



Rewarding Learning

General Certificate of Secondary Education
2022

Centre Number

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Candidate Number

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Double Award Science: Physics

Unit 7 Practical Skills

Booklet B

Higher Tier

MV18

[GDW78]

THURSDAY 23 JUNE, MORNING

Time

30 minutes, plus your additional time allowance.

Instructions to Candidates

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write on blank pages.

Complete in black ink only.

Answer **all** questions.

Information for Candidates

The total mark for this paper is 35.

Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Question **1(a)**.

1 (a) A student is given a plastic bottle of cooking oil.

He wants to find the density of the cooking oil.

In addition to the bottle of cooking oil he is only given two other measuring instruments.



In this question you will be assessed on your written communication skills including the use of specialist scientific terms. [6 marks]

Give the names of the two measuring instruments needed.

1. _____
2. _____

State the two measurements that are needed to find the mass of the oil.

1. _____

2. _____

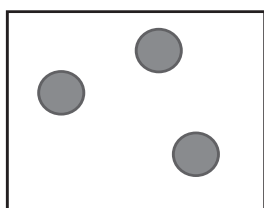
What other measurement is needed to find the density of the oil?

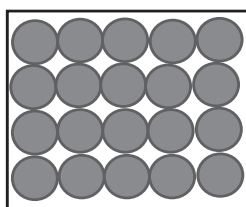
State fully, **in words**, the equation used to calculate density.

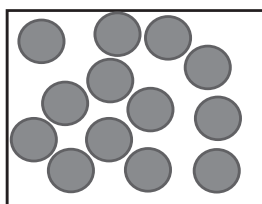
(b) Kinetic theory can be used to explain the difference between the densities of solids, liquids and gases.

The plastic bottle of oil consists of a solid, a liquid and an air gap above the oil.

Insert the word oil, plastic or air beside the correct particle diagram below. [3 marks]







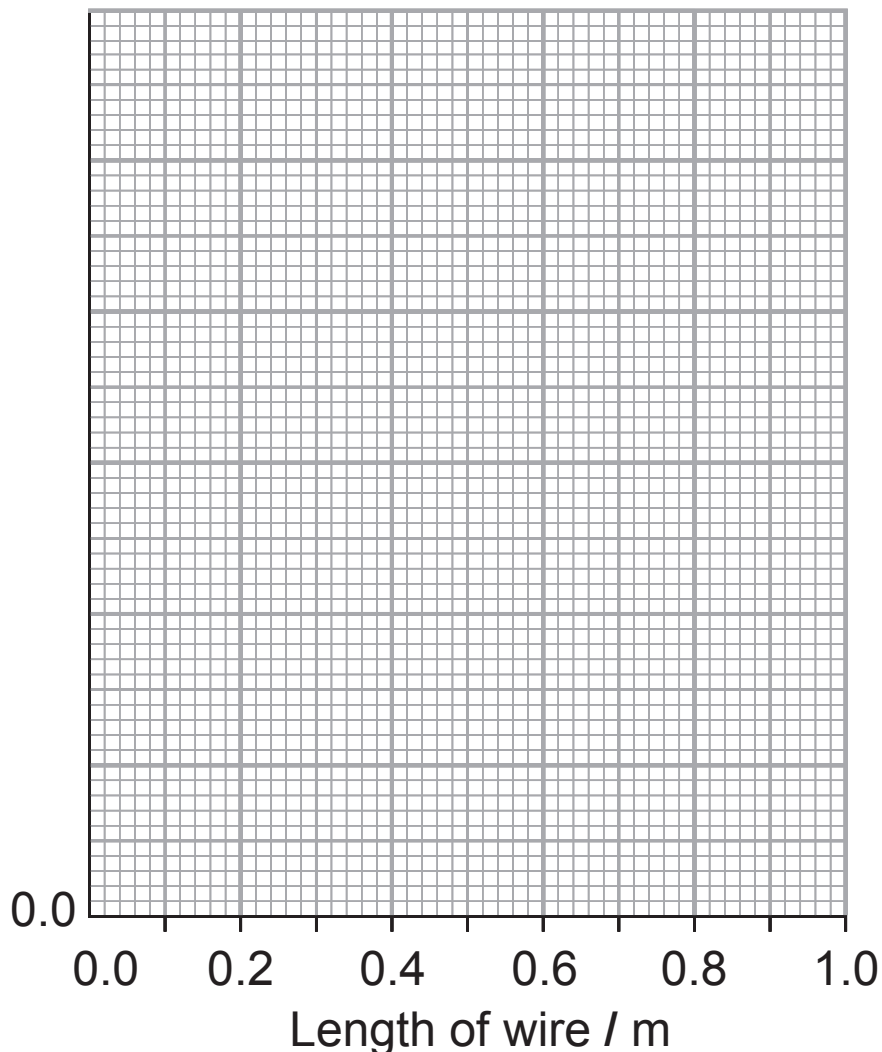
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(Questions continue overleaf)

- 2 A scientist carries out an investigation to find how the resistance of a metal wire depends on the length of the wire.

The table below shows the results obtained.

Length of wire / m	Resistance of wire / Ω
0.1	0.6
0.2	1.2
0.4	2.4
0.6	3.6
0.9	5.4

You are asked to plot a graph of resistance of wire (vertical axis) against length of wire (horizontal axis).



(a) Choose a suitable scale for the vertical axis and label it.

Plot the points.

Draw a straight line of best fit. [5 marks]

(b) Calculate the gradient of the line and give its unit.
[4 marks]

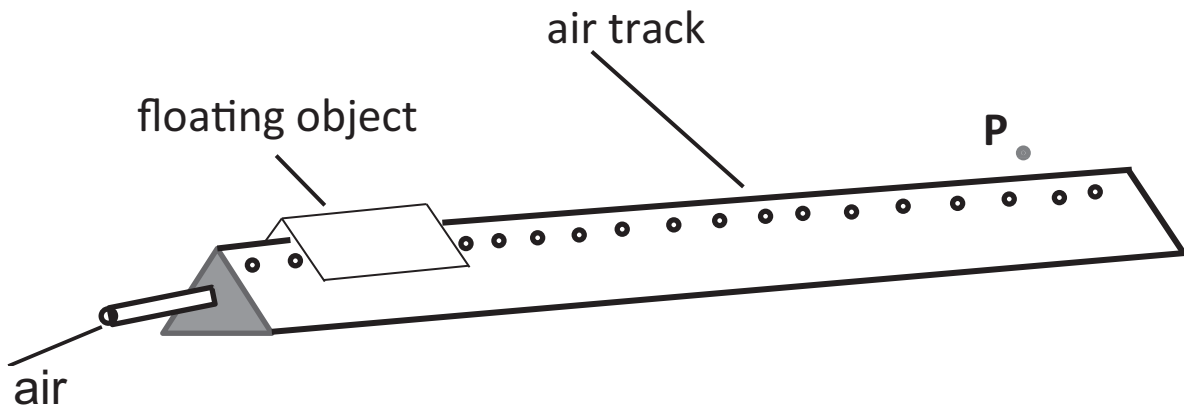
You are advised to show your working out.

Gradient of the line = _____ unit _____

3 An air track is used to investigate Newton's laws.

Air blown through the holes in the air track enable the object to float.

This means that friction between the object and the air track is zero.



A student gives the object an initial push.

- (a) Describe the speed of the object when it reaches the point P compared with its speed immediately after the initial push.

Choose from the following by placing a tick (✓) in the box.

The object will be going faster.

☐

The object will have slowed down.

☐

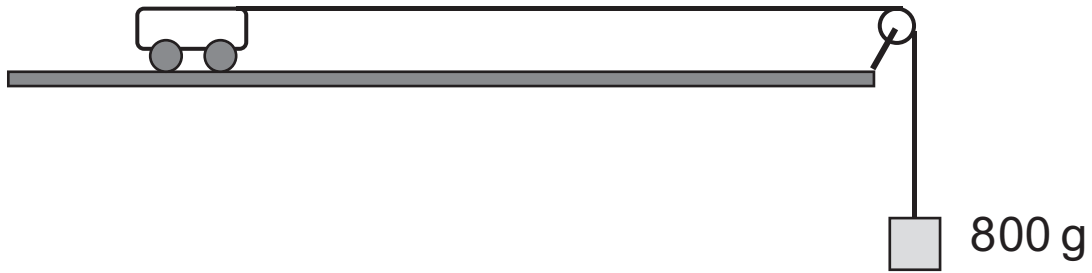
The object will be going at the same speed.

☐

Which of Newton's three laws is being demonstrated in this investigation? [2 marks]

Newton's law number _____

- (b)** In another investigation a trolley is accelerated along a runway.



- (i)** Calculate the force provided by the 800 g mass.
[2 marks]

You are advised to show your working out.

Force = _____ N

- (ii) On another occasion a trolley of mass 1.5 kg is pulled along a horizontal runway by a force of 10 N.

The frictional forces add up to 4 N.

Calculate the acceleration of the trolley. [5 marks]

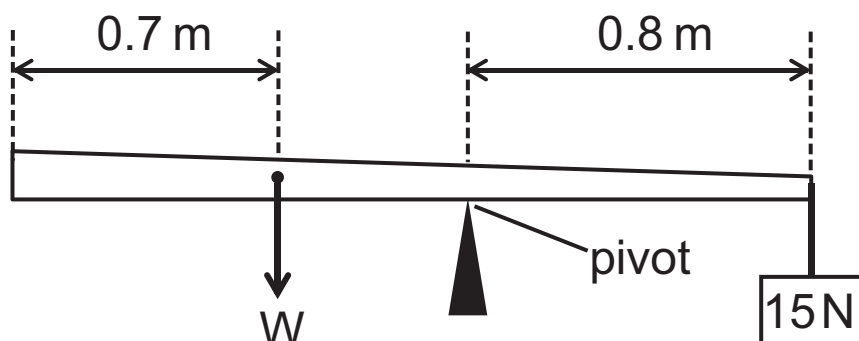
Include the unit with your answer.

You are advised to show your working out.

Acceleration = _____

4 A non-uniform beam of length 2.1 m is placed on a pivot.

A 15 N weight placed on the right-hand side 0.8 m from the pivot keeps the beam in a horizontal position.



(a) The weight, W , of the beam acts through the point shown. [2 marks]

What do we call this point?

What is the direction of the moment caused by the weight, W ?

Direction _____

- (b) Use the Principle of Moments to calculate the weight, W , of the non-uniform beam. [4 marks]

You are advised to show your working out.

Weight, W of the beam = _____ N

- (c) What is the size of the force the pivot exerts on the beam and give its direction? [2 marks]

Size of force = _____ N

Direction of force = _____

This is the end of the question paper

SOURCES:

- Q1(a)© Getty Images
- Q1(b)Chief Examiner
- Q3(a)Chief Examiner
- Q3(b)Chief Examiner
- Q4.....Chief Examiner

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Question Number	Marks
1	
2	
3	
4	

Total Marks	
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Examiner Number

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