

Write your name here

Surname					Other names				
Centre Number					Learner Registration Number				
Pearson BTEC Level 1/Level 2 First Award									
<h1>Applied Science</h1> <h2>Unit 1: Principles of Science</h2>									
Thursday 14 November 2013 – Morning Time: 1 hour					Paper Reference 20460E				
You will need a calculator and a ruler.								Total Marks	

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 mark your new answer with a cross ☒.

SECTION A Biology

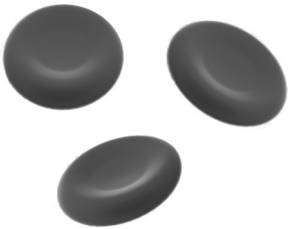
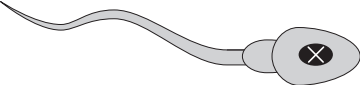
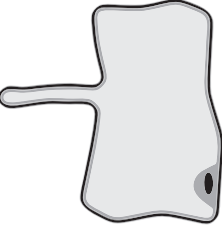
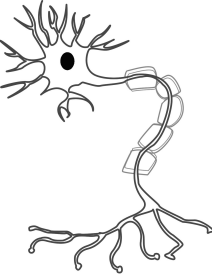
Answer ALL questions.

1 Some specialised cells are shown in the diagram.

(a) Label the specialised cells.

One has been done for you.

(3)

A 	B 
C 	D 
root hair cell	

(b) The function of the root hair cell is to absorb water from the soil. Give one example of how it is adapted for this function.

(1)

(Total for Question 1 = 4 marks)

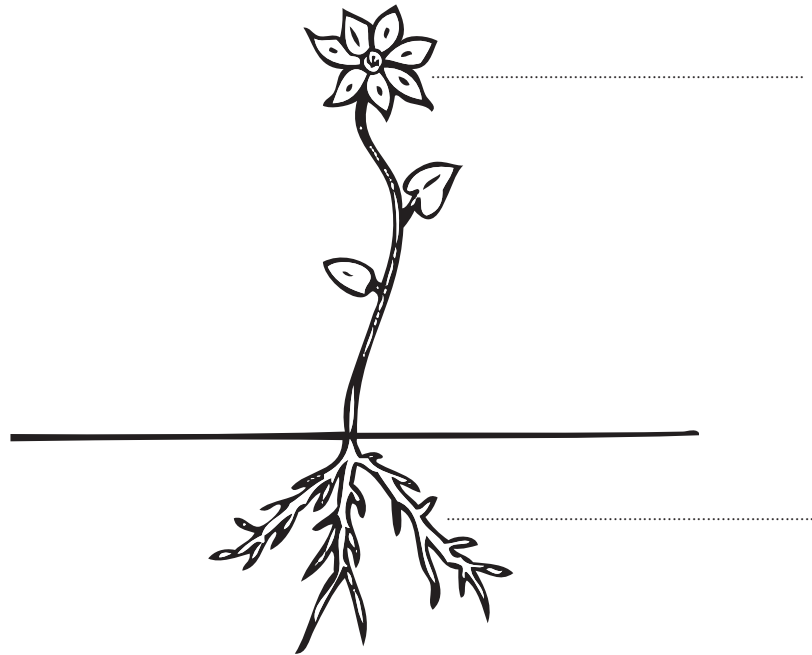


2 Rose is a florist. She needs to understand the structure of plants so that she can keep flowers looking fresh for longer.

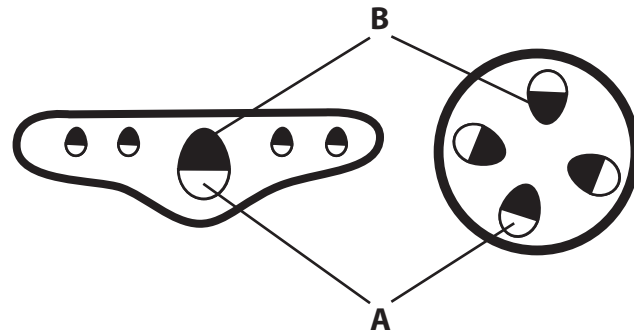
The diagram shows the structure of a plant.

(a) Fill in the missing labels on the diagram.

(2)



(b) The diagram shows a cross section of a leaf and a stem.
The part of the plant labelled B is the xylem.



(i) Give the name and the function of the part of the plant labelled A.

(2)

Name

Function

.....

(ii) Describe how vacuoles in cells in the plant stem help support the plant.

(2)

.....

.....

.....

(Total for Question 2 = 6 marks)



3 The nervous system and endocrine system control the body's responses to stimuli.

(a) The central nervous system is made up of the brain and the spinal cord.

State how the components of the central nervous system control the body's responses to stimuli.

(1)

Brain

(1)

Spinal cord

Vincent eats a chocolate bar. This will change the amount of glucose in his body.

(b) Explain how the endocrine system reacts to the change in glucose.

(2)

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(c) Explain **two** reasons why the nervous system is able to communicate messages from the brain to the feet quickly.

(4)

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(Total for Question 3 = 8 marks)

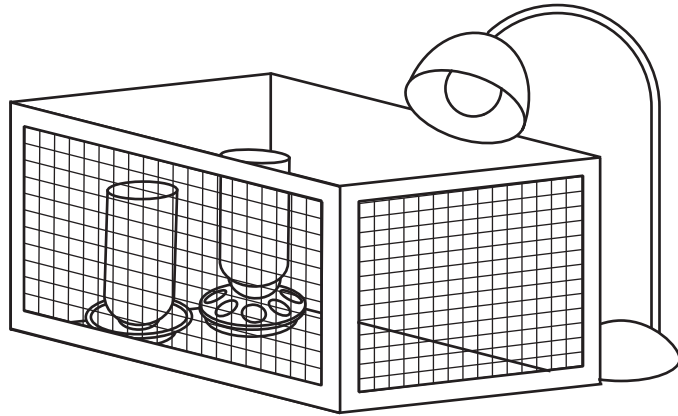
TOTAL FOR SECTION A = 18 MARKS



SECTION B Physics

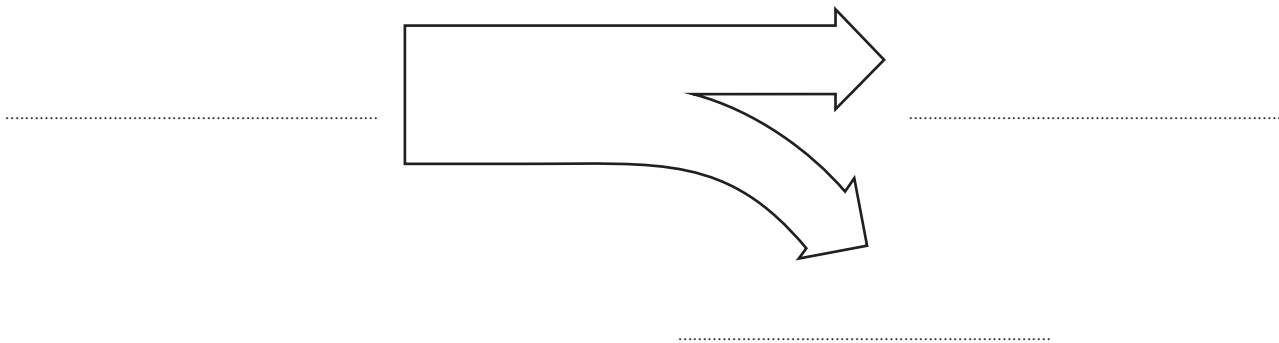
Answer ALL questions.

- 4 Ms Bantam is a poultry farmer who knows that it is important to keep her chicks warm for the first 60 days of their lives. She keeps them in a special box called a brooder that has an electrical lamp.



- (a) Label the diagram to show the energy transfer of the lamp.

(3)



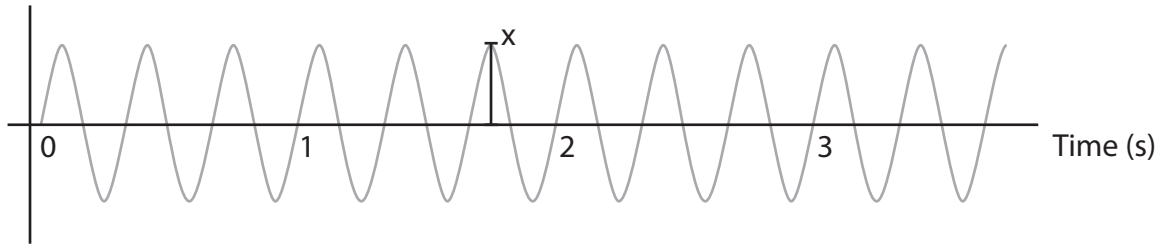
- (b) Name the process by which the useful energy is transferred from the lamp to the chicks.

(1)



(c) Some types of energy travel in waves.

The diagram shows the structure of a wave.



(i) Give the name of the measurement labelled X on the diagram.

(1)

(ii) State how many waves there are in one second.

(1)

(Total for Question 4 = 6 marks)



5 Light is one of the waves from the electromagnetic spectrum. We need to know about these waves as they are useful but can also have harmful effects.

The diagram shows the electromagnetic spectrum.

Two groups of waves are missing. They are labelled Waves 1 and Waves 2.

Radio waves	Microwaves	Waves 1	Visible light	Ultraviolet	X-rays	Waves 2
-------------	------------	----------------	---------------	-------------	--------	----------------

(a) Name the missing groups of waves.

Write your answers on the lines.

(1)

Waves 1

(1)

Waves 2

(b) Microwaves are used in a microwave oven.

(i) Give one other use of microwaves.

(1)

.....
(ii) State one harmful effect of microwaves.

(1)
.....



(c) A radio antenna transmits radio waves with a wavelength of 75 m.

The radio waves travel in the air with a speed of 3.0×10^8 m/s.

$$\text{wave speed} = \text{wavelength} \times \text{frequency}$$

Calculate the frequency of the radio waves transmitted by the radio antenna.

Show your working.

(2)

Frequency = Hz

(Total for Question 5 = 6 marks)



6 A county council has been considering using a renewable energy source to be more environmentally friendly.

It has decided to invest in a wind farm.

Explain **one scientific** advantage and **two scientific** disadvantages of using a wind farm.

Advantage

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Disadvantage

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Disadvantage

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(Total for Question 6 = 6 marks)

TOTAL FOR SECTION B = 18 MARKS



SECTION C Chemistry

Answer ALL questions.



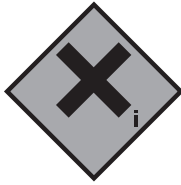

- 7 Zinc chloride is a metal salt used to make smoke candles that provide smoke screens in paint ball games.

It can be produced by reacting zinc with hydrochloric acid.

- (a) Below are four hazard symbols.

Put a cross in **one** box to identify the correct hazard symbol for hydrochloric acid.

(1)

A 	B 	C 	D 
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- (b) The diagram is a pH indicator scale. Put a cross in **one** box to indicate the pH of hydrochloric acid.

(1)

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- (c) Hydrogen is also produced when zinc chloride is formed.

- (i) Give the test for hydrogen.

(1)

- (ii) Give the result you would expect if hydrogen is present.

(1)

(Total for Question 7 = 4 marks)



8 The diagram shows two elements from the periodic table.

The numbers tell us how many protons, neutrons and electrons are in the elements.

23	24
Na	Mg
11	12

(a) Give the mass number of magnesium.

(1)

(b) Give the number of protons in a sodium atom.

(1)

(c) How many neutrons does a sodium atom have?

(1)

(d) State the electronic configuration for magnesium.

(1)



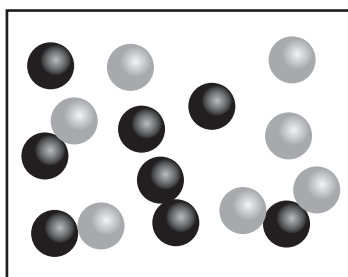
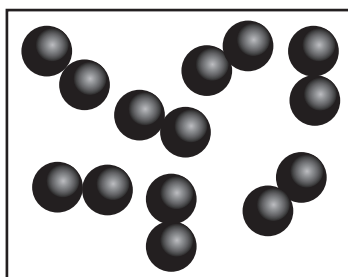
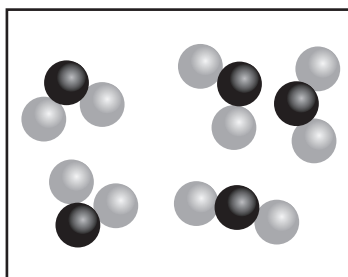
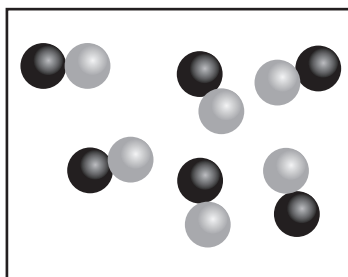
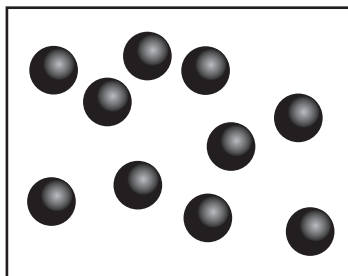
(e) The diagrams show elements, compounds or mixtures.

Draw a line to match each chemical with the correct image.

(2)

Chlorine Molecule

Hydrogen Chloride



(f) Chlorine occurs naturally as two isotopes.

Chlorine contains 75% chlorine-35 and 25% chlorine-37.

Calculate the Relative Atomic Mass of chlorine.

Show your working.

(2)

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



9 Mr Bream manages a fish farm in a lake. He is concerned about the impact that acid rain may cause to the lake.

Giving specific problems in your answer, **explain** how he can reduce the effects of acid rain.

You can include appropriate word or symbol equations to support your answer.

Dotted lines for writing the answer.

(Total for Question 9 = 6 marks)

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



P 4 3 9 8 8 A 0 1 5 1 6



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