

Surname	Centre Number	Candidate Number
First name(s)		0



GCSE



S24-3420U30-1B

MONDAY, 8 JANUARY – FRIDAY, 9 FEBRUARY 2024

PHYSICS – Unit 3 (3420U30)

PRACTICAL ASSESSMENT

INVESTIGATING THE STRENGTH OF AN ELECTROMAGNET

SECTION B

1 hour

For Examiner's use only		
	Maximum Mark	Mark Awarded
Section B	24	

**ADDITIONAL MATERIALS**

A calculator and your Section **A** exam paper.

**INSTRUCTIONS TO CANDIDATES**

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. If you run out of space, use the additional page(s) at the back of the booklet, taking care to number the question(s) correctly.

**INFORMATION FOR CANDIDATES**

The total number of marks available for this section of the task is 24.

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

This task is in 2 sections, **A** and **B**. You will have completed Section **A** in a previous lesson.



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**SECTION B**Answer **all** questions.

2. (a) (i) State the independent variable in this experiment. [1]

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- (ii) State the range of the independent variable. [1]

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- (iii) State the dependent variable in this experiment. [1]

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- (iv) Identify **one** controlled variable in this experiment **and** explain why it was controlled. [2]

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- (b) (i) Use your results from Section **A** to draw a **line graph** of mass of pins (vertical axis) against the number of turns (horizontal axis) on the grid opposite. [5]



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- (ii) Use your graph to describe the relationship between the number of turns and the mass of pins.  
Explain what this shows about the strength of the electromagnet. [2]

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- (c) (i) Evaluate the repeatability of your data from Section A. [2]

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- (ii) State how the reproducibility of the experiment could be evaluated. [1]

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- (iii) Identify **two** inaccuracies in the experiment **and** explain how they could be reduced. [4]

1. ....

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2. ....

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- (d) A 10 cm length of the same type of wire that you used in Section **A** is now used by a group of students to investigate the strength of a permanent magnet.

They varied the current in the wire and measured the force between the wire and the permanent magnet.

Some of their results are given below:

$$\begin{aligned}\text{current} &= 0.50 \text{ A} \\ \text{force} &= 0.009 \text{ N}\end{aligned}$$

- (i) State the resolution of the ammeter used in their experiment. [1]

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- (ii) When the current in the wire was 1.00 A the force on the wire was recorded to be 0.018 N.  
Use all of the results to explain whether the force is proportional to the current in the wire. [2]

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- (iii) The students used their results to calculate the strength of the magnetic field. Their value for the magnetic field strength was 0.18 T.  
The true value of the magnetic field strength of the magnet is 0.19 T.  
Explain what the students' value shows about the data collected. [2]

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