

NAME: _____ SCHOOL: _____
2024 M164/I



NSANJE DISTRICT MOCK

MALAWI SCHOOL CERTIFICATE OF EDUCATION EXAMINATION

PHYSICS

Wednesday, 3 April

Subject Number: M164/I

Time Allowed: 2 hours

8:00-10:00 am

PAPER I

(100 marks)

Theory

Instructions

1. This paper contains 14 printed pages. Please check.
2. Answer **all** the **thirteen** questions in the spaces provided. The maximum number of marks for each answer is indicated against each question.
3. Write your **Name and School Name** at the top of each page of your question paper in the spaces provided.
4. Use of electronic calculators is allowed.
5. 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			
8			
9			
10			
11			
12			
13			
Total			

Section A (70 marks)

Answer **all** the questions in this section

1. a. **Figure 1** is a diagram illustrating three students taking a reading from a ruler.

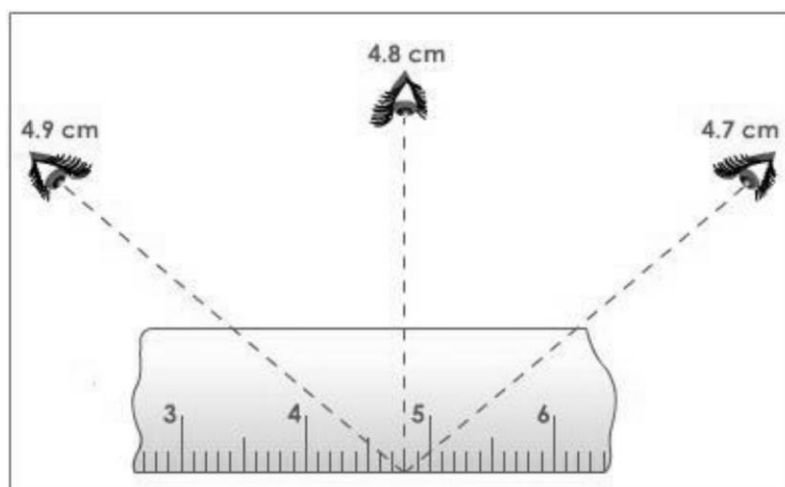


Figure 1

- (i) What is the correct reading?

(1 mark)

- (ii) Name the type of error which students that get wrong readings are likely to make.

(1 mark)

Continued/...

1. (Continued)

(iii) Calculate the relative error for any one of the students who gets the wrong

(2 marks)

b. Write the following number in standard notation:

$$\frac{12}{60\,000} \Omega$$

(2 marks)

2. a. In terms of kinetic theory of matter, explain why liquids freeze.

(3 marks)

Continued/...

2. (Continued)

- b. Why would a person sink more in a wet ground when wearing high heeled shoes than flat heeled shoes?

(2 marks)

- c. **Figure 2** shows the motion of a trolley joined to a ticker-tape timer.

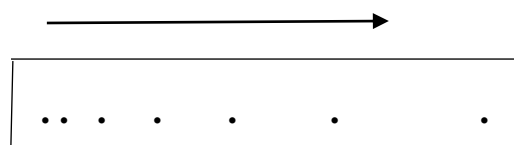


Figure 2

Describe the motion of the trolley.

_____ **(1 mark)**

- 3. a.** State Newton's third law of motion.

(1 mark)

- b. Mention any **two** factors that affect pressure in liquids.

(2 marks)

Continued/...

3. (Continued)

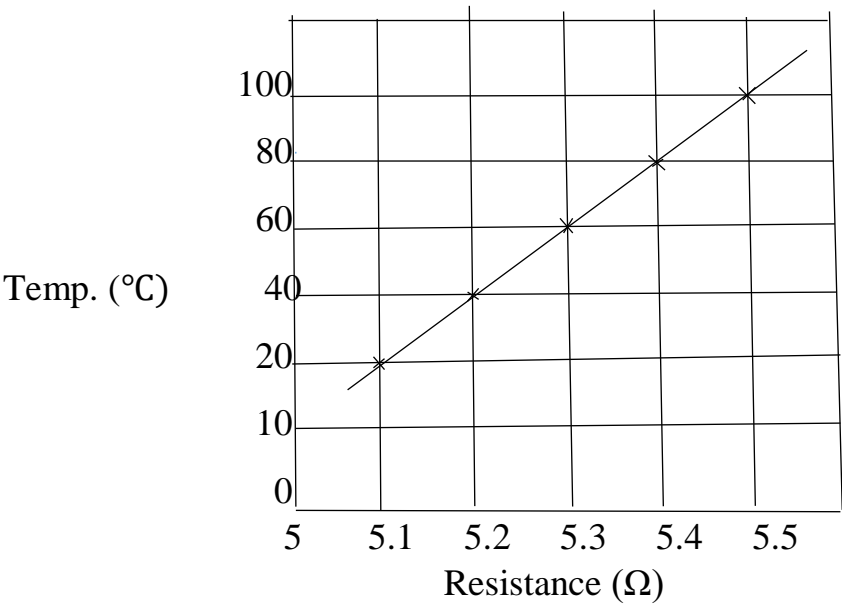
c. Why is distance a scalar quantity?

(1 mark)

d. A student was asked to plot a graph of resistance against temperature using the results in the **Table 1** below.

Table 1

Temp. (°C)	20	40	60	80	100
Resistance (Ω)	5.1	5.2	5.3	5.4	5.5



Give **two** corrections that can be made to the graph.

(2 marks)

Continued/...

4. a. **Figure 3** is a diagram showing water waves approaching two slits, S_1 and S_2 in the obstacle.

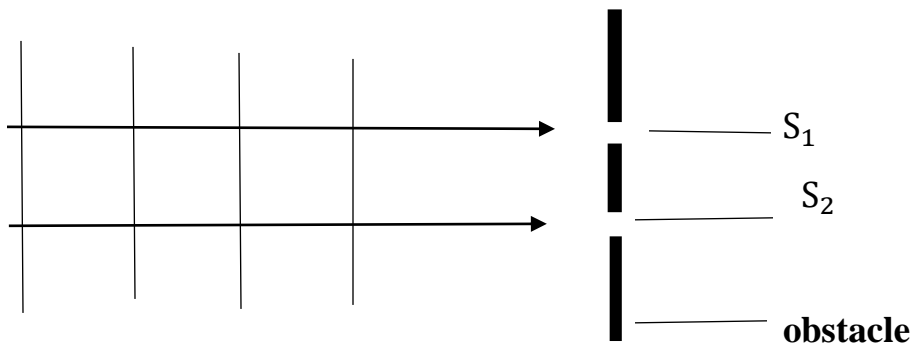


Figure 3

(i) Complete the diagram to show waves emerging on the other side of the obstacle

(3 marks)

(ii) State **two** properties of waves that are demonstrated in the completed diagram.

(2 marks)

b. If mass of 400g is suspended from two identical spiral springs connected in parallel, the extension produced is 4cm. Calculate the spring constant of the spring.

(4 marks)

Continued/...

Continued/...

5. a. Explain how increasing number of gaseous molecules in a container affects gas pressure.

(3 marks)

b. **Figure 4** is a diagram of a transistor.

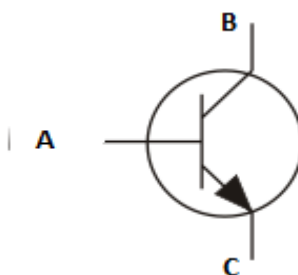


Figure 4

(i). Name the parts labelled A, B and C.

A: _____ (1mark)

B: _____ (1mark)

C: _____ (1 mark)

(ii). What type of transistor is shown in **figure 4**?

_____ (1mark)

(iii). State any **one** use of a transistor in an electric circuit.

_____ (1mark)

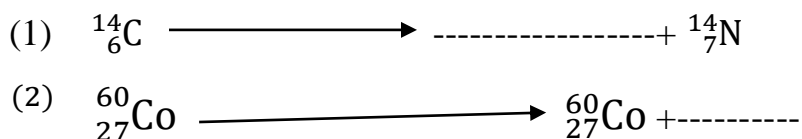
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Continued/...

6. a. Explain how radioactivity could be induced.

(3marks)

b. The equations below show nuclear decay of carbon ($^{14}_6\text{C}$) and cobalt ($^{60}_{27}\text{Co}$).



(i) Complete the equations.

(2 marks)

(ii) Which equation represents gamma emission?

(1 mark)

(iii) Why has $^{60}_{27}\text{Co}$ not changed its atomic mass and atomic number in the daughter nuclide?

(2 marks)

7. a. Define “electromagnetic spectrum”.

(1 mark)

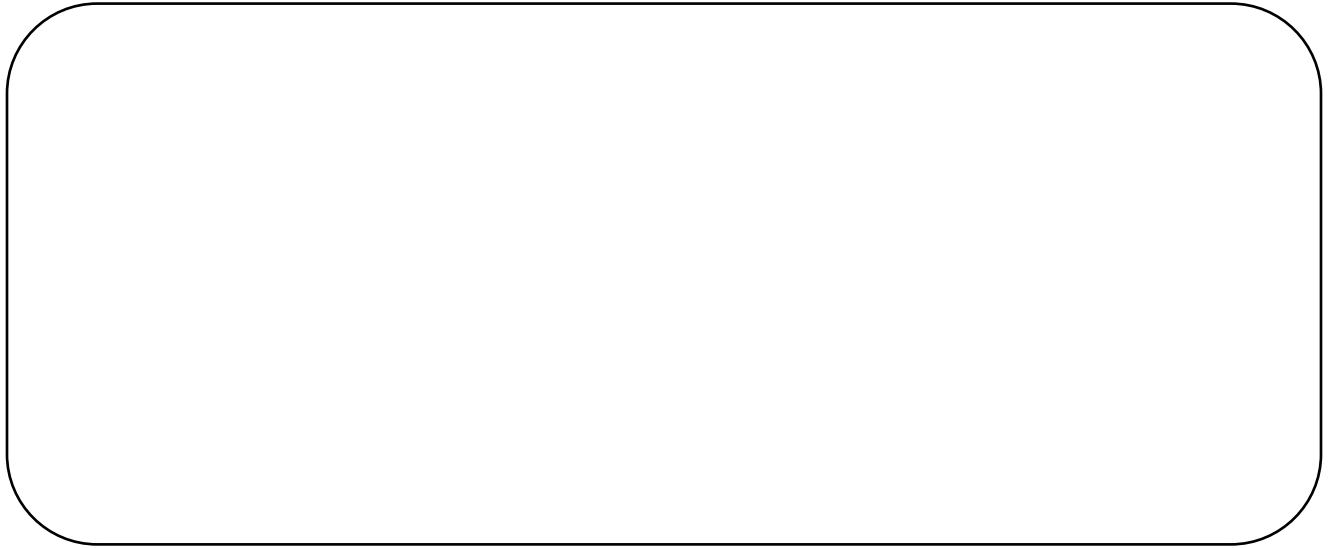
b. State any **two** sources of infra-red radiation.

(2 marks)

Continued/...

7. (Continued)

- b. A particle revolves at a frequency of 4 Hz in a circle of radius 2m . Calculate its tangential velocity.

**(4 marks)**

- 8. a.** State Pascal's hydraulic principle.

(1 mark)

- b. Give any **two** properties of hydraulic fluid.

(2 marks)

Continued/...

8. (Continue)

c. Explain any **one** application of Boyle's law.

(4 marks)

9. a. Calculate the value of letter b in **figure 5**.

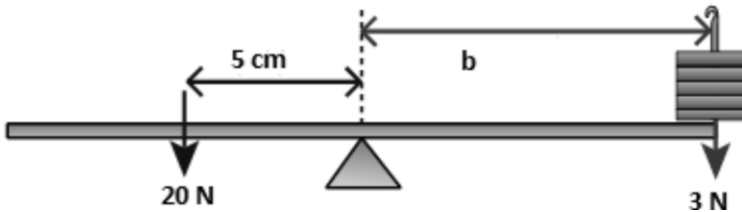


Figure 5

(3 marks)

9. (Continued)

b. Mention any **two** electrical hazards.

(2 marks)

10. a. State any **two** factors that affect the magnitude of induced electromotive force.

(2 marks)

b. **Figure 6** shows part of a ray diagram.

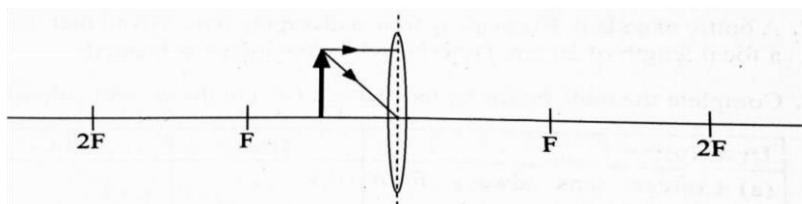


Figure 6

(i) Complete the ray diagram to locate the position of the image. **(3 marks)**

(ii) State the nature of the image formed.

(3 marks)

Continued/...

Section B (30 marks)

Answer **all** the questions in this section.

11. a. With the aid of a well labelled diagram, describe how a constant-volume gas thermometer works.

(6 marks)

- b. Explain how the pressure law agrees with the kinetic theory of matter.

(4 marks)

Continued/...

12. a. Describe how the thickness of a sheet of plastic could be controlled using radiation during manufacture.

(5 marks)

- b. Explain how shrink fitting is done.

(5 marks)

13. a. With the aid of a well labelled diagram, describe how a manometer is used to measure lung pressure.

(6 marks)

- b. Briefly, explain how volume of a single drop of water from a burette can be measured.

(4 marks)

END OF QUESTION PAPER

NB: This paper contains 14 pages