NAME.: _____ **EXAM NO.:** _____ **SHIFT.:** _____

KAMUZU BARRACKS COMMUNITY DAY SECONDARY SCHOOL

2022 MALAWI SCHOOL CERTIFICATE OF EDUCATION – FORM 3

PHYSICS

December, 2022

Subject Number: M164/I

Time Allowed: 2 hours

8:00 – 12:00 am

PAPER I

(100 marks)

Theory

Instructions

1. **This paper contains 10 printed pages. Please check.**

2. Write your **Candidate Name, Number** and **Shift** at the top of each page of the question paper.

3. This paper has two sections, A and B. In Section A there are four short answer questions while in Section B there are three essay questions.

4. Answer **all** the **seven** 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 question number you have answered.

Question Number	Tick if answered	Do not write in these columns	
1			
2			
3			
4			
5			
6			
7			
	Total		

Section A (70 marks)

Answer **all** question in this section.

1. **Figure 1** is a diagram of a measuring instrument.

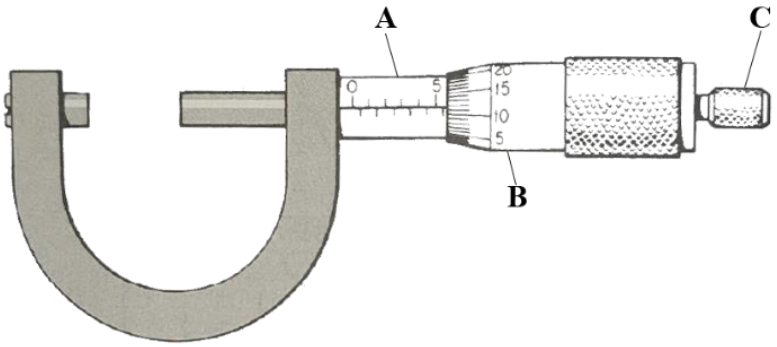


Figure 1

a. Name the measuring instrument in **figure 1**.

_____

(1 mark)

b. Identify the parts labelled **A** and **B** from the measuring instrument in **figure 1**.

A:_____

(1 mark)

B:_____

(1 mark)

c. Give **two** objects that can be measured using the instrument in **figure 1**.

_____

_____

(2 marks)

d. State the function of the part labelled **C**.

_____

_____

(2 marks)

d. Given that reading of part labelled **A** is `4.7mm`, and that of part labelled **B** is `20 mm`. Calculate the scale reading of the instrument and give the answer in centimeters (cm).

(4 marks)

2. a. A scientist is carrying out an experiment to determine the relationship between voltage and current in a circuit. The materials she used include, ammeter, voltmeter, cells, resistor, connecting wires, and a switch.

(i) Formulate a hypothesis for the experiment.

_____

(1 mark)

(ii) Identify the independent variable.

_____

(1 mark)

(iii) Identify the dependent variable:

_____

(1 mark)

(iv) Identify any **two** controlled variables.

_____

_____

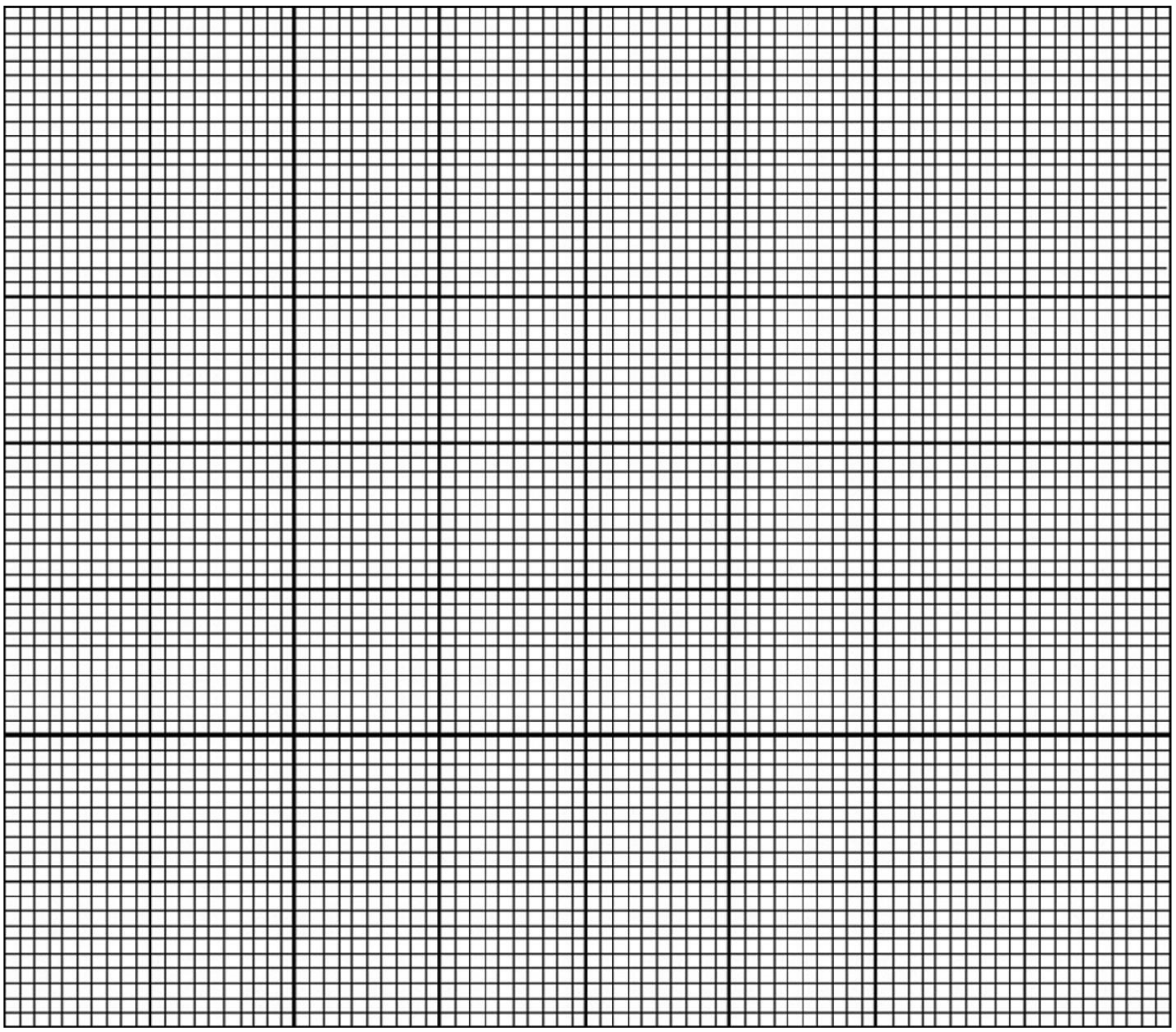
(2 marks)

b. **Table 1** show the results obtained from the experiment conducted in **2a**.

Table 1

Number of Cells	Voltage (V)	Current (A)
1	1.5	0.1
2	3	0.24
3	4.5	0.3
4	6	0.4

(i) Plot a graph of voltage against current on the graph paper below.



(4 marks)

(ii) State the relationship between voltage and current.

_____

_____

(1 mark)

c. Describe any **two** types errors that can be faced during a scientific investigation.

_____

_____

_____

_____

_____

(4 marks)

c. Name **two** methods of communicating the results of a scientific investigation.

_____

_____

(2 marks)

3. a. Define the term freezing.

_____

_____

(1 mark)

b. State any **two** properties of liquids.

_____

_____

(2 marks)

b. Describe the kinetic theory of matter.

_____

_____

_____

_____

(3 marks)

c. Explain the relationship between molecular motion and absolute temperature.

_____

_____

_____

_____

(3 marks)

d. Mention any **two** factors that affect gas pressure.

_____

_____

(2 marks)

e. In relation to gas pressure, explain how car or bicycle tires are kept inflated.

_____

_____

_____

_____

(4 marks)

4. a. State the SI unit of temperature.

_____

_____

(1 mark)

b. The body temperature of a normal person is 0.37×10^2 ^oC.

(i) Express the body temperature in normal form.

(2 marks)

(ii) Convert the body temperature found in **b(i)** to the SI unit stated in **4a**.

(2 marks)

d. Discuss the **two** types of liquid in glass thermometers.

_____

_____

_____

_____

_____

_____

(4 marks)

e. The pressure in a constant volume gas thermometer is 755 mmHg at 0 ^{o}C of ice and 790 mmHg at 100 ^{o}C. Calculate the temperature when the pressure is 765 mmHg.

(5 marks)

Section B (30 marks)
Answer **all** questions in this section.

5. a. Describe how you can measure the depth of a blind hole using a vernier calliper.

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(5 marks)

b. Explain in terms of the kinetic theory of matter why candle wax melts when the candle is lit.

_____

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(5 marks)

6. a. Outline the steps you could follow to measure 113grams of sugar from a given sample bag of sugar using a triple beam balance.

_____

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_____

(5 marks)

b. With the aid of a well labelled diagram, describe how the distance between the molecules of a state of matter affect the Intermolecular Forces (IMF).

_____

_____

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_____

_____

_____

(5 marks)

7. Describe an experiment you could carry out to determine the relationship between the periodic time (T) of an oscillating spring and the mass on the spring.

(10 marks)

END OF QUESTION PAPER