

Please write clearly in block capitals.

Centre number

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Candidate number

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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

Monday 12 June 2023

Afternoon

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.

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.

For Examiner's Use	
Question	Mark
1	
2	
TOTAL	



Section C – PhysicsAnswer **all** the questions in this section.**0 1 . 1** Solar power is an example of a renewable energy source.

What is meant by a renewable energy source?

[1 mark]

0 1 . 2 One advantage of solar power is that it is a renewable energy source.Give **one** other advantage of solar power.**[1 mark]**

0 1 . 3 Give **one** disadvantage of solar power.**[1 mark]**



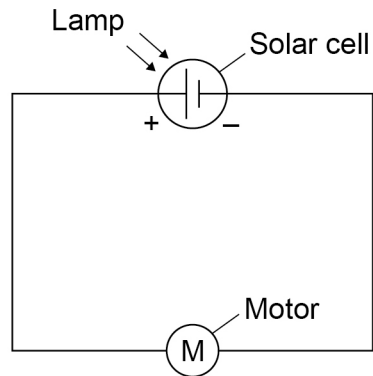
A solar cell uses solar power to produce electricity.

A student did an experiment to measure the efficiency of a solar cell.

The student connected a solar cell to a motor and shone a lamp on the solar cell to produce electricity.

Figure 1 shows part of the circuit diagram for the circuit the student used.

Figure 1



0 1 . 4

The student measured the current and voltage produced by the solar cell.

Draw a circuit diagram for a circuit that would allow the student to measure the current and voltage produced by the solar cell.

[2 marks]

Question 1 continues on the next page

Turn over ►



0 1 . 5 The voltage across the motor is 3.20 V and the current in the circuit is 17 mA.

Calculate the power output of the solar cell.

Use the Formulae Sheet.

[2 marks]

Power output of solar cell = _____ W

0 1 . 6 The total power input on the solar cell is 0.80 W.

Calculate the efficiency of the solar cell.

Use the Formulae Sheet.

[1 mark]

Efficiency of solar cell = _____

0 1 . 7 The student moved the lamp further away from the solar cell and repeated the experiment.

Explain what happens to the speed of the motor.

[3 marks]



0 1 . 8 The student completed the experiment in a darkened room.

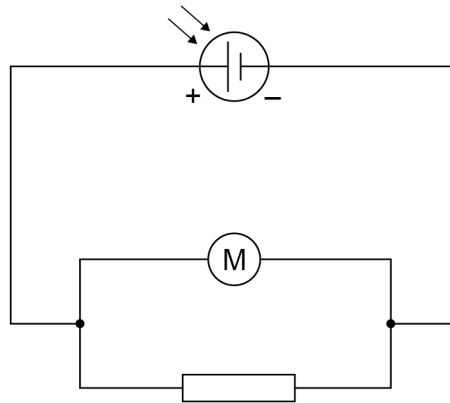
Suggest why.

[1 mark]

The student set up a new circuit with a resistor connected in parallel with the motor.

Figure 2 shows a circuit diagram of the new circuit.

Figure 2



0 1 . 9 What effect does the addition of the resistor have on the total resistance of the circuit compared to the circuit used in **Figure 1**?

Tick (✓) **one** box.

[1 mark]

Total resistance decreases

Total resistance increases

Total resistance stays the same

13

Turn over for the next question

Turn over ►

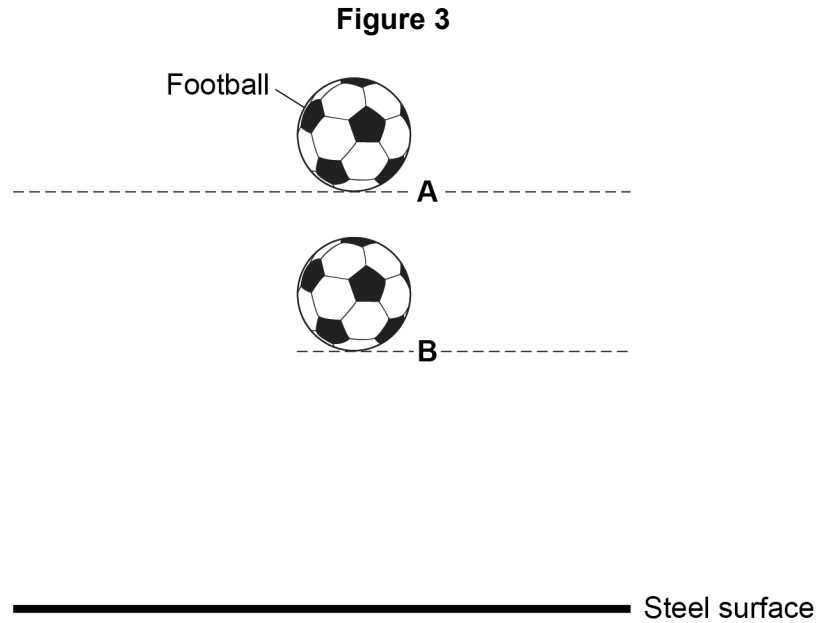


0 2

A football is dropped from a height on to a steel surface.

The height the football bounces is measured.

Figure 3 shows the football is dropped at position **A** and it bounces back up to position **B**.



0 2 . 1

The football takes 0.64 s to drop from position **A** to the steel surface.

Calculate the speed of the football when it hits the steel surface.

The acceleration due to gravity is 9.8 m s^{-2}

Use the Formulae Sheet.

[1 mark]

Speed of football = _____ m s^{-1}



0 2 . 2 The mass of the football is 0.45 kg.

Calculate the momentum of the football as it hits the steel surface.

Give the unit.

Use the Formulae Sheet.

[2 marks]

Momentum of football = _____ Unit _____

0 2 . 3 Explain why the football bounces as it hits the steel surface.

Use Newton's Third Law in your explanation.

[2 marks]

0 2 . 4 Explain why the football does not return to position **A** when it bounces.

[2 marks]

7

END OF QUESTIONS



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1 2



2 3 6 A A S C 1 / P

IB/M/Jun23/ASC1/P