

Write your name here

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

Applied Science

Unit 1: Principles of Science

Wednesday 4 March 2015 – Morning	Paper Reference
Time: 1 hour	20460E

You must have: 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.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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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: Biology

Answer ALL questions.

1 Our bodies respond to changes in temperature to keep the conditions inside our bodies the same.

(a) Give the name of this process.

(1)

- A** Communication
- B** Homeostasis
- C** Inheritance
- D** Respiration

(b) Two responses that keep the body temperature the same are sweating and shivering.

Draw **one** line from **each** response to its correct effect on the body.

(2)

Response	Effect on the body
<div style="border: 1px solid black; padding: 5px; display: inline-block;">Sweating</div>	<div style="border: 1px solid black; padding: 5px; display: inline-block; margin-bottom: 10px;">Water evaporates from skin</div> <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-bottom: 10px;">Hairs lie flat</div> <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-bottom: 10px;">Heat radiates from skin</div> <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-bottom: 10px;">Blood vessels widen</div> <div style="border: 1px solid black; padding: 5px; display: inline-block;">Muscles contract</div>
<div style="border: 1px solid black; padding: 5px; display: inline-block;">Shivering</div>	



(c) One system that controls the internal environment of the body is the nervous system.
Name the other system.

(1)

(Total for Question 1 = 4 marks)



P 4 5 1 2 5 A 0 3 1 6

2 (a) (i) Reflex actions are involuntary actions that respond to a stimulus.

One example of a stimulus is dust getting into your eye.

Name the part of the nervous system that is **not** involved in a reflex action.

(1)

- A Brain
- B Receptor
- C Sensory neurone
- D Spinal cord

(ii) Give the response that is a reflex action.

(1)

- A Chewing when food is in your mouth
- B Dropping a hot pan
- C Sitting down to have a rest
- D Walking to get to school

(b) Doug accidentally breaks a glass.

When he tries to clear up the broken glass the sharp edge cuts his hand.

He quickly drops the broken glass.

(i) Give the stimulus that makes Doug move his hand.

(1)

(ii) Name the part of the nervous system that makes Doug's arm muscles contract causing him to drop the broken glass.

(1)



(c) When Doug eats too much glucose his pancreas releases insulin to lower the glucose level in his blood.

Describe how insulin lowers the blood glucose level.

(2)

.....

.....

.....

(Total for Question 2 = 6 marks)



3 Animal cells contain chromosomes.

(a) (i) Name the component of an animal cell that contains chromosomes. (1)

.....

(ii) Chromosomes are made up of genes.
Give the function of the genes. (1)

.....

.....

(b) A farmer is growing two types of tomatoes.

- Type 1 tomatoes are red.
- Type 2 tomatoes are yellow.

He breeds Type 1 tomatoes with Type 2 tomatoes.

- Type 1 tomatoes have genotype RR.
- Type 2 tomatoes have genotype yy.

R represents the allele for red tomatoes. This is a dominant allele.

y represents the allele for yellow tomatoes. This is a recessive allele.

(i) Explain why all the offspring will be red. (2)

.....

.....

.....

.....



(ii) The farmer has a third type of tomato (Type 3) that is also red.

Type 3 tomatoes have genotype Ry .

When he breeds these tomatoes with the Type 2 tomatoes some of the offspring are red and some of the offspring are yellow.

Use a Punnett square to explain what percentage of the offspring will be red.

(4)

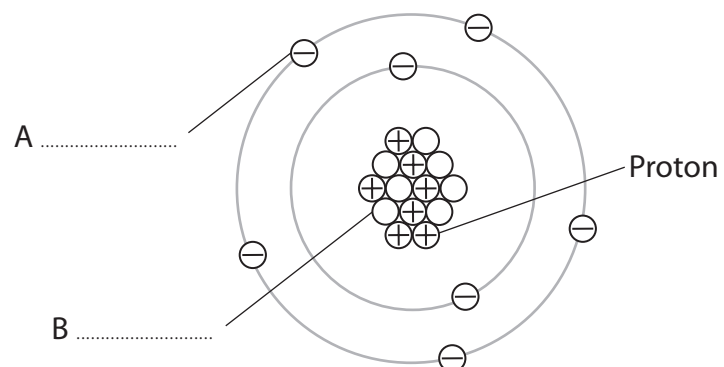
(Total for Question 3 = 8 marks)

TOTAL FOR SECTION A = 18 MARKS



(b) The diagram shows an atom of nitrogen.

The protons have been labelled.



(i) Label particles A and B in the nitrogen atom.

(2)

(ii) Give the atomic number of nitrogen.

(1)

(Total for Question 4 = 6 marks)



5 Copper chloride is used in fireworks because it burns with a blue-green flame.

One method for making copper chloride is to react hydrochloric acid with copper carbonate.

Hydrochloric acid is an irritant and has the hazard symbol shown in the diagram.



(a) (i) State what you should do if you spill hydrochloric acid on your skin.

(1)

.....

.....

(ii) Identify the chemical formula for hydrochloric acid.

(1)

- A HCl
- B Hcl
- C H₂Cl
- D Hcl₂



(b) The reaction between hydrochloric acid and copper carbonate gives copper chloride and two other products.

One of these products is carbon dioxide gas.

Describe the test for carbon dioxide gas.

(2)

Test

.....
.....

Result

.....
.....

(c) Complete the word equation for the reaction to make copper chloride.

(2)



(Total for Question 5 = 6 marks)



SECTION C: Physics

Answer ALL questions.

7 (a) This is a list of different types of energy stores.

chemical	kinetic	gravitational potential	elastic potential	nuclear
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Use the words in the box to answer questions 7(a)(i) and 7(a)(ii).

(i) Give the type of energy store in a **moving** bicycle. (1)

(ii) Give the type of energy store in coal. (1)

(b) Give the method by which energy is transferred from the Sun to the Earth. (1)

- A** By conduction
- B** By radiation
- C** Electrically
- D** Mechanically

(c) Name the useful energy produced when playing a guitar. (1)

(Total for Question 7 = 4 marks)



8 The following waves have similar properties.

radio waves	microwaves	infrared	radiation
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(a) (i) These waves are part of a spectrum.

Give the name of the spectrum to which these waves belong.

(1)

.....

(ii) Give **one** use of radio waves.

(1)

.....

(b) Give the harmful effects of excessive exposure to microwaves and infrared.

(2)

Microwave

.....

Infrared

.....



(c) A wave has a frequency of 1000 Hz.

(i) Calculate how many waves there will be in a minute.

Give your answer in **standard form**.

(2)

.....

(ii) The wave has a wave speed of 2500 m/s.

Calculate the wavelength of the wave.

Wave speed (m/s) = wavelength (m) \times frequency (Hz)

(2)

.....m

(Total for Question 8 = 8 marks)



