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Surname					Other names					
Pearson BTEC Level 1/Level 2 First Award	Centre Number					Learner Registration Number				
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Applied Science

Unit 1: Principles of Science

Monday 14 May 2018 – Afternoon Time: 1 hour	Paper Reference 20460E
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You must have: Calculator	Total Marks
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Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and learner registration number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information

- The total mark for this paper is 54.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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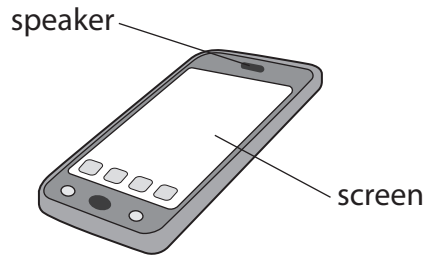

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Answer ALL questions. Write your answers in the spaces provided.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then put a cross in another box ☒.

SECTION A: Physics

1 The image shows a mobile phone.



Different parts of the mobile phone produce different forms of useful energy.

(a) Draw **one** line from each part of the mobile phone to the type of useful energy it produces.

(2)

part of mobile phone

useful energy produced

speaker

light

elastic

thermal

screen

electrical

sound

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(b) State **one** type of energy that is wasted by the mobile phone.

(1)

(c) State the type of energy stored in the battery of the mobile phone.

(1)

(Total for Question 1 = 4 marks)

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2 (a) Power is the amount of energy transferred per second.

State the unit of power.

(1)

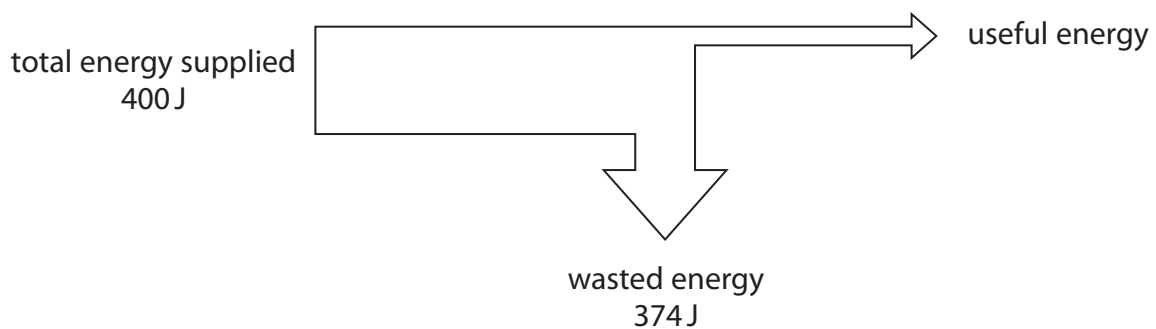
(b) Energy sources can be renewable or non-renewable.

Identify the non-renewable energy source.

(1)

- A coal
- B solar
- C tidal
- D wind

(c) The diagram shows the energy transfers in a machine.



Calculate the efficiency of the machine.

$$\text{efficiency} = \frac{\text{useful energy}}{\text{total energy supplied}} \times 100\%$$

Show your working.

(2)

efficiency = %

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(d) Fuel cells can be used to provide energy.

Explain **one** advantage of using fuel cells to provide energy.

(2)

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(Total for Question 2 = 6 marks)

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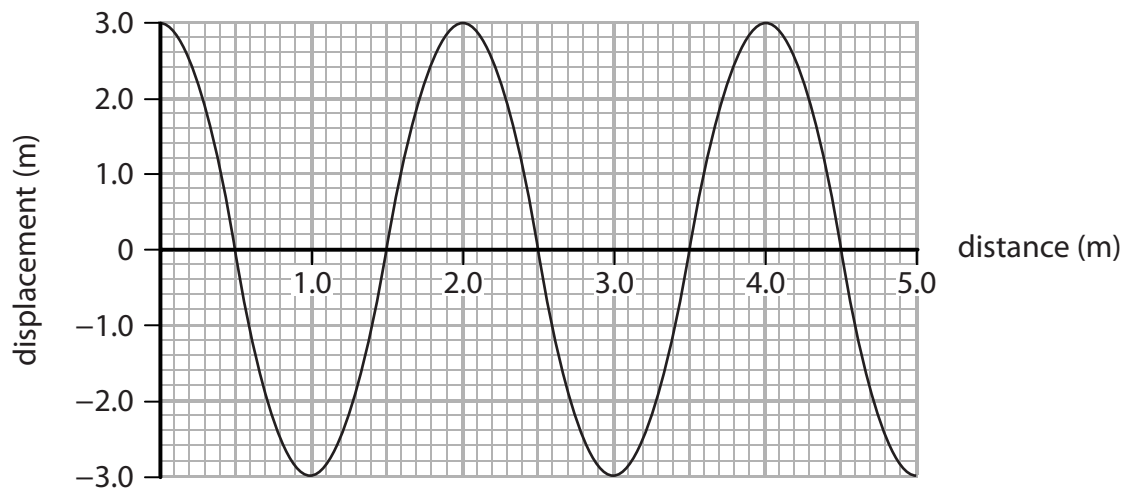
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3 (a) The graph shows a wave.



(i) Give the amplitude of the wave.

(1)

amplitude = m

(ii) Give the wavelength of the wave.

(1)

wavelength = m

(b) A different wave has a wave speed of 360 m/s and a wavelength of 1.5 m.

Calculate the frequency of the wave.

$$\text{wave speed (m/s)} = \text{wavelength (m)} \times \text{frequency (Hz)}$$

Show your working.

(2)

frequency = Hz

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(c) Gamma rays are used in hospitals.

Explain **one** benefit and **one** risk of using gamma rays in hospitals.

(4)

benefit.....

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risk.....

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(Total for Question 3 = 8 marks)

TOTAL FOR SECTION A = 18 MARKS

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SECTION B: Chemistry

4 The diagram shows part of the periodic table.

															He		
Li												B					
												Al		P			
	Ca				Cr												
Rb																	

(a) Identify the element that is a non-metal.

(1)

- A Ca
- B Cr
- C He
- D Li

(b) Which two elements are in the same group of the periodic table?

(1)

- A B and P
- B Ca and Cr
- C Li and Ca
- D Li and Rb

(c) Identify the element that is in the same period as the element Al.

(1)

- A B
- B He
- C Li
- D P

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(d) (i) Give the symbol of the element that has 5 protons.

(1)

(ii) Complete the table to show the relative mass and relative charge of a proton.

(2)

	relative mass	relative charge
proton		

(Total for Question 4 = 6 marks)



5 Martin had a bottle of hydrochloric acid.

The bottle showed this hazard symbol.



(a) (i) State the meaning of this hazard symbol.

(1)

(ii) Martin added sodium carbonate to some dilute hydrochloric acid.

A gas was produced.

The gas was bubbled through limewater.

The limewater turned milky.

Name the gas produced in the reaction.

(1)

(b) Martin carried out a different experiment with magnesium strips and dilute hydrochloric acid.

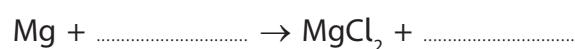
Magnesium chloride, MgCl_2 , and hydrogen gas were produced.

(i) Describe how Martin should show that hydrogen gas was produced.

(2)

(ii) Complete the balanced symbol equation for the reaction of magnesium with hydrochloric acid.

(2)



(Total for Question 5 = 6 marks)

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6 Fossil fuels often contain sulfur.

When the sulfur in the fossil fuel burns, sulfur dioxide is produced.

Explain the effect sulfur dioxide has on lakes **and** how neutralisation reactions are used to reduce the effect.

You may use equations to support your answer.

(6)

(Total for Question 6 = 6 marks)

TOTAL FOR SECTION B = 18 MARKS

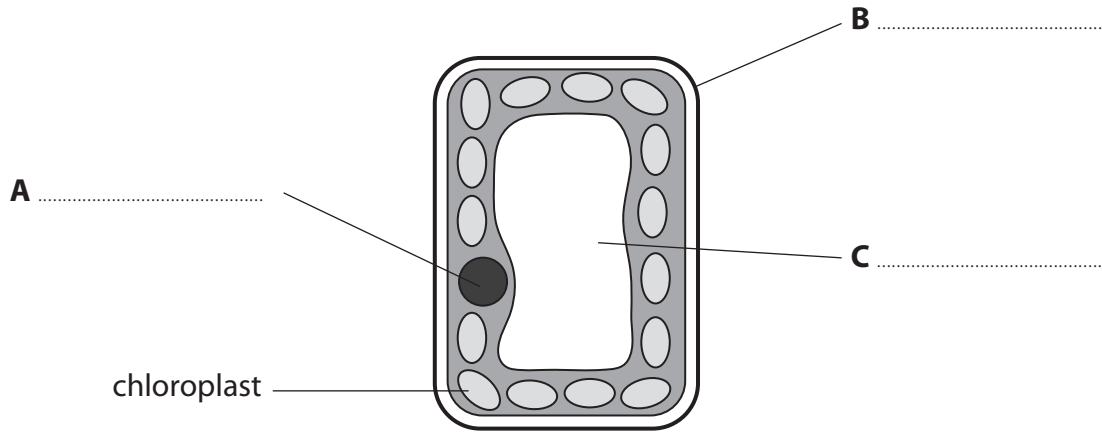


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SECTION C: Biology

7 A leaf contains palisade cells.

The diagram shows a palisade cell.



(a) Complete the labels **A**, **B** and **C** on the diagram.

(3)

(b) A chloroplast has been labelled.

State the function of the chloroplast.

(1)

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(Total for Question 7 = 4 marks)

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8 It is important that conditions in the human body remain constant.

(a) The maintenance of a constant internal environment within the human body is known as

(1)

- A homeostasis
- B photosynthesis
- C respiration
- D transpiration

(b) The central nervous system helps maintain a constant internal environment.

(i) Name the **two** organs that make up the central nervous system.

(2)

1

2

(ii) Name the system that transmits electrical impulses to and from the central nervous system.

(1)

(c) Explain how sweating and hairs lying flat on the skin help to cool the body when its temperature is too high.

(4)

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(Total for Question 8 = 8 marks)



9 Blood contains red blood cells and white blood cells.

Explain how the red blood cells and the white blood cells are adapted for their functions.

(6)

red blood cells.....

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white blood cells.....

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(Total for Question 9 = 6 marks)

TOTAL FOR SECTION C = 18 MARKS
TOTAL FOR PAPER = 54 MARKS

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