Cambridge Secondary 1 Progression Test

Question paper

Cambridge Secondary 1

45 minutes

Science Paper 2

Stage 9

7557451491

Name .....

Additional materials: Ruler
Calculator

READ THESE INSTRUCTIONS FIRST

Answer **all** questions in the spaces provided on the question paper.

You should show all your working on the question paper.

The number of marks is given in brackets [ ] at the end of each question or part question.

The total number of marks for this paper is 50.

For Teacher's Use	
Page	**Mark**
1	
2	
3	
4	
5	
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8	
9	
10	
11	
12	
13	
14	
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18	
Total	

DC (SJF/SW) 93624/3RP

CAMBRIDGE
International Examinations

For Teacher's Use

1 Complete the sentences.

Use words from the list.

carbon dioxide	**growth**	**nitrate**	**nitrogen**
oxygen	**photosynthesis**	**respiration**	**sunlight**

(a) Plants take in ..... from the air to make glucose.

This process uses energy from ..... and is called

..... . [3]

(b) Plants also take in substances like ..... through the roots which they can use for ..... . [1]

2 Rutherford was a scientist who studied the structure of the atom.

He made observations from experiments and drew conclusions.

Draw lines between each **observation** and the **conclusion** made from it.

observation	conclusion
Most alpha particles go straight through metal foil.	Electrons are negatively charged and have a smaller mass than the alpha particle.
Some alpha particles are deflected back from metal foil.	The nucleus takes up very little space in the atom.
	The nucleus is positively charged and has a greater mass than the alpha particle.

[2]

For Teacher's Use

For Teacher's Use

3 The table shows some information about the elements in Group 7 of the Periodic Table.

element	chemical symbol	formula of molecule	melting point in °C	speed of reaction with iron
fluorine	F	F_2	–220	very fast
chlorine	C*l*	Cl_2	–102	fast
bromine	Br	Br_2	–7	
iodine	I	I_2		very slow
astatine	At			no reaction

Use the information to predict:

(a) the formula of a molecule of astatine …… . [1]

(b) the melting point of iodine ……..°C. [1]

(c) the speed of reaction of bromine with iron …… . [1]

For Teacher's Use

4 Fungi are microorganisms which decompose dead plant material in soil.

(a) Name one **other** type of microorganism which is a decomposer.

.....[1]

(b) Decomposers like fungi contribute to the growth of new plants.

Explain how.

.....

.....

.....[2]

(c) After heavy rain, soil can become flooded.

If soil remains flooded for a long time, then the new plants will not grow.

Suggest a reason for this.

.....

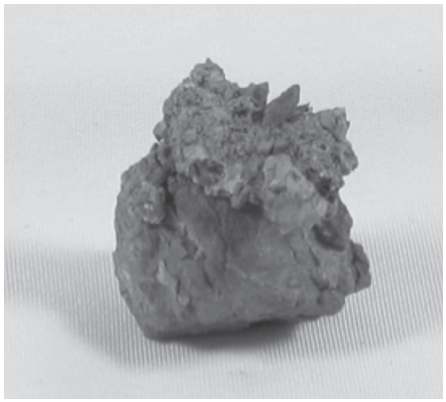
.....[1]

5 This question is about density.

(a) Write down the formula to work out the density of an object using its mass and volume.

.....[1]

(b) Maria wants to work out the density of this small piece of rock.



Describe an experiment she could do to find the volume of this piece of rock.

A labelled diagram may help your answer.

.....

.....

.....[3]

For Teacher's Use

(c) This piece of rock had broken off a much larger rock.

Maria thinks that the density of the larger rock will be the same as the density of her piece.

Is she correct?

Circle your answer.

yes **no**

Explain your answer.

.....

.....

.....[2]

For Teacher's Use

6 Changes can be exothermic or endothermic.

(a) What is meant by the word exothermic?

.....[1]

(b) The table shows some changes.

Put a tick (✓) in the correct column to show whether the change is exothermic or endothermic.

change	exothermic	endothermic
burning fuel for cooking food		
firework exploding with light and sound		
water freezing to form ice		
underground rock melting to form magma		

[2]

(c) Mike tests four solids **A**, **B**, **C** and **D**.

He adds each solid to 10 cm^3 of water.

He measures the temperature of the water at the start.

He then stirs the mixture and measures the temperature of the water again.

Here is his results table.

solid	temperature at start in °C	temperature at end in °C
A	10	18
B	10	10
C	5	5
D	10	7

Circle the solid which gives the endothermic change.

A **B** **C** **D**

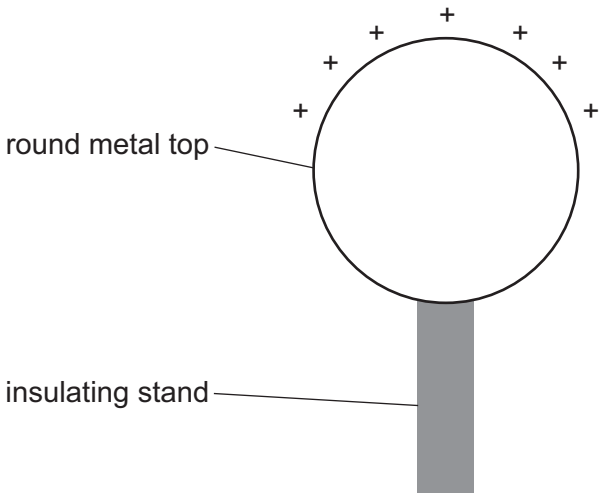
[1]

7 The Van de Graaff generator can be used to produce static electricity.

For Teacher's Use

The metal top of the Van de Graaff generator is not charged.

It becomes positively charged when the Van de Graaff generator is switched on.



(a) What happens to the charged particles in the metal top when the Van de Graaff generator is turned on and the top starts to become positive?

Tick (✓) the **correct** box.

electrons move off the metal ☐

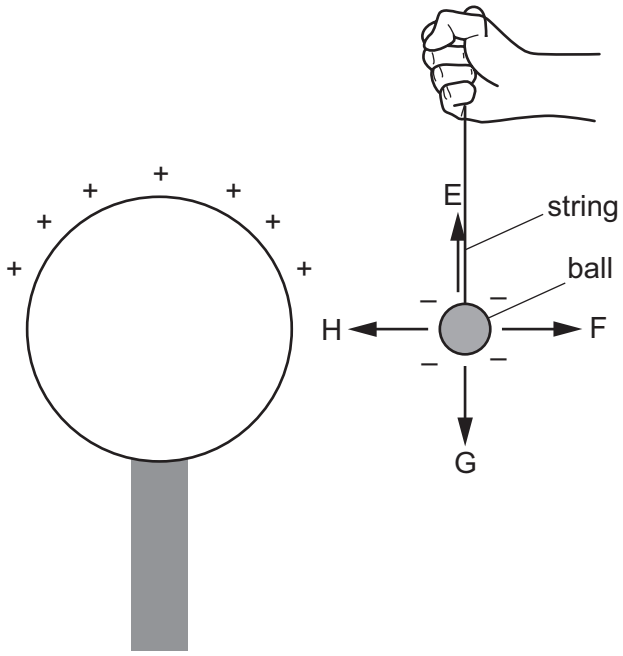
protons move onto the metal ☐

electrons move off and protons move on ☐

[1]

(b) Ruben brings a small plastic ball with a negative charge close to the top of the Van de Graaff generator.

The ball is hanging on a string.



Circle the arrow which shows the direction of the electrostatic force on the ball.

E **F** **G** **H**

[1]

(c) When a Van de Graaff generator is earthed, it is not charged.

The metal top of the Van de Graaff generator should be earthed immediately after use.

Suggest why.

.....

.....[1]

8 Aristotle was a scientist who lived about 2300 years ago.

He proposed a classification system for living things.

- All living things were split into two groups: plant or animal.
- Animals were split into three types: walking, flying or swimming.

We now know that this classification system does not work.

(a) Suggest **one** reason why Aristotle's classification of **animals** does not work.

.....

.....[1]

(b) Today scientists know organisms like fungi are not animal or plants.

Fungi are classified into a third group.

Would Aristotle have classified fungi as plant or as animal? Explain your answer.

Aristotle's classification …….

Explanation .....

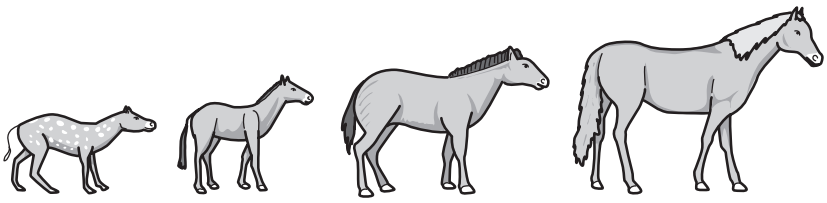
.....[1]

(c) Charles Darwin lived about 150 years ago.

He suggested that:

- living things could gradually change over many generations
- these changes allowed them to adapt better to their environments
- evolution is a gradual change that continues progressively.

The diagram shows how horses have changed over the last 50 million years.



date in millions of years ago	**50**	**35**	**25**	**2**
height in cm	**40**	**55**	**100**	**175**
number of rib bones	**36**	**30**	**38**	**36**

(i) Describe where scientists found this evidence about evolution of horses.

.....[1]

(ii) Use the information from the diagram to give **one** piece of evidence:

that **supports** evolution. .....

.....

that does **not support** evolution. .....

.....[2]

9 This question is about pressure.

The formula for pressure is:

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

(a) Kavita has a new wood floor in her house.

Wood is a soft material.

She decides which shoes to wear, **A** or **B**.

A

B

Which shoes will cause **less** damage to her floor?

.....

Explain your choice.

.....

.....

.....[2]

(b) Calculate the pressure on the ground from an elephant.

The weight of the elephant is 40 000 N.

The area of its feet in contact with the ground is 0.25 m^2.

Show your working **and** give the unit.

For Teacher's Use

pressure = ... unit ..... [3]

10 Peter is a mountain climber.

Peter records the types of plants growing on one of his climbs.

Here are his results.

height above sea level in m	types of plants growing
0 – 700	broad leaved trees, grasses, large and small flowering plants, cacti, sugar cane
700 – 2000	pine trees, grasses, large and small flowering plants, coffee plants
2000 – 3000	grasses, small flowering plants
3000 – 4000	grasses
4000 – 5000	no plants

(a) (i) There are no tall trees growing at a height above 2000 m.

Suggest why.

.....

.....[1]

(ii) There are no plants growing at a height above 4000 m.

Suggest why.

.....

.....[1]

(b) Some scientists think that changes in the Earth's atmosphere will allow crops like sugar cane to be grown at heights above 700 m.

Explain why.

.....

.....[1]

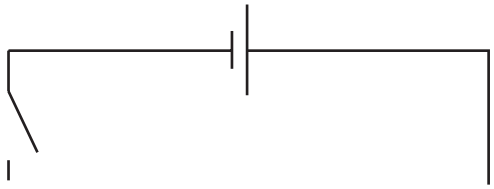
[Turn over

11 Andrew investigates how the voltage of a cell affects the current in a circuit.

He decides to use a simple series circuit with a lamp.

He does five experiments, each time using a cell with a different voltage.

The diagram shows part of the circuit with one of the cells.



(a) Complete the circuit diagram to include the two components that he must use. [2]

(b) Andrew decides to use cells of 1, 2, 3, 4 and 5 V.

He does preliminary work to check that the 1 V cell gives a current large enough for him to measure.

What should he check for the 5 V cell?

.....

.....[1]

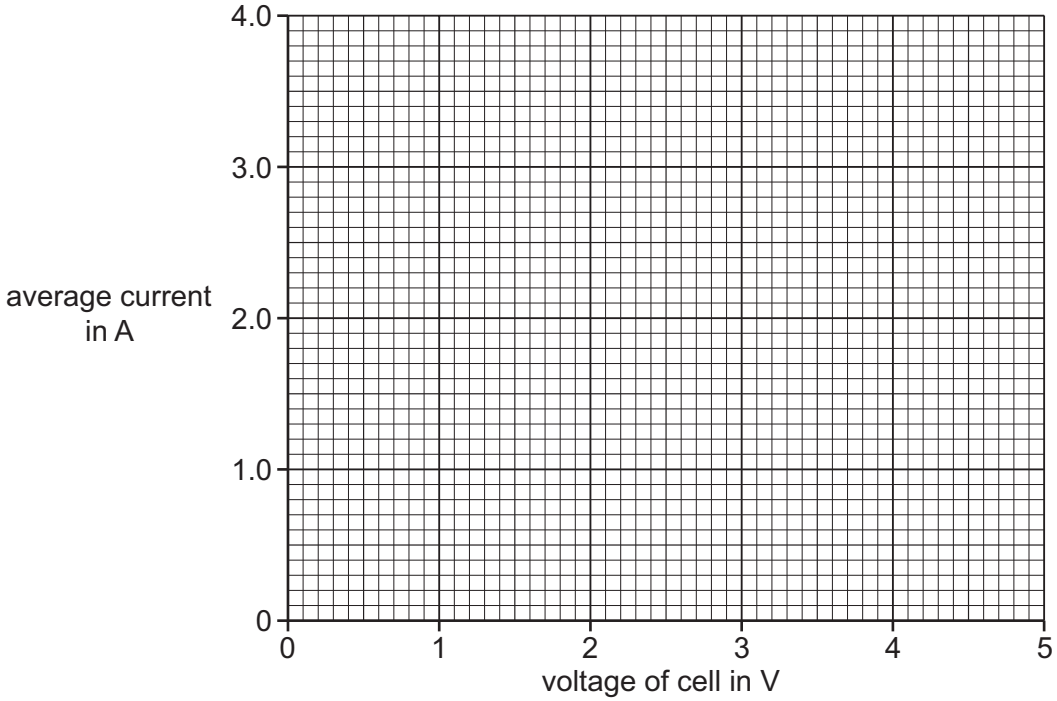
(c) Andrew uses four of the cells.

He takes repeat readings for each, and works out the average current for each cell.

Here are his results.

voltage of cell in V	average current in A
1	0.6
2	1.1
3	1.8
4	
5	3.1

(i) Plot the results on the grid.



[2]

(ii) Complete the graph by drawing the best fit **straight** line. [1]

(d) Use your graph to predict the average current for the 4 V cell.

You **must** show on your graph how you got your answer.

average current for 4 V cell = ... A [1]

For Teacher's Use

12 Aluminium reacts with iron oxide to form aluminium oxide and iron.
This reaction gives out heat.

(a) What type of reaction is this?

Circle the correct answer.

neutralisation **endothermic** **displacement** **evaporation**

[1]

(b) Zinc reacts with copper sulfate solution.

(i) Complete the word equation.

zinc + copper sulfate → …….

[2]

(ii) Copper does **not** react with zinc sulfate solution.

Explain why.

.....

.....[1]