Surname		Centre Number	Candidate Number
First name(s)			0

GCSE

wjec cbac

S24-3420U30-1D

MONDAY, 8 JANUARY – FRIDAY, 9 FEBRUARY 2024

PHYSICS – Unit 3 (3420U30)

PRACTICAL ASSESSMENT

INVESTIGATING THE MOTION OF A FALLING OBJECT

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]

....

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

....

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

....

(iv) State the resolution of the stopwatch used in the experiment in Section **A**. [1]

....

(v) Complete the table below to explain why the area of the cake case was controlled. [1]

Controlled variable	Why was it controlled?
Area of cake case	

(b) (i) Use your results from Section **A** to draw a graph of time (vertical axis) against distance travelled (horizontal axis) on the grid opposite. [5]

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Examiner only

(ii) Use your graph to describe the relationship between distance travelled and the time taken. [2]

....

....

....

(c) Copy your results for mean time to fall from Section **A** into the table below.

Distance travelled (cm)	Mean time (s)	Speed (**UNIT =** ....)
150		
130		
110		
90		
70		
50		

(i) Use the data in the table above and the equation:

$$\text{speed} = \frac{\text{distance travelled}}{\text{time}}$$

to calculate the speed of the cake case for each distance.
Record each speed in the table **and** include a suitable unit. [3]
Space for calculations.

(ii) William suggests that the cake case falls at terminal speed for each distance travelled.
Explain whether your results support this. [2]

....

....

....

....

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(d) (i) The uncertainty in the time for any given distance travelled is given by:

$$\text{uncertainty} = \frac{\text{maximum time taken} - \text{minimum time taken}}{2}$$

Calculate the uncertainty in time for your results for **150 cm**. [2]

uncertainty = ... s

(ii) One inaccuracy in this experiment is starting the stopwatch as the cake case passes the pointer.
Suggest **two** improvements which would reduce this inaccuracy. [2]

Improvement 1

....

....

Improvement 2

....

....

(iii) Explain whether your data for **150 cm** is repeatable. [2]

....

....

....

....

(iv) Explain how you could assess the reproducibility of your results. [1]

....

....

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END OF PAPER

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Question number	Additional page, if required. Write the question number(s) in the left-hand margin.

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