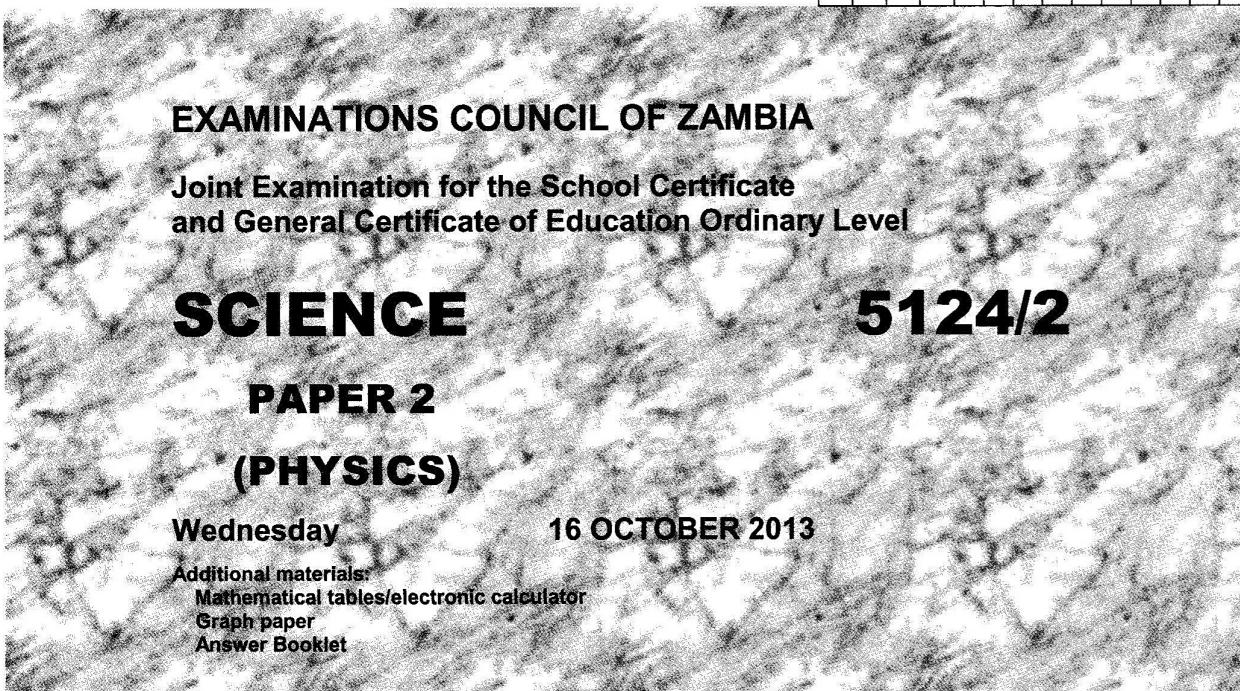


Candidate Name \_\_\_\_\_

Centre Number	Candidate Number



**Time: 1 hour 15 minutes**

**INSTRUCTIONS TO CANDIDATES**

Write your name, centre number and candidate number at the top of this page and on any separate Answer Booklet used.

There are **twelve (12)** questions in this paper.

**Section A**

Answer **all** the questions.

Write your answers in the spaces provided on the question paper.

**Section B**

Answer any **two** questions.

Write your answers on the Answer Booklet provided.

At the end of the examination

1. Fasten Answer Booklet used securely to the question paper.
2. Enter the numbers of the **Section B** questions you have answered in the grid shown.

**INFORMATION FOR CANDIDATES**

The number of marks is given in brackets [ ] at the end of each question or part question.

**Cell phones are not allowed in the Examination room.**

Candidate's use	Examiner's use
Section A	
Section B	
Total	

**Section A**

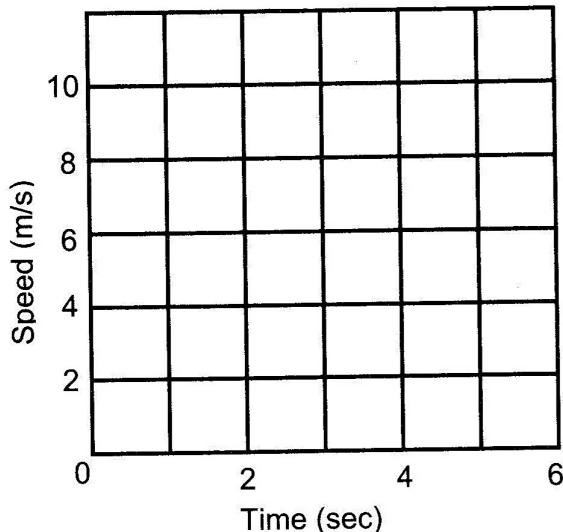
**[45 marks]**

**Answer all questions.**

Write your answers in the spaces provided on the question paper.

- 1 A car of mass 1400kg starts from rest and moves along a straight road with a constant acceleration to reach a speed of 10m/s in 6 seconds.

- (a) On the axes below, draw a graph of speed against time for the first 6 seconds of the motion.



[1]

- (b) For the motion of the car in the first 6 seconds, calculate the

- (i) distance travelled by the car

Distance = \_\_\_\_\_ [1]

- (ii) acceleration of the car

Acceleration = \_\_\_\_\_ [1]

- (iii) resultant force acting on the car.

Resultant force = \_\_\_\_\_ [1]

**[Total: 4]**

- 2 (a)** State one difference between mass and weight.

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[1]

- (b)** What two factors will make an object stable?

(i) \_\_\_\_\_

(ii) \_\_\_\_\_

[2]

- (c)** A mass of an object is 50kg on earth, what will be its mass on the moon?

Mass on the moon = \_\_\_\_\_ [1]

**[Total:4]**

- 3 (a)** Briefly describe how the mass of a liquid can be determined. Show how the final result can be calculated.

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[3]

- (b)** An empty relative density bottle has a mass of 35g. When filled with water, its mass becomes 85g.

Calculate the

- (i) mass of water

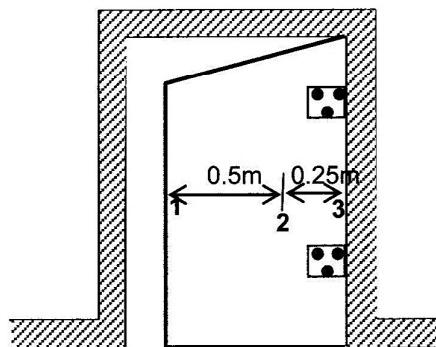
Mass of water = \_\_\_\_\_ [1]

- (ii) volume of the bottle (take the density of water to be  $1\text{g/cm}^3$ )

Volume of bottle = \_\_\_\_\_ [2]

**[Total: 6]**

- 4 Figure 4.1 below shows a door well secured on the door frame.



**Figure 4.1**

- (a) What is meant by moment of force? Include its SI unit?

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[2]

- (b) Calculate the moment of force if a force of 10N is applied at point 1 to open or close the door.

Moment of force = \_\_\_\_\_ [2]

- (c) Explain why it is easier to open or close the door if the handle is fixed at point 1 than at point 2 or 3.

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[2]

**[Total:6]**

- 5 Figure 5.1 below shows a simple bottle opener made by fixing two screws into a piece of wood.

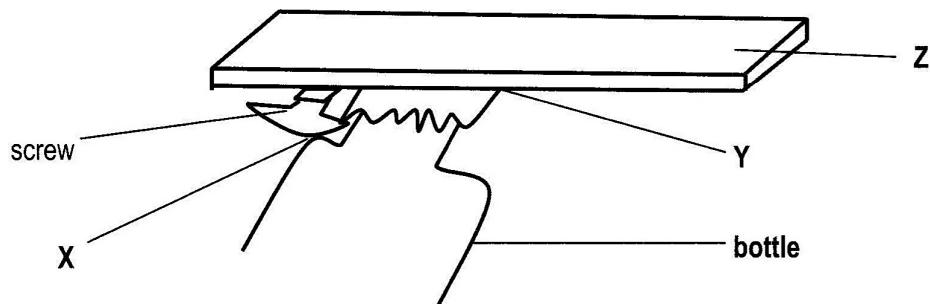


Figure 5.1

- (a) What is meant by a simple machine?

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[1]

- (b) Which of the points X, Y or Z is;

(i) the pivot \_\_\_\_\_ [1]

(ii) the effort \_\_\_\_\_ [1]

- (c) Is the force applied at X less or greater than the force applied at Z?

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[1]

- (d) State one modification that should be made on the design of the bottle opener so that less effort is used to open the bottle.

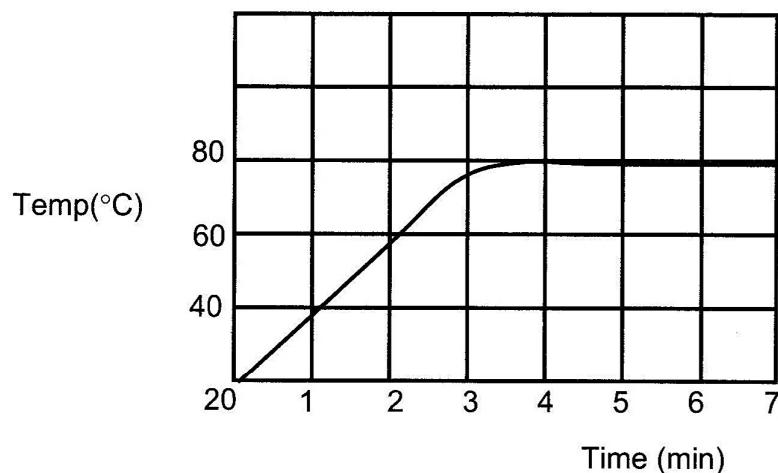
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[1]

[Total: 5]

- 6 Figure 6.1 below shows how the temperature of some liquid in a beaker changed as it was heated until it boiled.

**Figure 6.1**

- (a) What was the boiling point of the liquid?

Boiling point = \_\_\_\_\_ [1]

- (b) State and explain what difference, if any, there would be in the final temperature if the liquid was heated more strongly.

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[2]

- (c) State two differences between boiling and evaporation.

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[2]

**[Total: 5]**

- 7 Figure 7.1 below shows an incomplete ray diagram.

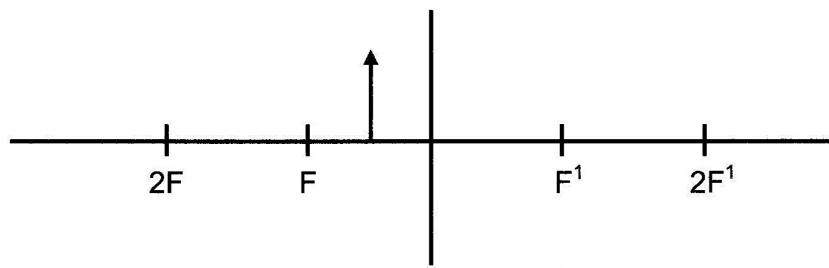


Figure 7.1

- (a) Complete the ray diagram above to show the position of the image. [3]

- (b) Give two characteristics of the image formed.

(i) \_\_\_\_\_

(ii) \_\_\_\_\_ [2]

[Total:5]

- 8 Study the circuit diagram in Figure 8.1 below.

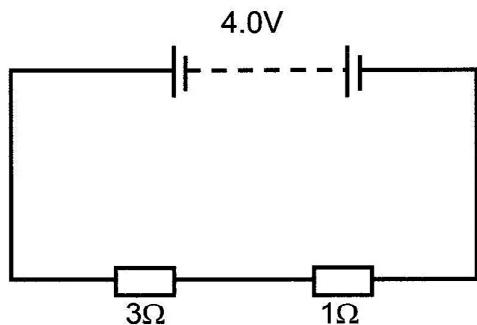


Figure 8.1

- (a) Calculate the current through the battery.

Current = \_\_\_\_\_ [2]

- (b) (i) How long would it take a charge of 2.0C to flow through the battery?

Time = \_\_\_\_\_ [2]

- (ii) How much energy would be used in moving this charge round the circuit?

Energy = \_\_\_\_\_ [2]

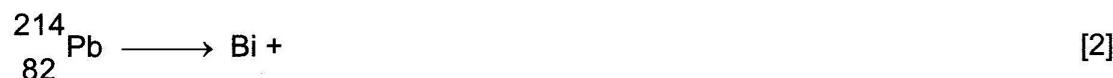
[Total:6]

- 9 (a) For one neutral atom of lead  $\begin{bmatrix} 214 \\ 82 \end{bmatrix} \text{Pb}$ , state the number of;

(i) Neutrons \_\_\_\_\_ [1]

(ii) Electrons \_\_\_\_\_ [1]

- (b) Lead nucleus can undergo decay by the emission of beta particle to produce a bismuth (Bi) nucleus. Complete the equation below to represent the decay of the lead nucleus.



[Total: 4]

## Section B

[20 marks]

Answer any **two (2)** questions from this section.

Use the **Answer Booklet** provided.

- 10 (a) Describe an experiment to show that a blackened metal surface is a better absorber of infrared radiation than a polished metal surface at the same temperature. [5]

- (b) An electric light bulb quickly reaches a constant high temperature when switched on. Explain how heat is lost from the bulb and also why the temperature of the bulb becomes constant. [5]

**[Total: 10]**

- 11 (a) Describe an experiment to determine the upper fixed point of a liquid – in glass thermometer. [4]

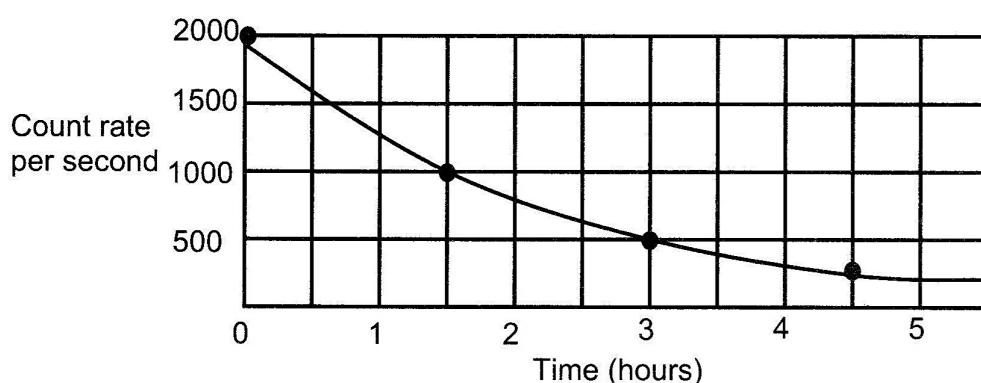
- (b) (i) The volume of a gas at a temperature of  $-73^{\circ}\text{C}$  and a pressure of 380mm Hg is  $1\ 000\text{cm}^3$ . Find the volume of the same gas at a pressure 760mm Hg and temperature of  $127^{\circ}\text{C}$ . [2]

- (ii) State two advantages of mercury over alcohol as thermometric liquids. [2]

- (c) Give two advantages of a thermocouple thermometer over liquid in glass thermometers. [2]

**[Total: 10]**

- 12 A detector of nuclear radiation was set up to measure the decay of a radioactive substance. **Figure 12.1** below shows the results of the experiment.



**Figure 12.1**

- (a) (i) What is the half-life of the substance? [1]  
(ii) Clearly explain how you obtained your answer to (a) (i) above. [2]
- (b) List any three properties of a beta-particle. [3]
- (c) Describe how you would show that the radioactive source is emitting only beta-particles. [4]

**[Total: 10]**

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