

A



Surname \_\_\_\_\_

Other Names \_\_\_\_\_

Centre Number \_\_\_\_\_

Candidate Number \_\_\_\_\_

Candidate Signature \_\_\_\_\_

## Level 3 Certificate / Extended Certificate

### APPLIED SCIENCE

Unit 1 Key concepts in science

Section C – Physics

**ASC1P**

Monday 11 June 2018

Afternoon

Time allowed: 1 hour 30 minutes.

You are advised to spend approximately 30 minutes on this section.

**For this paper you must have:**

- a calculator
- formulae sheet.

At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.

[Turn over]



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## INSTRUCTIONS

- Use black ink or black ball-point pen.
- Answer ALL questions in each section.
- You must answer the questions in the spaces provided. Do not write on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

## INFORMATION

- You will be provided with a copy of the formulae sheet.
- There are three sections in this paper:  
SECTION A – Biology  
SECTION B – Chemistry  
SECTION C – Physics.
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60 and the maximum mark for this section is 20.

## ADVICE

Read each question carefully.

**DO NOT TURN OVER UNTIL TOLD TO DO SO**



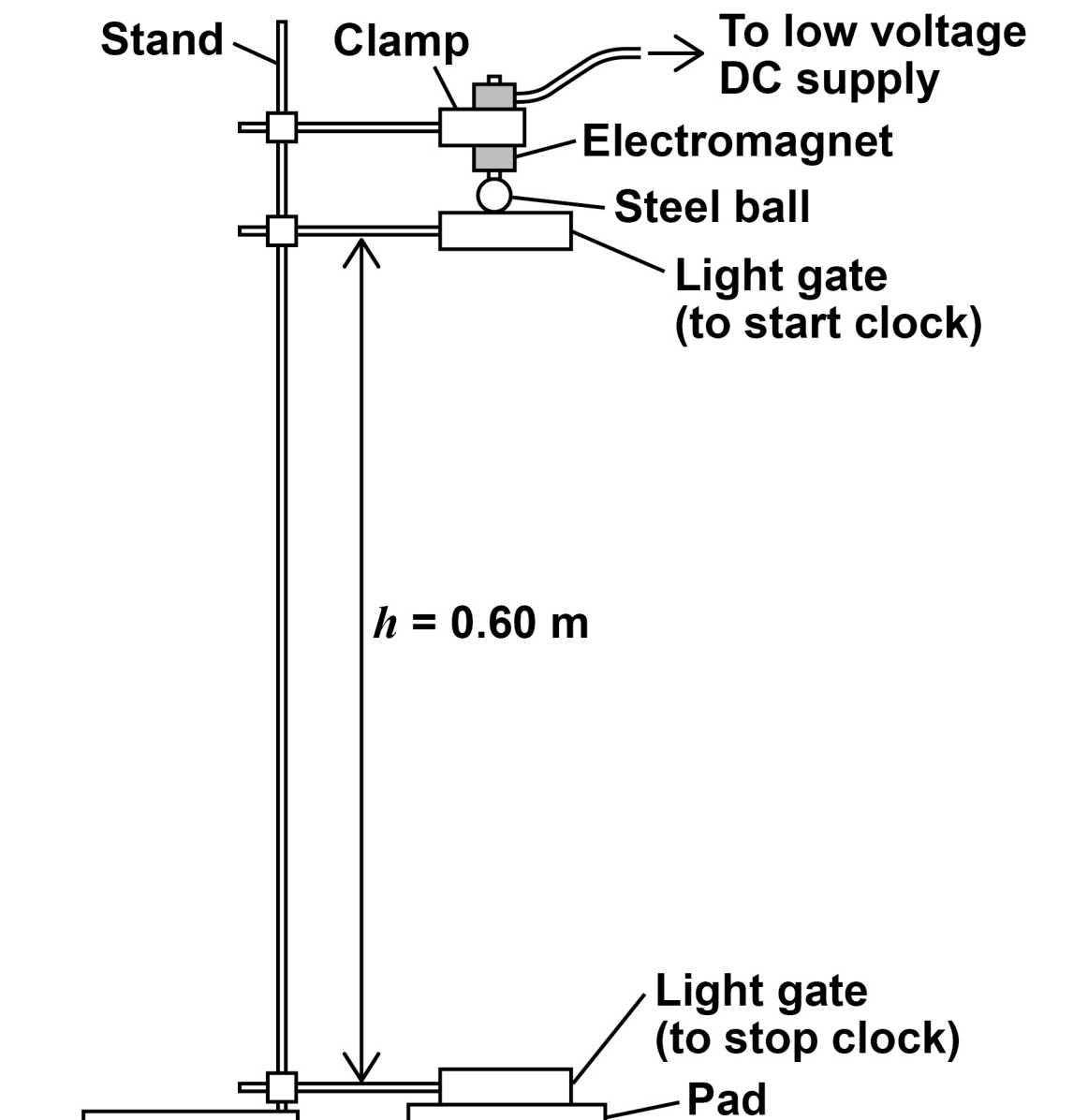
**SECTION C – PHYSICS**

Answer ALL questions in this section.

A student wants to measure the acceleration due to gravity of a steel ball.

FIGURE 1 shows the equipment the student plans to use.

FIGURE 1



**0 1 . 1** Name the energy the steel ball has before it is released. [1 mark]

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**0 1 . 2** Explain why the steel ball remains stationary before it is released.  
In your explanation, include the forces involved. [2 marks]

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**[Turn over]**



**0 1 . 3** The distance between the light gates,  $h$ , is 0.60 m.

The time taken for the steel ball to fall between the light gates was 0.351 s.

Calculate the **AVERAGE** speed of the steel ball as it travelled between the light gates. [1 mark]

Average speed = \_\_\_\_\_ m s<sup>-1</sup>

**0 1 . 4** Calculate the acceleration due to gravity of the steel ball.

Assume the speed of the steel ball at the first light gate is 0 m s<sup>-1</sup>

State the correct unit in your answer. [3 marks]

Acceleration due to gravity = \_\_\_\_\_

Unit = \_\_\_\_\_



**0 1 . 5** Give TWO ways the student could reduce the effect of errors in the results. [2 marks]

**1** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**[Turn over]**



**0 1 . 6** The student calculates the speed of the steel ball to be  $3.7 \text{ m s}^{-1}$  just before it hits the pad.

The mass of the steel ball is  $0.060 \text{ kg}$ .

Calculate the kinetic energy of the steel ball just before it hits the pad. [2 marks]

Kinetic energy = \_\_\_\_\_ J







**0 2**

A product design engineer measures the temperature of a hot drink as it cools in a cup.

TABLE 1 shows the engineer's results.

**TABLE 1**

<b>Time / minutes</b>	<b>0</b>	<b>10</b>	<b>20</b>	<b>30</b>	<b>40</b>	<b>50</b>	<b>60</b>
<b>Temperature / °C</b>	<b>88</b>	<b>54</b>	<b>39</b>	<b>30</b>	<b>24</b>	<b>23</b>	<b>23</b>

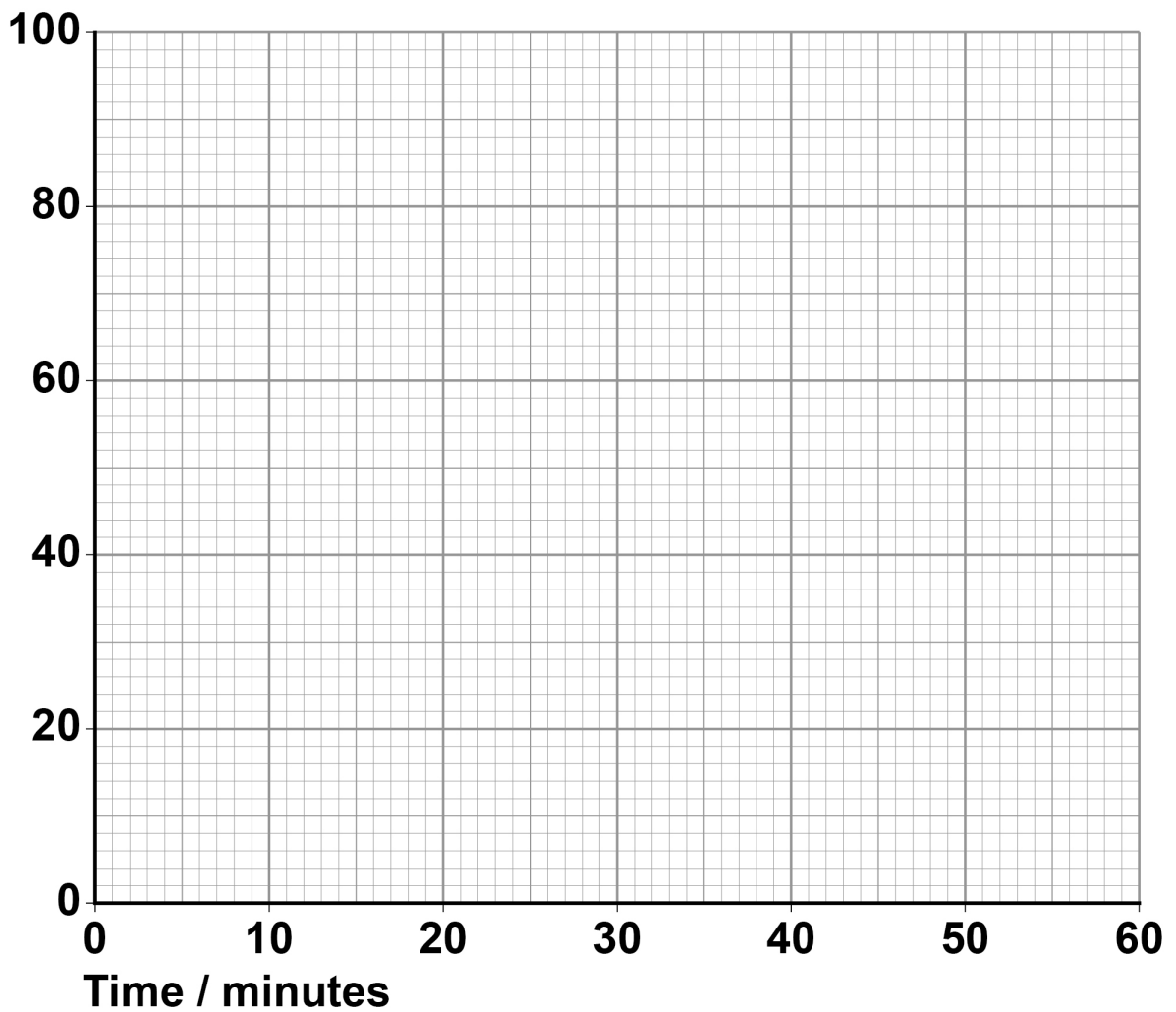


**0 2 . 1** Plot a graph of the values in TABLE 1 on FIGURE 2.

**Draw a line of best fit. [2 marks]**

**FIGURE 2**

**Temperature / °C**



**[Turn over]**



**0 2 . 2** The engineer wants to calculate the U-value of the material the cup is made from.

**State what is meant by the term U-value of a material. [1 mark]**

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**0 2 . 3** When the hot drink has a temperature of 88 °C, the drink loses 58 J of heat in 1 second.

The temperature of the room is 23 °C.

The total surface area of the cup is 0.050 m<sup>2</sup>

Calculate the U-value of the material the cup is made from. [2 marks]

U-value = \_\_\_\_\_ W m<sup>-2</sup> °C<sup>-1</sup>

[Turn over]



**0 2 . 4** The engineer designed the cup to minimise thermal transfer.

**Suggest TWO examples where thermal transfer should be maximised. [2 marks]**

**1** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**2** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

<b>7</b>

**END OF QUESTIONS**



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For Examiner's Use	
Question	Mark
1	
2	
<b>TOTAL</b>	

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**IB/M/Jun18/NC/ASC1P/E2**

