![AQA]

Level 3 Certificate and Extended Certificate in Applied Science
KEY CONCEPTS IN SCIENCE
Unit Number: ASC1

Section C – ASC1/P (Physics)

Tuesday 23 January 2018   Morning   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
- formulae sheet.

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 outside the box around each page or 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.

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
TOTAL	

Section C – Physics

Answer **all** questions in this section.

0 1 Power stations which use renewable energy resources produce around 25% of the United Kingdom's electricity.

0 1 . 1 **Table 1** shows different types of power station.

Tick (✓) **all** of the power stations in **Table 1** which use renewable energy sources.
[1 mark]

Table 1

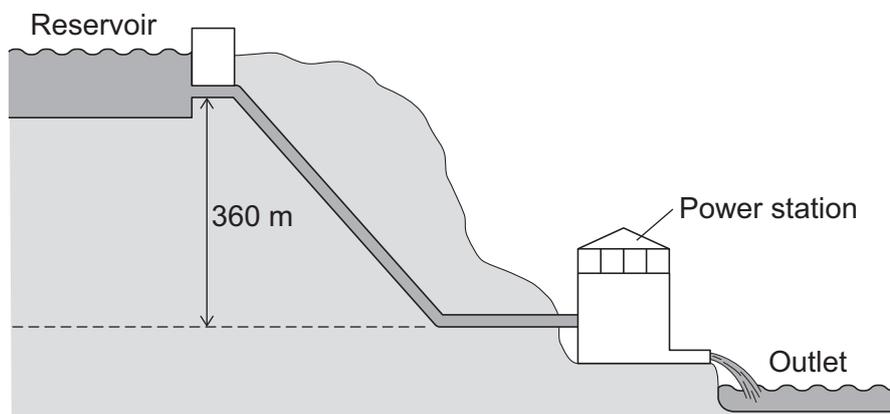| Type of power station	Tick (✓)
Biomass	
Coal	
Geothermal	
Natural gas	
Nuclear	
Oil	
Wave	
Wind	

Hydroelectric power is another type of renewable energy.

Figure 1 shows a hydroelectric power station.
The hydroelectric power station has a power output of 440 MW when water passes through it.

Water is supplied from a reservoir.

Figure 1

Do not write outside the box

0 1 . 2 | 167 000 kg of water flow through the power station each second.

Calculate the loss of gravitational potential energy per second of the water as it flows from the reservoir to the power station.

Give an appropriate unit for your answer.
Assume g = 9.8 ms⁻²

[3 marks]

Loss of gravitational potential energy per second = _____ Unit = _____

0 1 . 3 | Calculate the efficiency of the hydroelectric power station.

[2 marks]

Efficiency = _____

0 1 . 4 | State **two** ways in which energy could be wasted in the hydroelectric power station.

[2 marks]

1 _____

_____

2 _____

_____

Question 1 continues on the next page

Turn over ▶

0 1 . 5 Nuclear power stations produce approximately 20% of the United Kingdom's electricity.

Describe how electricity is generated in a nuclear power station.

[4 marks]

_____

_____

_____

_____

_____

_____

0 1 . 6 State **one** disadvantage to the environment of using a nuclear power station to generate electricity.
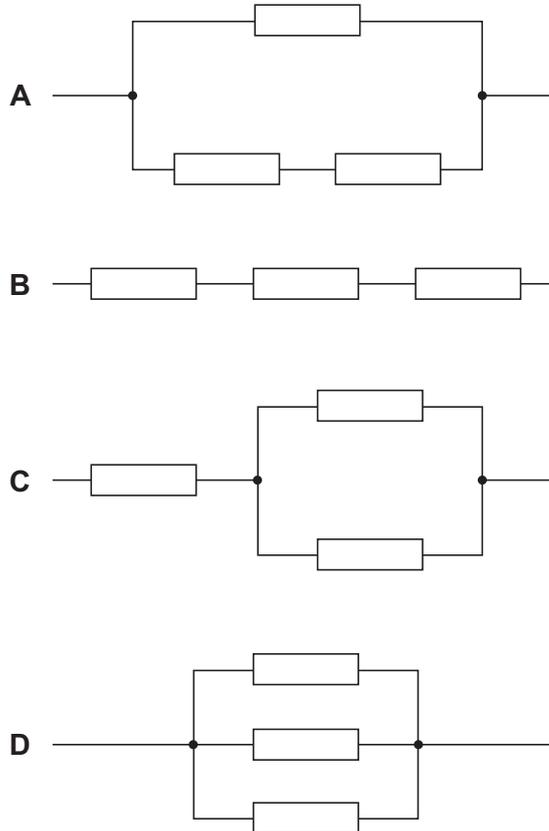
[1 mark]

_____

_____

13

| 0 | 2 |

A technician has set up four electrical circuits. She uses three identical 10 Ω resistors in each circuit.
Figure 2 shows the arrangement of resistors in each circuit.

Figure 2

| 0 | 2 | . | 1 |

State which circuit, **A**, **B**, **C** or **D**, has the **lowest** total resistance and which has the **highest** total resistance.

[2 marks]
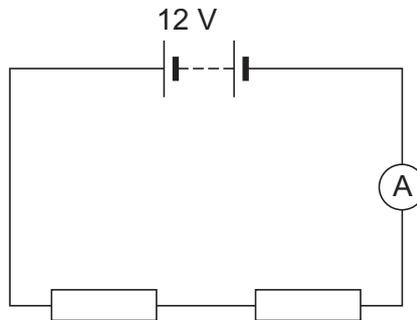
Lowest total resistance _____

Highest total resistance _____

Question 2 continues on the next page

Turn over ▶

The technician uses **two** of the identical 10 Ω resistors in a circuit as shown in **Figure 3**.

Figure 3

| 0 | 2 | . | 2 | Add a component to **Figure 3** which would allow the technician to measure the voltage across **one** of the resistors.

[1 mark]

| 0 | 2 | . | 3 | Calculate the reading on the ammeter in **Figure 3**.

[2 marks]

Reading on ammeter = _____ A

| 0 | 2 | . | 4 | State what the expected voltage across each resistor should be.

[1 mark]

Voltage = _____ V

0 2 . 5 The technician measures the voltage across **one** of the resistors. The voltage is less than she expects it to be.

Give **one** reason why the voltage is lower than expected.

[1 mark]

_____

_____

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END OF QUESTIONS

There are no questions printed on this page

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ANSWER IN THE SPACES PROVIDED