Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2019

Double Award Science: Physics

Unit 7 Practical Skills
Booklet B
Higher Tier

MV18

[GDW78]

FRIDAY 14 JUNE, MORNING

Time

30 minutes, plus your additional time allowance.

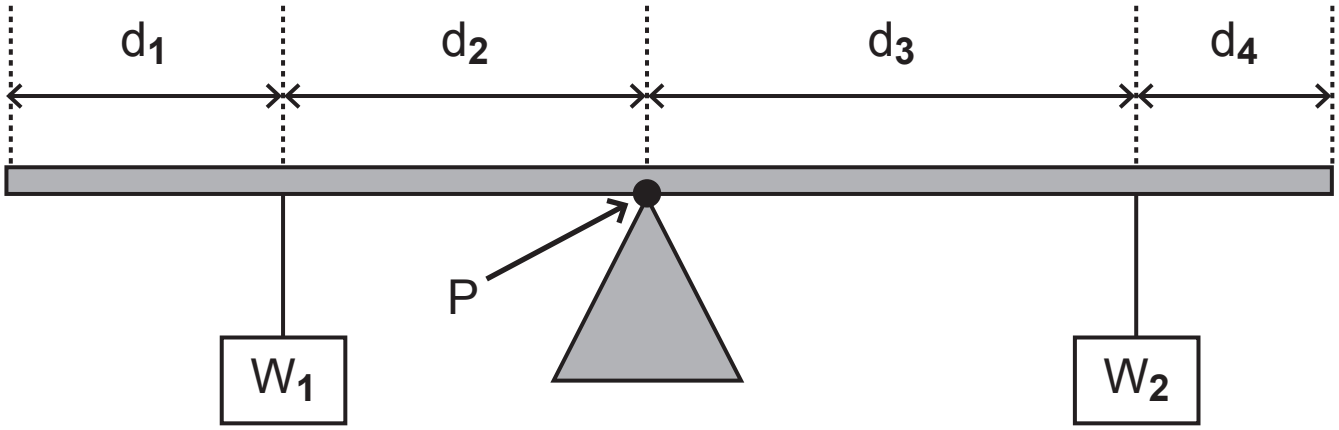
Instructions to Candidates

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**.

1 A student carries out an experiment to verify the Principle of Moments.
Weights W_1 and W_2 and distances d_1, d_2, d_3 and d_4 are shown on the diagram.



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

Name the point P in the diagram.

_____

State the distances you would record to verify the Principle of Moments.

_____

Using the symbols on the diagram, state how you would calculate the anticlockwise moment.

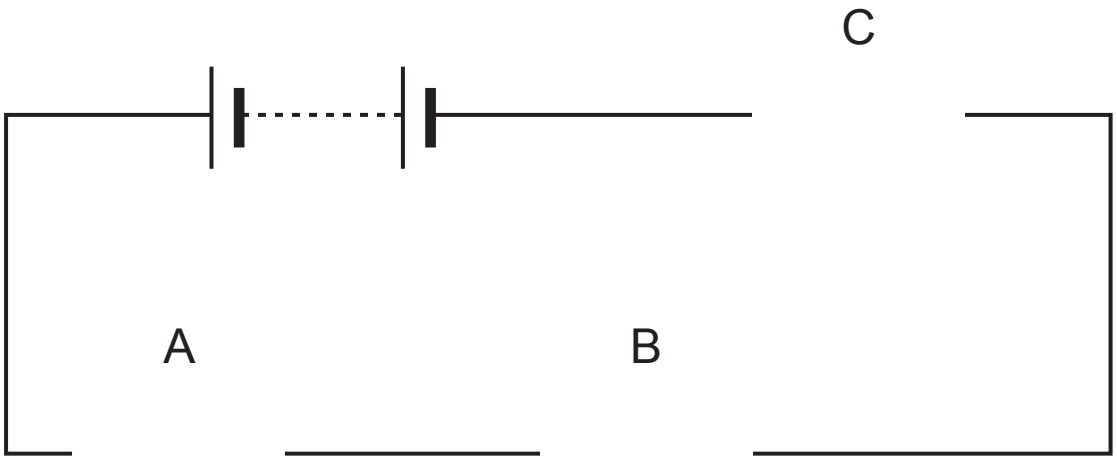
_____

State a unit for a moment.

_____

State fully, in words, the Principle of Moments.

2 A student carries out an investigation into how the current through a resistor depends on the voltage across it.
An incomplete circuit is shown.



(a) (i) In the gap A insert the symbol for the resistor. [1 mark]

(ii) In the gap B insert the symbol for the component which measures one of the quantities needed in this investigation. [2 marks]

(iii) In the gap C insert the symbol for the component to allow the current to be varied. [1 mark]

(iv) What name is given to this component? [1 mark]

Name of component _____

(v) Add a further component, using the symbol, to measure the other quantity needed in this experiment. [2 marks]

(vi) During this experiment one quantity should be kept constant.
What is this quantity and how do you ensure that it is kept constant? [2 marks]

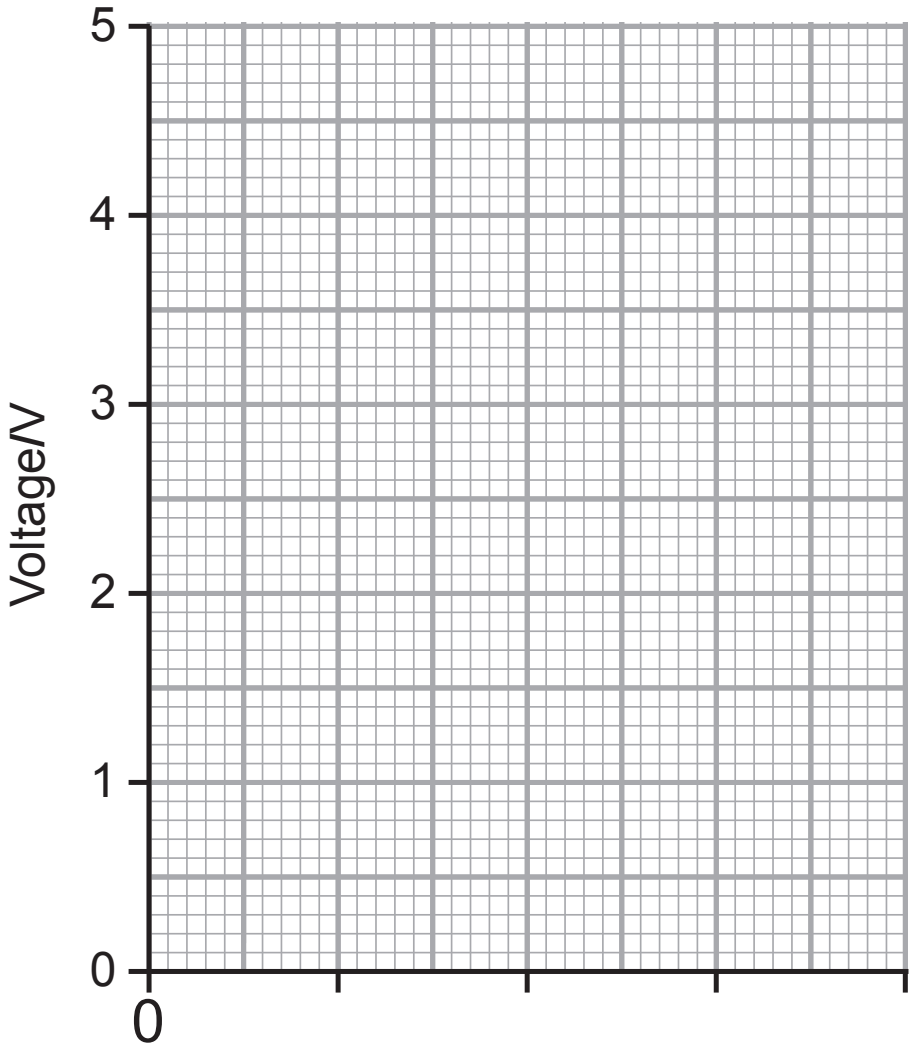
Quantity _____

How it is kept constant _____

This experiment is repeated but this time the resistor is replaced by a filament lamp.
The following values were obtained.

Voltage/V	Current/A
0.0	0.0
0.4	0.1
1.2	0.2
2.4	0.3
5.0	0.4

You are asked to plot a graph of voltage (vertical axis) against current (horizontal axis).



(b) (i) Choose a suitable scale for the horizontal axis and label it. [2 marks]

(ii) Plot the points. [2 marks]

(iii) Draw the curve of best fit. [1 mark]

(iv) By first using your graph to find the current, calculate the resistance of the lamp when the voltage across it is 4 V.
Give your answer to one decimal place. [4 marks]

You are advised to show your working out.

Resistance = _____ Ω

3 A student carries out an investigation to see how the average speed of a ball down a slope, of **length 50 cm**, depends on the height of the slope.

(a) State the two measuring instruments the student would use. [2 marks]

1. _____

2. _____

The investigation gave the following results:

Height of slope/cm	Time to roll down slope/s			Average speed of ball down slope/ cm/s
	Experiment 1	Experiment 2	Average	
5	5.3	5.1	5.2	
10	3.8	3.2		
15	3.0	2.8		
20	2.4	2.3		

(b) Complete the column labelled Average, with the average time calculated to **one decimal place**. [3 marks]

(c) (i) For the height of 5 cm, calculate the average speed of the ball down the slope and enter the value in the table to **one decimal place**. [3 marks]
Remember, the length of the slope is 50 cm.

You are advised to show your working out.

Average speed = _____ cm/s

(ii) Complete the table for the remaining heights to one decimal place. [1 mark]

(d) The student states that,

'the height of the slope is proportional to the average speed of the ball down the slope.'

(i) Calculate the ratios

average speed **:** height

for heights of 5 cm and 10 cm. Give your answer to one decimal place. [1 mark]

Height/cm	**Ratio**
5	
10	

(ii) Do these ratios confirm the student statement above?

Circle Yes or No. **Yes** **No**

Give a reason for your answer. [1 mark]

_____

_____

This is the end of the question paper

SOURCES

Q1.....Source: Author
Q2.....Source: Author

For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
Total Marks	

Examiner Number