why a rotten chicken egg floats on water.

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(1 mark)

- c. Calculate the average density of the mixture when  $20 \text{ cm}^3$  of paraffin whose density is  $0.7 \text{ g/cm}^3$  is mixed with  $10 \text{ cm}^3$  of petrol whose density is  $0.9 \text{ g/cm}^3$ .



(4 marks)

Continued/...



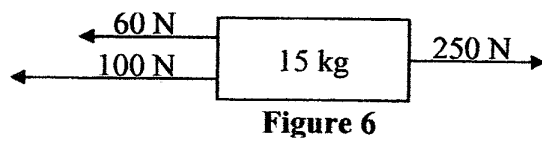
8. a. Give any **two** methods of resolving vectors.

**(2 marks)**

- b. Explain why “displacement” is an example of a vector quantity.

**(2 marks)**

- c. **Figure 6** shows a 15 kg box being pulled by three forces.



- (i) Calculate the resultant force on the box.

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**(2 marks)**

- (ii) Calculate the acceleration of the box.

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**(2 marks)**

Continued/...



8. c. (Continued)

(iii) Which Newton's law of motion is being investigated in Figure 6?

\_\_\_\_\_ (1 mark)

9. a. Mention any **two** factors that affect the resistance of a piece of wire.

\_\_\_\_\_  
\_\_\_\_\_  
(2 marks)

b. Figure 7 is an electric circuit diagram.

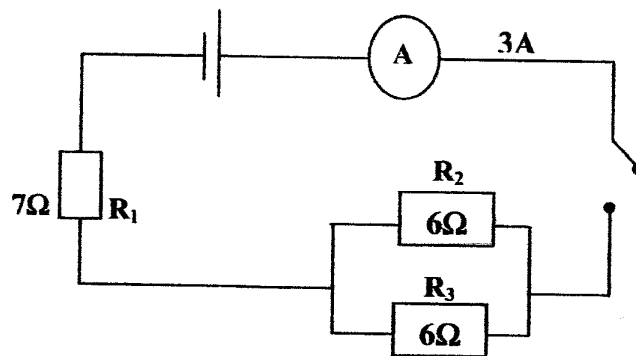


Figure 7

(i) Calculate the current that will flow through  $R_2$  when the switch is closed.

\_\_\_\_\_  
\_\_\_\_\_  
(2 marks)

Continued/...



9. b. (Continued)

- (ii) What is the total resistance in the circuit?

(2 marks)

10. a. State the Archimedes' Principle.

\_\_\_\_\_ (1 mark)

- b. Calculate the upthrust force for the displaced water if a 2000 N boat weighs 1500 N when it is partly submerged in water.

(2 marks)

SECTION B (30 marks)

11. Explain how each of the following works to prevent accidents caused by electrical faults.

- a. Earth wire:

(5 marks)

Continued/...



**11. (Continued)**

b. Fuse:

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**(5 marks)**

**12. a.** Describe how the boiling point of pure water will differ at the top of a mountain and at sea level.

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**(6 marks)**

b. Describe how a bimetallic strip regulates the temperature in an electric iron.

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**(4 marks)**

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13. a. Figure 10 shows a velocity-time graph for a motorist.

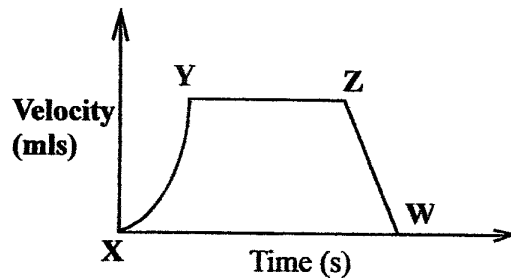


Figure 10

Describe the motion of the motorist between the following points.

- (i) X to Y : \_\_\_\_\_ (1 mark)
- (ii) Y to Z : \_\_\_\_\_ (1 mark)
- (iii) Z to W : \_\_\_\_\_ (1 mark)

- b. Explain how the speed of an athlete could be determined using a stopwatch and a tape measure.

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(7 marks)

END OF QUESTION PAPER

This paper contains 12 printed pages