

Write your name here

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Pearson  
Edexcel BTEC  
Level 1/Level 2  
First Award

Centre Number					Learner Registration Number				

# Applied Science

## Unit 1: Principles of Science

Tuesday 4 November 2014 – Afternoon <b>Time: 1 hour</b>	Paper Reference <b>20460E</b>
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<b>You must have:</b> Calculator and a ruler	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.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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PEARSON

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: Chemistry**

**Answer ALL questions.**

**1** Chemists need to test chemicals to find out what they are.

(a) (i) Give the result when a lit splint is placed at the mouth of a test tube of hydrogen gas.

(1)

- A** it burns with a green flame
- B** it causes a squeaky pop
- C** it produces carbon dioxide
- D** it relights

(ii) Give the name of the chemical used to test for carbon dioxide.

(1)

- A** hydrochloric acid
- B** limewater
- C** sodium hydroxide
- D** zinc

(b) (i) Give the name of the paper that can be used to test for the pH of a substance.

(1)

(ii) A chemist tested a solution with the paper used to test for pH.

The paper went red.

Name the type of chemical that will turn this paper red.

(1)

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**(Total for Question 1 = 4 marks)**

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2 Aluminium sulfate is used in water treatment plants.

Aluminium sulfate can be made by reacting aluminium with sulfuric acid. Hydrogen gas is also produced in this reaction.

			27 Al 13						

(a) Using the periodic table, state what type of element aluminium is.

(1)

(b) A container for aluminium sulfate will have this hazard symbol on it.



State the hazard that this symbol warns of when using aluminium sulphate.

(1)

(c) Hydrogen gas is a molecule.

Give the symbol for a molecule of hydrogen gas.

(1)

- A H
- B H<sub>2</sub>
- C 2H
- D H<sup>2</sup>

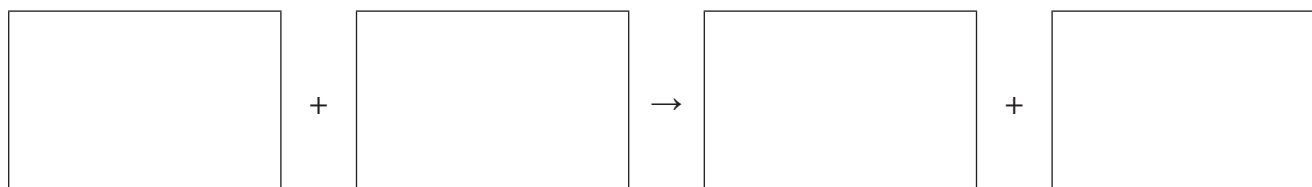


(d) State the type of compound aluminium sulfate is.

(1)

(e) Write a word equation for the reaction used to make aluminium sulfate.

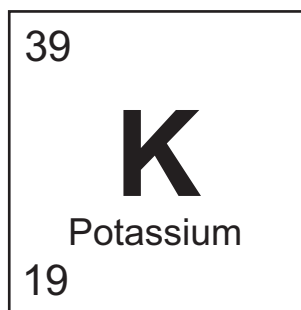
(2)



**(Total for Question 2 = 6 marks)**



3 Frankie is learning about elements in the periodic table.  
She finds out that potassium is in group 1 on the periodic table.  
The diagram shows how potassium is represented on her periodic table.



(a) (i) How many protons does an atom of potassium have? (1)

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(ii) How many electrons does an atom of potassium have? (1)

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(b) Sodium is also in group 1.

Frankie knows that sodium and potassium are both alkali metals.

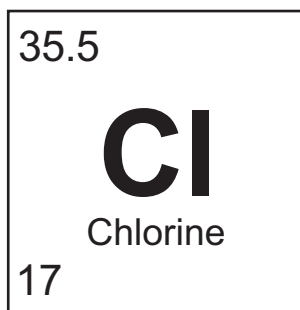
Explain why sodium and potassium are placed in the same group in the periodic table.

(2)

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(c) The diagram shows how chlorine is represented on her periodic table.



Use the information in the diagram to explain how Frankie knows that chlorine-35.5 has isotopes.

(4)

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**(Total for Question 3 = 8 marks)**

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**TOTAL FOR SECTION A = 18 MARKS**



**SECTION B: Physics**

**Answer ALL questions.**

**4** Mike is looking at ways to heat his home.

He wants to use a renewable energy source.

(a) Identify **two** renewable energy sources.

(2)

- A** coal
- B** crude oil
- C** geothermal
- D** natural gas
- E** wind

(b) Mike decides to use solar power to heat his home.

State the source of the energy for solar power.

(1)

(c) Complete the diagram showing the energy change when solar power is used to heat Mike's home.

(1)



(d) Mike uses rechargeable batteries to power his radio.

(i) Name the type of energy stored in a battery.

(1)

(ii) Name the useful energy produced by the radio.

(1)

(iii) Name the wasted energy produced by the radio.

(1)

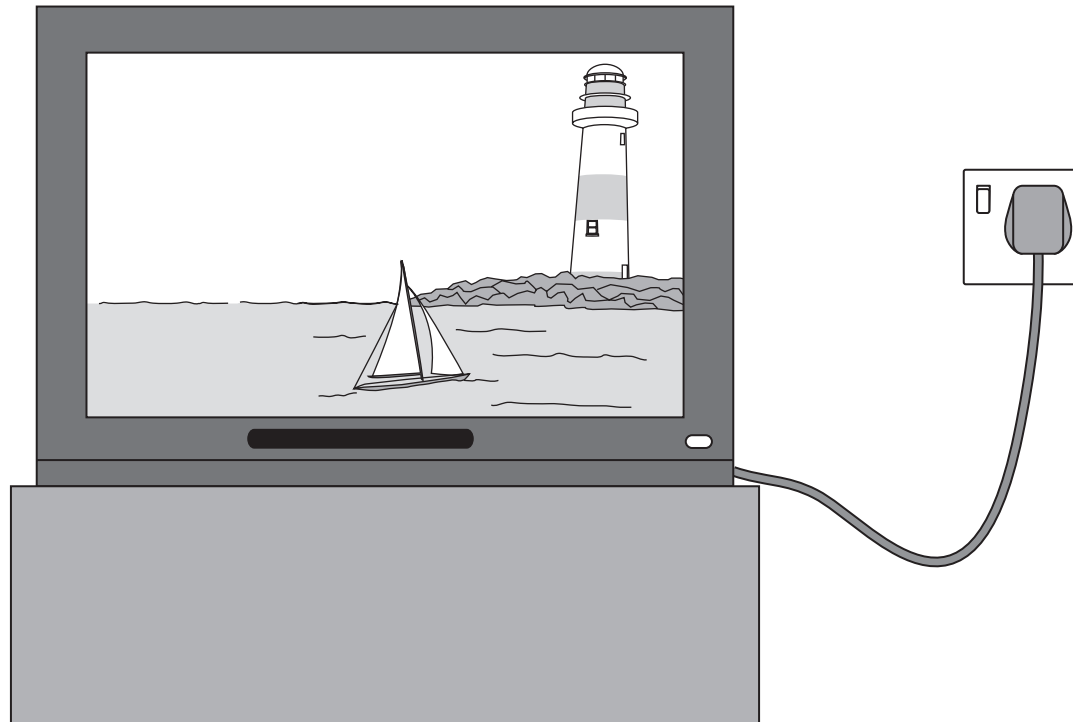
**(Total for Question 4 = 7 marks)**





5 Emma has a new television.

She plugs it into a socket on the wall and switches it on.



(a) Name the type of energy used to power the television.

(1)

(b) Emma uses a remote control to turn on the television.

(i) Name the type of electromagnetic wave used by the remote control to turn on the television.

(1)

(ii) Name the type of electromagnetic wave Emma sees when she watches the television.

(1)



(c) Emma watches the television for ten minutes.

In ten minutes the television uses **48 000 joules** of energy.

Calculate the power of the television.

$$\text{power (watts)} = \frac{\text{energy (joules)}}{\text{time (seconds)}}$$

Show your working.

(2)

..... watts

**(Total for Question 5 = 5 marks)**





**SECTION C: Biology**

**Answer ALL questions.**

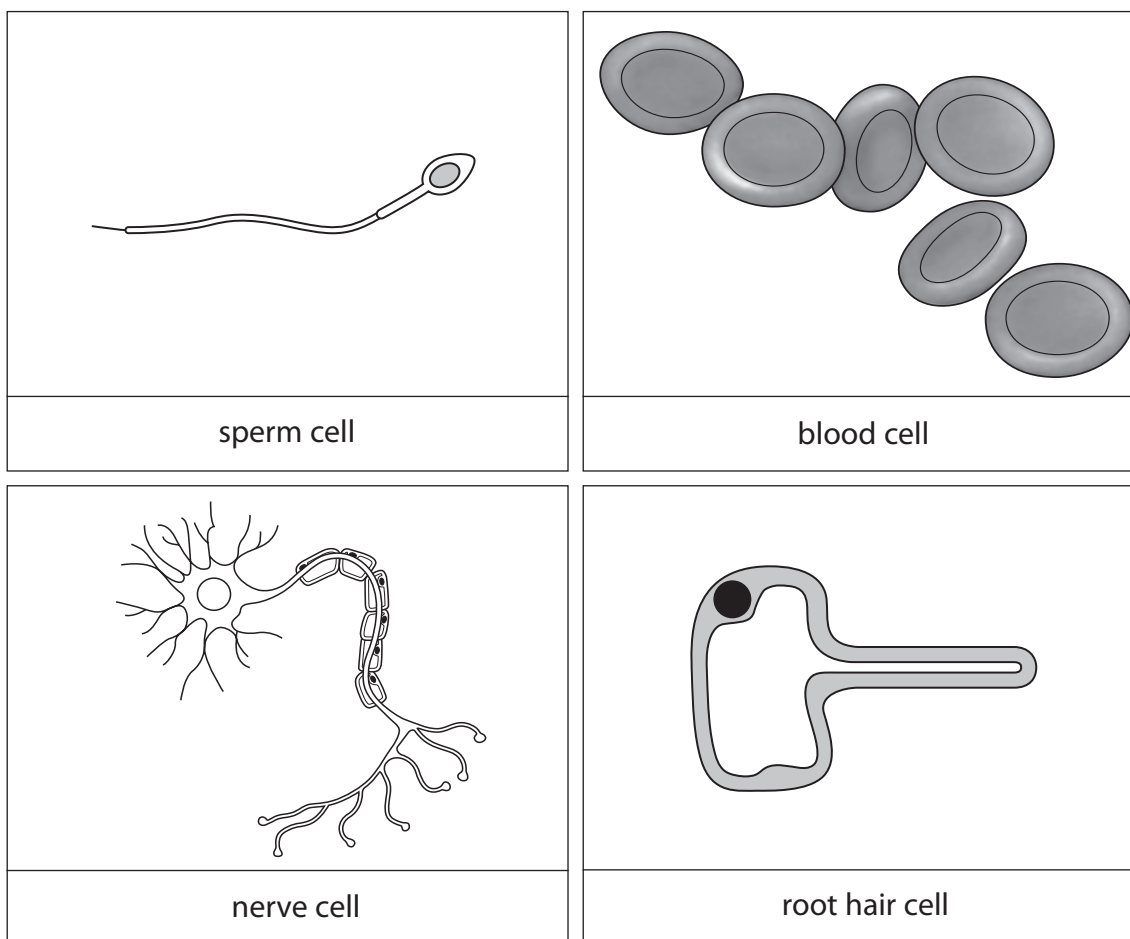
**7** Plant and animal cells have different components.

(a) Identify the component found in plant cells but **not** in animal cells.

(1)

- A** cell membrane
- B** cell wall
- C** cytoplasm
- D** nucleus

(b) The diagram shows four types of specialised cell.



Give the name of the cell in the diagram that is found in plants but **not** in animals.

(1)



(c) (i) Plants use light for photosynthesis.

Identify the part of the plant where photosynthesis takes place.

(1)

- A** leaf
- B** petal
- C** root
- D** seed

(ii) State how some plant cells are specialised to carry out photosynthesis.

(1)

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**(Total for Question 7 = 4 marks)**

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8 Sheena goes outside without a coat on a cold day.

Sheena starts to shiver.

(a) (i) Why does Sheena shiver when she gets cold?

(1)

(ii) Give **another way** that the body responds to being cold.

(1)

(b) Hormones are used by the body to control some of its functions.

(i) Name the hormone that lowers blood glucose levels.

(1)

(ii) Name the hormone that raises blood glucose levels.

(1)



(c) Sheena is cooking her dinner and picks up a pan by its very hot handle.

Describe how the nervous system responds, so that she immediately drops the hot pan.

(4)

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**(Total for Question 8 = 8 marks)**



9 Cemile grows strawberries.

She has two different types of strawberry plant

- one plant with big strawberries
- one plant with small strawberries.

Cemile knows that the allele for big strawberries is dominant.

When she bred her strawberry plants, half of the offspring had big strawberries and half of the offspring had small strawberries.

Use your knowledge of genetics to explain why half of the offspring had big strawberries and half of the offspring had small strawberries.

You may draw a Punnett square to help you explain this.

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**(Total for Question 9 = 6 marks)**

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

