AQA

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

Level 3 Certificate/Extended Certificate
APPLIED SCIENCE

Unit 1 Key Concepts in Science
Section C – Physics

Time allowed: 1 hour 30 minutes.
You are advised to spend approximately 30 minutes on this section.

Materials
For this paper you must have:
- a calculator
- the Formulae Sheet (enclosed).

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in each section.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.

For Examiner's Use	
Question	Mark
1	
2	
TOTAL	

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.

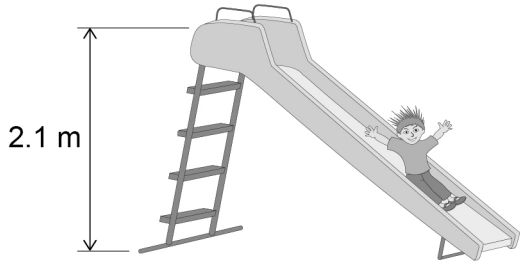
Do not write outside the box

Section C – Physics

Answer **all** the questions in this section.

0 1 **Figure 1** shows a child going down a slide.

Figure 1



The child has a mass of 21 kg.

The child's speed is 3.4 m s^{-1} at the bottom of the slide.

0 1 . 1 Calculate the gravitational potential energy of the child at the top of the slide.

Assume g = 9.8 m s^{-2}

Use information from **Figure 1**.

Use the Formulae Sheet.

[1 mark]

Gravitational potential energy = _____ J

0 1 . 2 The child's speed is 3.4 m s^{-1} at the bottom of the slide.

Calculate the child's kinetic energy at the bottom of the slide.

Use the Formulae Sheet.

[1 mark]

Kinetic energy = _____ J

Do not write outside the box

The child is at rest at the top of the slide.

The child's speed is 3.4 m s^{-1} at the bottom of the slide.

0 1 . 3 The child accelerates with a constant acceleration of 1.1 m s^{-2} down the slide.

Calculate the length of the slide.

Use the Formulae Sheet.

[2 marks]

Length of slide = _____ m

0 1 . 4 Describe how the momentum of the child changes from the top of the slide to the bottom of the slide.

[2 marks]

0 1 . 5 Explain why Newton's First Law of Motion does **not** apply when the child goes down the slide.

[2 marks]

Question 1 continues on the next page

Do not write outside the box

0 1 . 6 The child sits on a coat and goes down the slide again.

The speed of the child is faster than 3.4 m s^{-1} at the bottom of the slide.

Explain what effect sitting on the coat has on the efficiency of the slide.

[3 marks]

11

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0 2 A set of garden lights uses solar power.

The garden lights have a battery that is charged by light from the Sun.

0 2 . 1 Solar power is a renewable energy source.

Table 1 shows a list of other energy sources.

Tick (✓) all the **renewable** energy sources in **Table 1**.

[1 mark]

Table 1

Energy source	Tick (✓)
Fossil fuels	
Hydroelectric power	
Nuclear fuels	
Tidal power	
Wave power	
Wind power	

0 2 . 2 One advantage of solar power is that it is a renewable energy source.

Give **one** other advantage and **one** disadvantage of using solar power for the garden lights.

[2 marks]

Advantage _____

_____

Disadvantage _____

_____

Question 2 continues on the next page

Do not write outside the box

0 2 . 3 The battery is charged by an average current of 0.075 A for 8 hours.

Calculate the total charge flow while the battery is charged.

Give the unit.

Use the Formulae Sheet.

[3 marks]

Charge = _____ Unit _____

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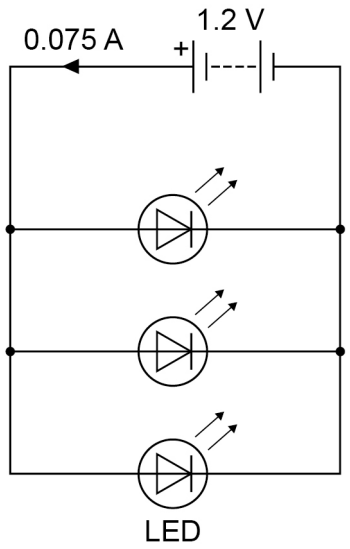
0 2 . 4 The garden lights consist of three **identical** light-emitting diodes (LEDs) connected to a battery.

Figure 2 shows the circuit diagram for the garden lights.

Figure 2



Give the voltage and the current for each LED.

[2 marks]

Voltage = _____ V

Current = _____ A

0 2 . 5 A **series** circuit is **not** used for the garden lights.

Give **one** reason why a **series** circuit is **not** used for the garden lights.

[1 mark]

_____

_____

9

END OF QUESTIONS

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Question number	**Additional page, if required.** **Write the question numbers in the left-hand margin.**

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