



Surname _____

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Candidate Number _____

Candidate Signature _____

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

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]



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.**
- **The total time for all three sections of this paper is one-and-a-half hours.**



INFORMATION

- **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.**
- **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.**

ADVICE

- **You are advised to spend approximately 30 minutes on this section.**
- **Please read each question carefully before starting.**

DO NOT TURN OVER UNTIL TOLD TO DO SO



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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	

[Turn over]



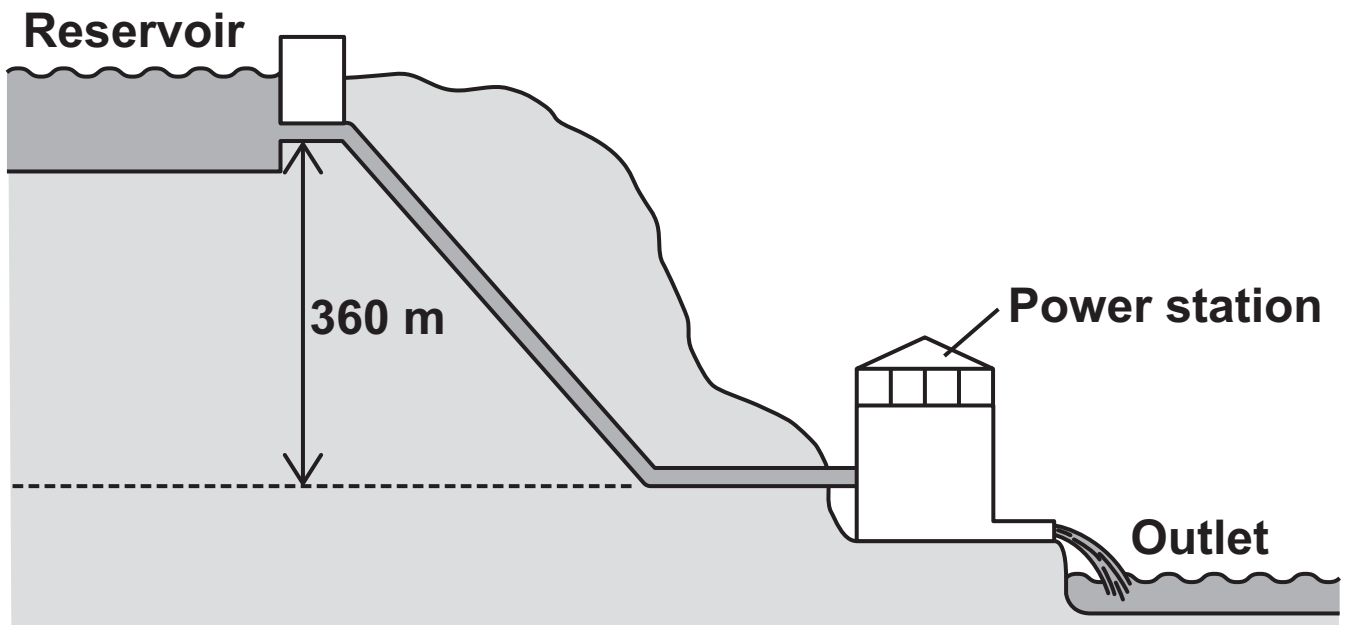
Hydroelectric power is another type of renewable energy.

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



0	1	.	2
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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.
[3 marks]

Assume $g = 9.8 \text{ ms}^{-2}$

Loss of gravitational potential energy

per second = _____ Unit = _____

[Turn over]



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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 _____

[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

[Turn over]

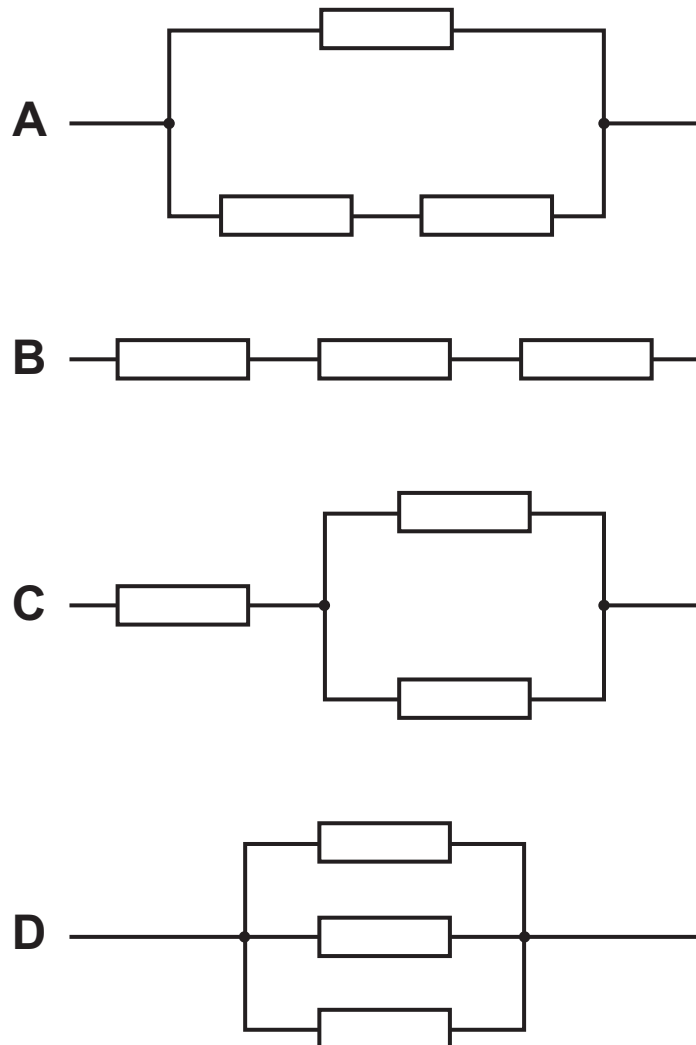


0 2

A technician has set up four electrical circuits. She uses three identical $10\ \Omega$ resistors in each circuit.

FIGURE 2 shows the arrangement of resistors in each circuit.

FIGURE 2



0	2	.	1
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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

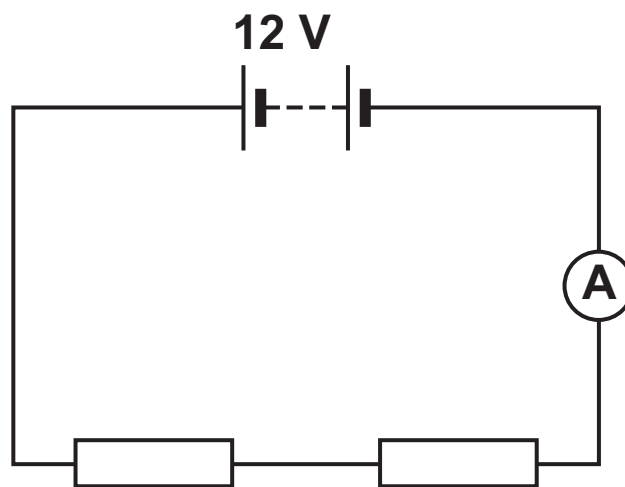
Highest total resistance

[Turn over]



The technician uses two of the identical $10\ \Omega$ 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]

7

END OF QUESTIONS



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Examiner's Initials	
Question	Mark
1	
2	
TOTAL	

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