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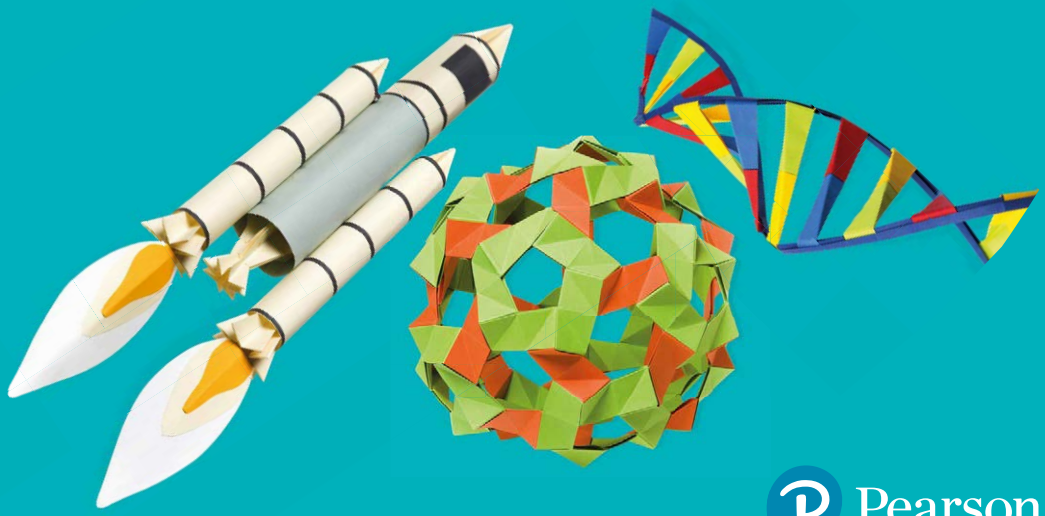
Entry Level Certificate in Further Science

Sample Assessment Materials

Pearson Edexcel Entry Level Certificate in Further Science (NSF0)

First certification from June 2018 | Issue 1



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Contents

Introduction

The Pearson Edexcel Entry Level Certificate in Further Science is designed for use in schools and colleges. It is part of a suite of Entry Level qualifications offered by Pearson.

These sample assessment materials have been developed to support this qualification and will be used as the benchmark to develop the assessment students will take.

General marking guidance

- All students must receive the same treatment. Teachers must mark the last student in exactly the same way as you marked the first.
- Mark schemes should be applied positively. Students must be rewarded for what they have shown they can do rather than be penalised for omissions.
- Teachers should mark according to the mark scheme.
- All the marks on the mark scheme are designed to be awarded. Teachers should always award full marks if deserved, i.e. if the answer matches the mark scheme. Teachers should also be prepared to award zero marks if the student's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification/indicative content will not be exhaustive.
- Crossed-out work should be marked **unless** the student has replaced it with an alternative response.

Write your name here

Surname	Other names

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Entry Level Certificate

Centre Number | | | | | |

Candidate Number | | | | |

Science

Paper 1: Biology 2A

Sample assessment material for first teaching September 2017

Total Marks

For teacher's use only **/25**

Instructions

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

Information

- The total mark for this paper is 25.
- 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.
- Check your answers if you have time at the end.

Turn over ▶

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S 5 6 3 9 2 A 0 1 1 2

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Answer ALL questions.

1 Figure 1 shows equipment used to catch animals living in an ecosystem.

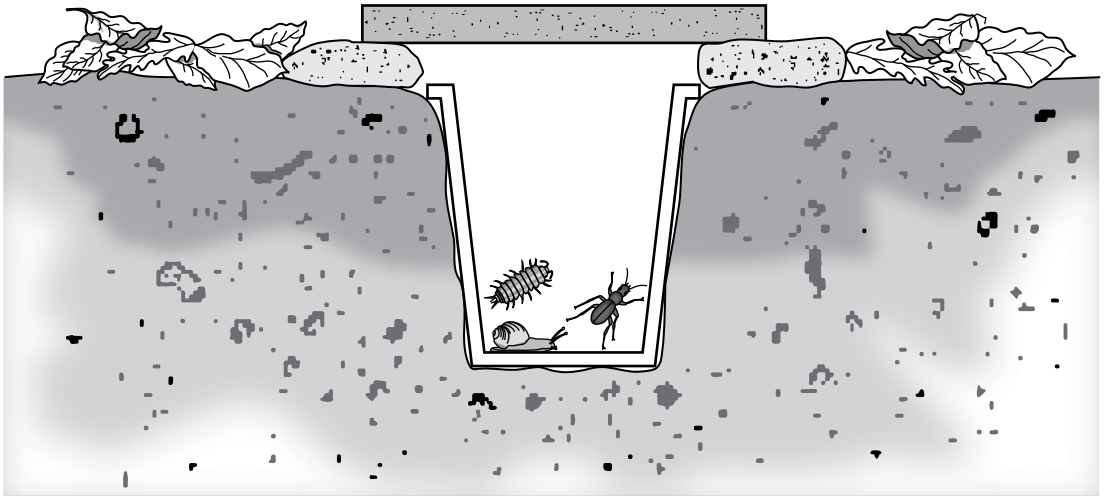

Figure 1

(a) Name the equipment shown in Figure 1.

(1)

(b) Figure 1 shows there is a population of woodlice in this ecosystem.

The terms below describe the levels of organisation in an ecosystem.

Draw one line from each term to its correct description.

(2)

term	description
population	the living organisms and non-living features of the environment
community	a group of individuals from one species
ecosystem	all the different living organisms in a habitat

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(c) Complete the sentence by underlining the correct answer in the box.

(1)

The population of woodlice will decrease if there are more | **predators** / **resources** / **habitats** | .

(Total for Question 1 = 4 marks)

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2 Large areas of the Amazon rainforest are being cut down.

(a) Use words from the box to complete these sentences.

(2)

increase	decrease	photosynthesis	respiration	dissolve

Cutting down the rainforests causes the amount of carbon dioxide in the atmosphere to ..... .

This is because there is less ..... .

(b) Give a benefit of reforestation.

(1)

.....

.....

(c) Trees have an important role in the carbon cycle.

Decomposers are microorganisms involved in the carbon cycle.

What is the role of decomposers?

(1)

.....

.....

(Total for Question 2 = 4 marks)

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3 Figure 2 shows a root hair cell.

Root hair cells absorb water from the soil.

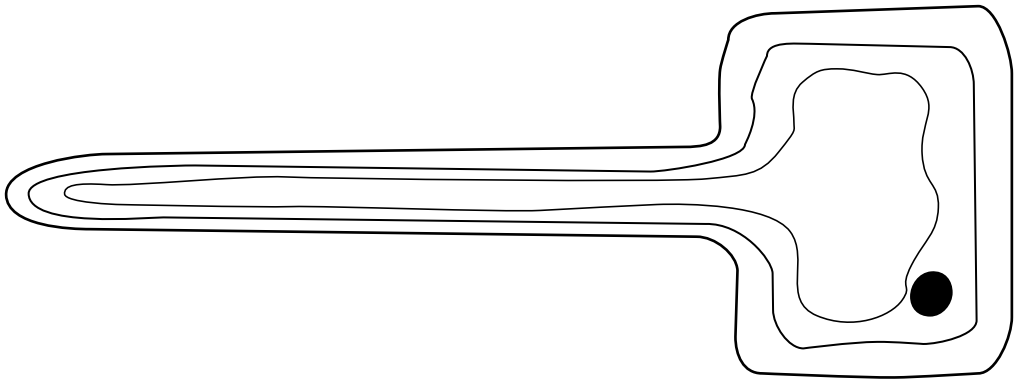

Figure 2

(a) How is this cell adapted to absorb water?

Put a cross ☒ in the box next to your answer.

(1)

☒ **A** it has a thick cell wall

☒ **B** it has only one nucleus

☒ **C** it has a large surface area

☒ **D** it has chloroplasts

(b) There is a higher concentration of water molecules in the soil.

There is a lower concentration of water molecules in the root.

Give the term used to describe how water moves from the soil into the root.

(1)

.....

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(c) Plants use magnesium for growth.

Plant roots take magnesium ions from the soil by active transport.

Describe why active transport is needed to move magnesium ions from the soil into the plant roots.

(2)

.....

.....

.....

.....

(d) Complete the sentence by underlining the correct answer in the box.

(1)

Mineral ions in water are transported up the plant stem in the

phloem
biomass
xylem

.

(e) What is the name of the process that moves mineral ions in water up the plant stem?

Put a cross ☒ in the box next to your answer.

(1)

☒ **A** absorption

☒ **B** active transport

☒ **C** photosynthesis

☒ **D** transpiration

(Total for Question 3 = 6 marks)

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4 Red colobus monkeys are an endangered species.

They live on the island of Zanzibar.

Figure 3 shows the number of red colobus monkeys on Zanzibar from 1985 to 2010.

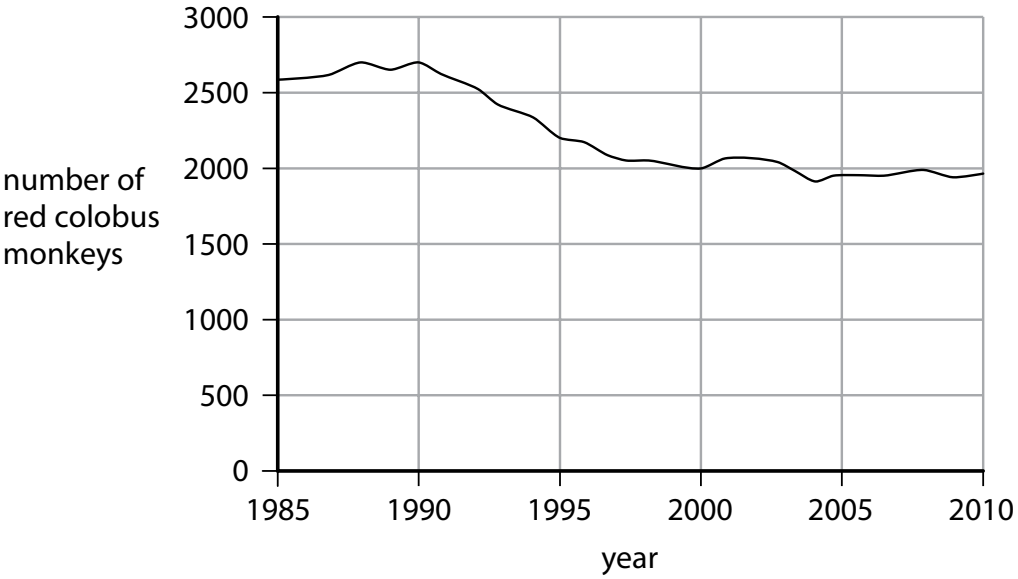

Figure 3

(a) In the year 1990 there were 2700 red colobus monkeys.

Calculate the decrease in the number of monkeys between 1990 and 2000.

(2)

..... monkeys

(b) Disease can cause a decrease in the number of monkeys.

Which of these could also cause a decrease in the number of monkeys?

Put a cross ☒ in the box next to your answer.

(1)

☒ **A** increase in food source

☒ **B** destruction of habitat

☒ **C** decreased hunting

☒ **D** conservation projects

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(c) Red colobus monkeys can be found in zoos.

Give one benefit of keeping them in zoos.

(1)

.....

(Total for Question 4 = 4 marks)

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5 Figure 4 shows some pondweed in a beaker.

The pondweed can photosynthesise.

(Source: Science Photo Library)

Figure 4

(a) Complete the sentence by underlining the correct answer in the box.

(1)

For the photosynthesis reaction, the pondweed needs

oxygen
carbon dioxide
glucose

.

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A student investigates the effect of temperature on the rate of photosynthesis.

He adds the pondweed to tubes of sodium hydrogencarbonate indicator solution at different temperatures.

When the pondweed is photosynthesising, the indicator turns purple.

Figure 5 shows his results.

temperature in °C	time taken for the indicator to turn purple in hours
15	5
18	4
21	2
24	3
27	5

Figure 5

(b) Which temperature had the fastest rate of photosynthesis?

Put a cross ☒ in the box next to your answer.

(1)

☒ **A** 15 °C

☒ **B** 18 °C

☒ **C** 21 °C

☒ **D** 27 °C

(c) How long do you think it would take the indicator to turn purple at 30 °C?

(1)

.....

(d) How could temperature be controlled during this investigation?

(1)

.....

(e) Give two things that would need to be kept the same during this investigation.

(2)

1 .....

2 .....

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(f) Sodium hydrogencarbonate indicator solution is alkaline.

Give one safety precaution the student needs to take when using the indicator.

(1)

.....

(Total for Question 5 = 7 marks)

TOTAL FOR PAPER = 25 MARKS

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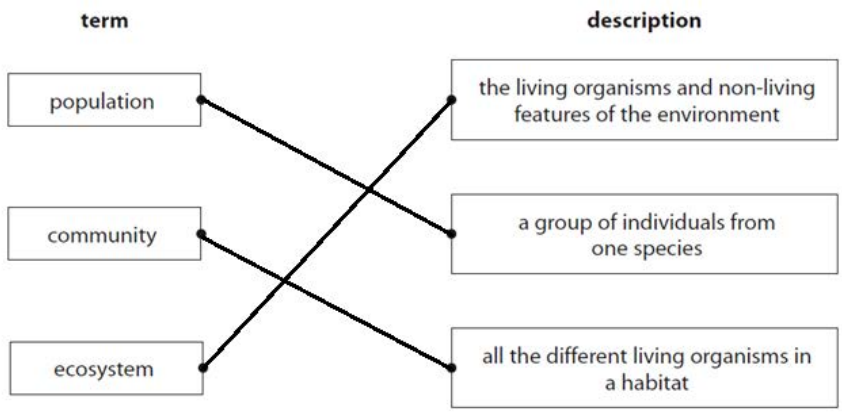
Paper 1 Biology 2A

Question number	Answer	Mark
1(a)	pitfall-trap/pit trap	(1)

Question number	Answer	Mark
1(b)	 one mark for any one correct answer two marks for all three correct	(2)

Question number	Answer	Mark
1(c)	predators	(1)

Question number	Answer	Mark
2(a)	increases photosynthesis	(2)

Question number	Answer	Mark
2(b)	reduced climate change/increases biodiversity/provides a habitat/increased photosynthesis	(1)

Question number	Answer	Additional guidance	Mark
2(c)	decompose dead organisms/breaks down/decays/rots	ignore decompose unless qualified accept other suitable terms for organisms, e.g. matter/plant/ animal	**(1)**

Question number	Answer	Mark
3(a)	C	**(1)**

Question number	Answer	Additional guidance	Mark
3(b)	osmosis	ignore diffusion	**(1)**

Question number	Answer	Mark
3(c)	• from a low concentration to a high concentration (of magnesium ions)/against the concentration gradient (1) • using energy (1)	**(2)**

Question number	Answer	Mark
3(d)	xylem	**(1)**

Question number	Answer	Mark
3(e)	D	**(1)**

Question number	Answer	Additional guidance	Mark
4(a)	year 2000 = 2000 monkeys (1) 2700−2000 = 700 (1)	allow 2 marks for correct answer with no working ecf from incorrect reading from the graph	**(2)**

Question number	Answer	Mark
4(b)	B	(1)

Question number	Answer	Mark
4(c)	provide a habitat/breeding programmes/increase population number/makes money	(1)

Question number	Answer	Mark
5(a)	carbon dioxide	(1)

Question number	Answer	Mark
5(b)	C	(1)

Question number	Answer	Mark
5(c)	Any value of 5 (hours) or over	(1)

Question number	Answer	Mark
5(d)	waterbath/incubator	(1)

Question number	Answer	Additional guidance	Mark
5(e)	Two from: • light intensity • mass/length of pondweed • volume of solution • supply of carbon dioxide • mineral content of the water • same size/type of beakers/tubes	accept other suitable responses	(2)

Question number	Answer	Mark
5(f)	goggles/gloves/clear any spillages quickly/not drink	(1)

Write your name here

Surname	Other names

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Candidate Number | | | | |

Science

Paper 2: Biology 2B

Sample assessment material for first teaching September 2017

For teacher's use only

Total Marks /25

Instructions

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- Answer **all** questions.
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- Calculators may be used.

Information

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Advice

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

Turn over ▶

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Answer ALL questions.

1 (a) Use words from the box to complete these sentences.

(2)

testes	pancreas	uterus	blood	ovaries

In the menstrual cycle, oestrogen causes the lining of the ..... to be repaired.

Oestrogen is produced by the ..... .

(b) Using a condom can prevent pregnancy.

Complete the sentence by underlining the correct answer in the box.

(1)

Using a condom to prevent pregnancy is a type of

ovulation
contraception
menstruation

.

(c) How do condoms prevent pregnancy?

(1)

.....

(d) Give one other health benefit of using a condom during sexual intercourse.

(1)

.....

(Total for Question 1 = 5 marks)

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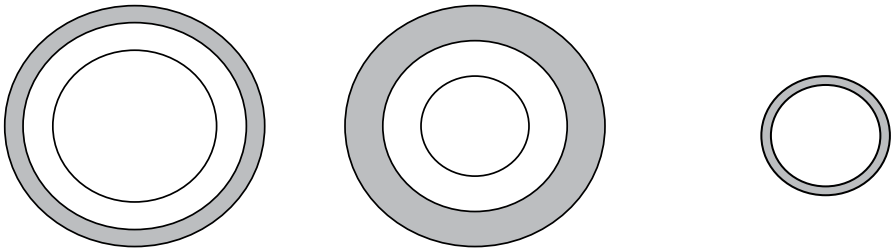
2 Blood has different components.

(a) Draw one line from each component to its function.

(2)

component	function
red blood cells	help the process of blood clotting
white blood cells	carry oxygen around the body
platelets	fight infections

(b) Figure 1 is a diagram showing three types of blood vessel.



vessel A vessel B vessel C

Figure 1

(i) What type of blood vessel is C?

(1)

.....

(ii) Which vessel contains valves?

(1)

.....

(Total for Question 2 = 4 marks)

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3 Figure 2 shows a diagram of the heart.

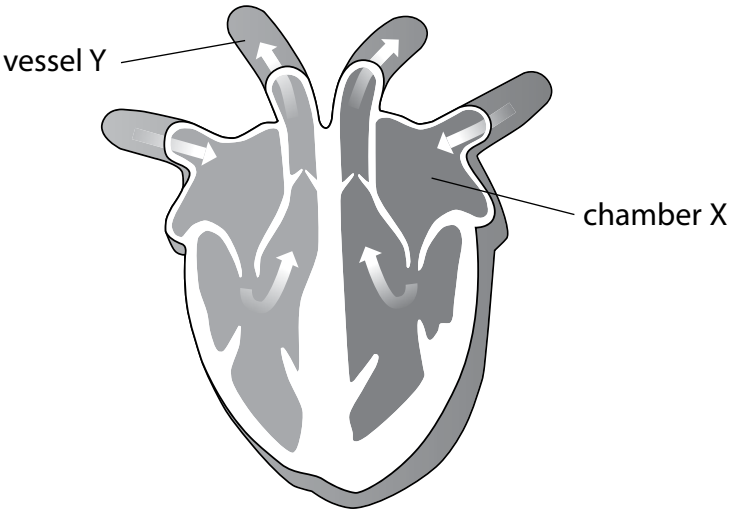

Figure 2

(a) What is the name of chamber X?

Put a cross ☒ in the box next to your answer.

(1)

☒ **A** left atrium

☒ **B** right atrium

☒ **C** left ventricle

☒ **D** right ventricle

(b) Where does the blood in vessel Y go?

(1)

.....

(c) Heart valves can be damaged by disease.

The disease makes the valves become hard.

How does this affect the blood flow in the heart?

(2)

.....

.....

.....

.....

(Total for Question 3 = 4 marks)

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4 A scientist wants to measure how much oxygen mealworms use.

Figure 3 shows the apparatus she could use.

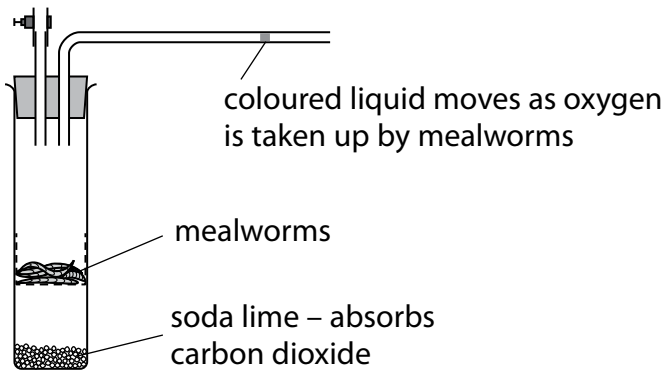

Figure 3

(a) The scientist found that the mealworms used 4 cm^3 of oxygen in 10 minutes.

Calculate how much oxygen they would use in 60 minutes.

(2)

..... cm^3

(b) How could the scientist check her result?

(1)

.....

(c) Mealworms do not like high temperatures.

What equipment could the scientist use to check the temperature of the room?

(1)

.....

(d) Give one safety precaution the scientist should take when handling the mealworms.

(1)

.....

(e) Mealworms use oxygen to release energy.

What is the name of this process?

(1)

.....

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(f) Complete the sentence by underlining the correct answer in the box.

(1)

The other chemical mealworms need to releasing energy is

water
glucose
carbon dioxide

.

(Total for Question 4 = 7 marks)

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5 Amylase is an enzyme.

It breaks down starch to sugars.

(a) Complete the sentence by underlining the correct answer in the box.

(1)

The part of the enzyme that the starch joins to is the

active site
pancreas
aorta

.

(b) Amylase works well at body temperature but stops working above 60 °C

Why does amylase stop working above 60 °C?

(1)

.....

.....

(c) A scientist investigates how quickly amylase breaks down starch to sugar.

He puts the amylase into starch solutions at pH 5, pH 6 and pH 7.

(i) What can he use to measure the pH of the solutions?

(1)

.....

(ii) Iodine solution is used to test for starch.

Iodine solution is yellow/brown when no starch is present.

It turns blue/black when starch is present.

How will he know when all the starch has been broken down into sugar?

(1)

.....

.....

(iii) The scientist times how long it takes for the amylase to break down starch to sugar at each pH.

How will he know which pH amylase works best at?

(1)

.....

(Total for Question 5 = 5 marks)

TOTAL FOR PAPER = 25 MARKS

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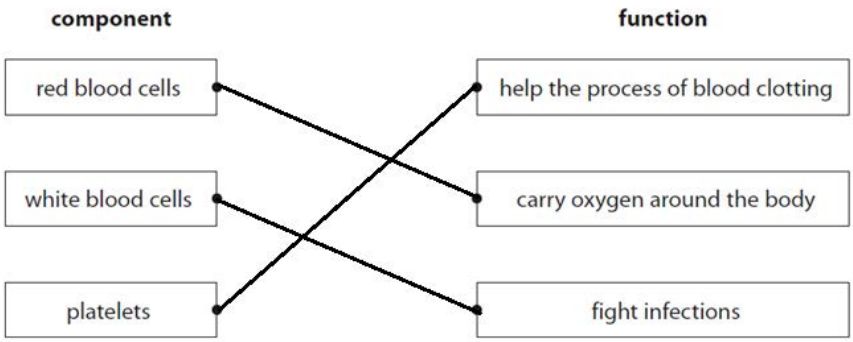
Paper 2 Biology 2B

Question number	Answer	Mark
1(a)	uterus ovaries	(2)

Question number	Answer	Mark
1(b)	contraception	(1)

Question number	Answer	Mark
1(c)	stops the sperm reaching the egg/barrier method	(1)

Question number	Answer	Mark
1(d)	prevents spread of STIs (sexually transmitted infections)	(1)

Question number	Answer	Mark
2(a)	 one mark for one correct line two marks for all three correct	(2)

Question number	Answer	Mark
2(b)(i)	capillary	(1)

Question number	Answer	Mark
2(b)(ii)	A	(1)

Question number	Answer	Mark
3(a)	A	**(1)**

Question number	Answer	Mark
3(b)	to the lungs	**(1)**

Question number	Answer	Additional guidance	Mark
3(c)	the valves do not function properly (1) causes blood to flow in the wrong direction/does not control blood flow/reduces blood flow (1)	accept valves stop working	**(2)**

Question number	Answer	Additional guidance	Mark
4(a)	60 ÷ 10 = 6 (1) 4 × 6 = 24 (cm^3) (1)	allow full marks for correct answer with no workings	**(2)**

Question number	Answer	Mark
4(b)	repeat the experiment/measure how much oxygen was used in 60 minutes	**(1)**

Question number	Answer	Mark
4(c)	thermometer	**(1)**

Question number	Answer	Mark
4(d)	avoid contact between the worms and the soda lime/avoid the liquid covering the worms/wash hands afterwards/handle the worms gently/eq	**(1)**

Question number	Answer	Mark
4(e)	respiration	**(1)**

Question number	Answer	Mark
4(f)	glucose	**(1)**

Question number	Answer	Mark
5(a)	active site	**(1)**

Question number	Answer	Additional guidance	Mark
5(b)	it denatures/it changes shape/changes the shape of the active site/substrate can no longer bind	ignore 'it is killed'	**(1)**

Question number	Answer	Mark
5(c)(i)	pH paper/universal indicator solution/pH probe/ pH meter/datalogger	**(1)**

Question number	Answer	Mark
5(c)(ii)	no colour change/is not blue-black	**(1)**

Question number	Answer	Mark
5(c)(iii)	the one that stops turning blue/black the fastest/in the shortest time	**(1)**

Write your name here

Surname	Other names

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Science

Paper 3: Chemistry 2A

Sample assessment material for first teaching September 2017

Total Marks

For teacher's use only **/25**

Instructions

- Use **black** ink or ball-point pen.
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- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- Calculators may be used.

Information

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- Check your answers if you have time at the end.

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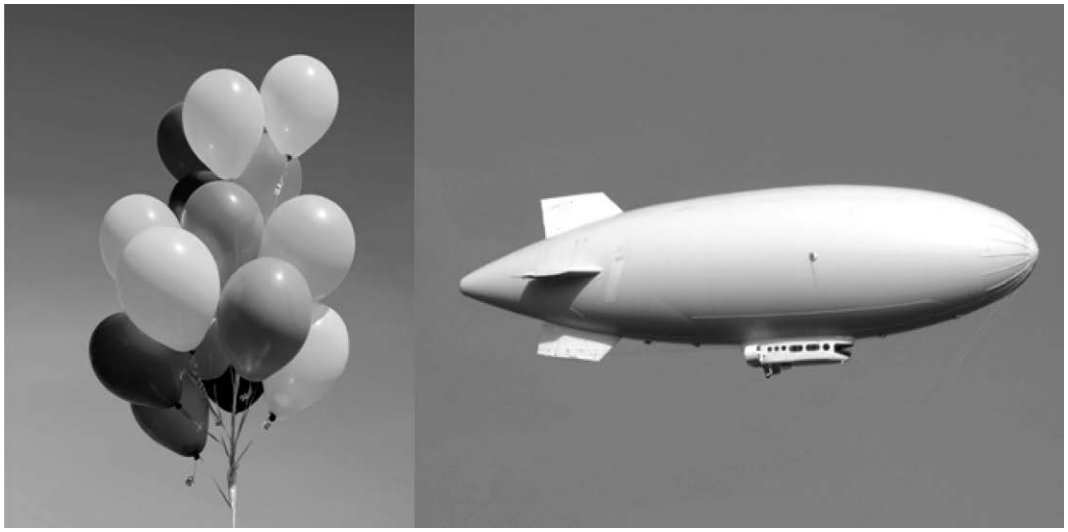
Answer ALL questions.

1 Figure 1 shows some balloons and an airship, both filled with helium.



(Source: ©iStock)

Figure 1

Give **two** reasons why helium is used to fill balloons and airships.

Reason 1 .....

.....

Reason 2 .....

.....

(Total for Question 1 = 2 marks)

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2 A student investigates what happens when salts dissolve in water.

She uses the apparatus in Figure 2.

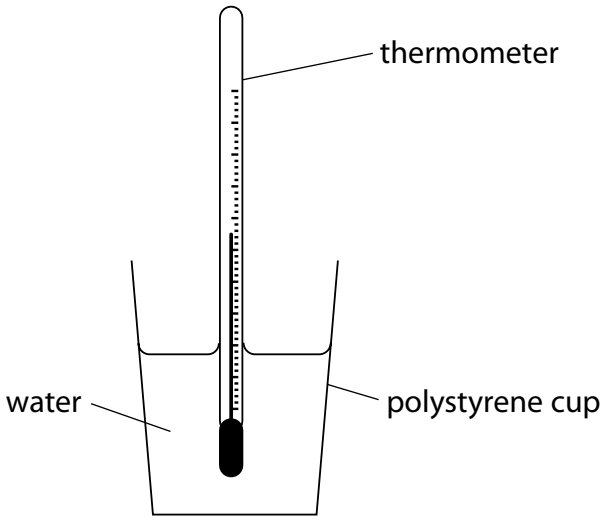

Figure 2

She records the temperature of the water in the cup before and after each salt is dissolved.

Figure 3 shows her results for three salts: P, Q and R.

salt	starting temperature in °C	final temperature in °C	temperature change in °C
P	18	25	7
Q	19	17	–2
R	18	39	.....

Figure 3

(a) Complete Figure 3 by writing in the temperature change for salt R.

(1)

(b) The results show that when salt Q is dissolved, heat energy is taken in and the temperature drops.

Complete the following statement by underlining the correct answer in the box.

(1)

This is an example of

an endothermic change
an exothermic change
a periodic change

.

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(c) In each experiment, 10 g of salt is measured and dissolved.

What piece of apparatus should be used to measure the 10 g of salt?

(1)

Put a ring round the correct answer.

balance **measuring cylinder** **ruler**

(Total for Question 2 = 3 marks)

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3 Chlorine is a toxic gas.

(a) Which hazard symbol is placed on containers of chlorine gas?

Put a cross ☒ in the box next to your answer.

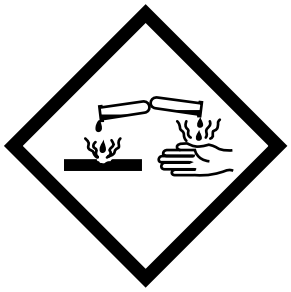
(1)

☒ **A**

☒ **B**

☒ **C**

☒ **D**



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(b) Describe the chemical test for chlorine and the result of the test.

(2)

Test.....

.....

Result.....

.....

(c) Warm iron wool reacts rapidly with chlorine to form an iron halide.

Complete the word equation for this reaction.

(2)

iron + ... → .....

(Total for Question 3 = 5 marks)

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4 Figure 4 shows some properties of the first five elements of group 7.

(a) Complete Figure 4 by predicting the melting point of astatine and its physical state at room temperature.

(2)

element	melting point in °C	physical state at room temperature
fluorine	–220	gas
chlorine	–101	gas
bromine	–7	liquid
iodine	114	solid
astatine	.....	.....

Figure 4

(b) Complete the following statement by underlining the correct answer in the box.

(1)

The colour of bromine is

green-yellow
blue
red-brown

.

(Total for Question 4 = 3 marks)

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5 Sodium, lithium and potassium are elements in group 1 of the periodic table.

(a) Complete the following statement by underlining the correct answer in the box.

(1)

Group 1 elements are known as the

alkali metals
halogens
noble gases

.

(b) Which line shows the three elements in the correct order of reactivity, starting with the most reactive?

Put a cross ☒ in the box next to your answer.

(1)

☒ **A** sodium, potassium, lithium

☒ **B** lithium, potassium, sodium

☒ **C** potassium, sodium, lithium

☒ **D** sodium, lithium, potassium

(c) Use words from the box to complete the following sentences about the reaction of sodium with water.

(3)

chloride	**floats**	**hydroxide**	**melts**	**neutralises**	**sinks**

When a piece of sodium is added to water it ..... and

..... .

As the sodium reacts, it forms a solution of sodium ..... .

(Total for Question 5 = 5 marks)

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6 Rubidium is a group 1 element.

(a) Which of the following correctly describes the properties of rubidium?

Put a cross ☒ in the box next to your answer.

(1)

☒ **A** a soft metal with a low melting point

☒ **B** a hard metal with a high melting point

☒ **C** non-metal with a low melting point

☒ **D** a non-metal with a high melting point

(b) When rubidium reacts with water a gas is given off.

What is the name of the gas?

(1)

.....

(Total for Question 6 = 2 marks)

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7 When marble chips react with dilute hydrochloric acid a gas is given off.

Figure 5 shows the volume of gas given off as 20 g of marble chips react with dilute hydrochloric acid.

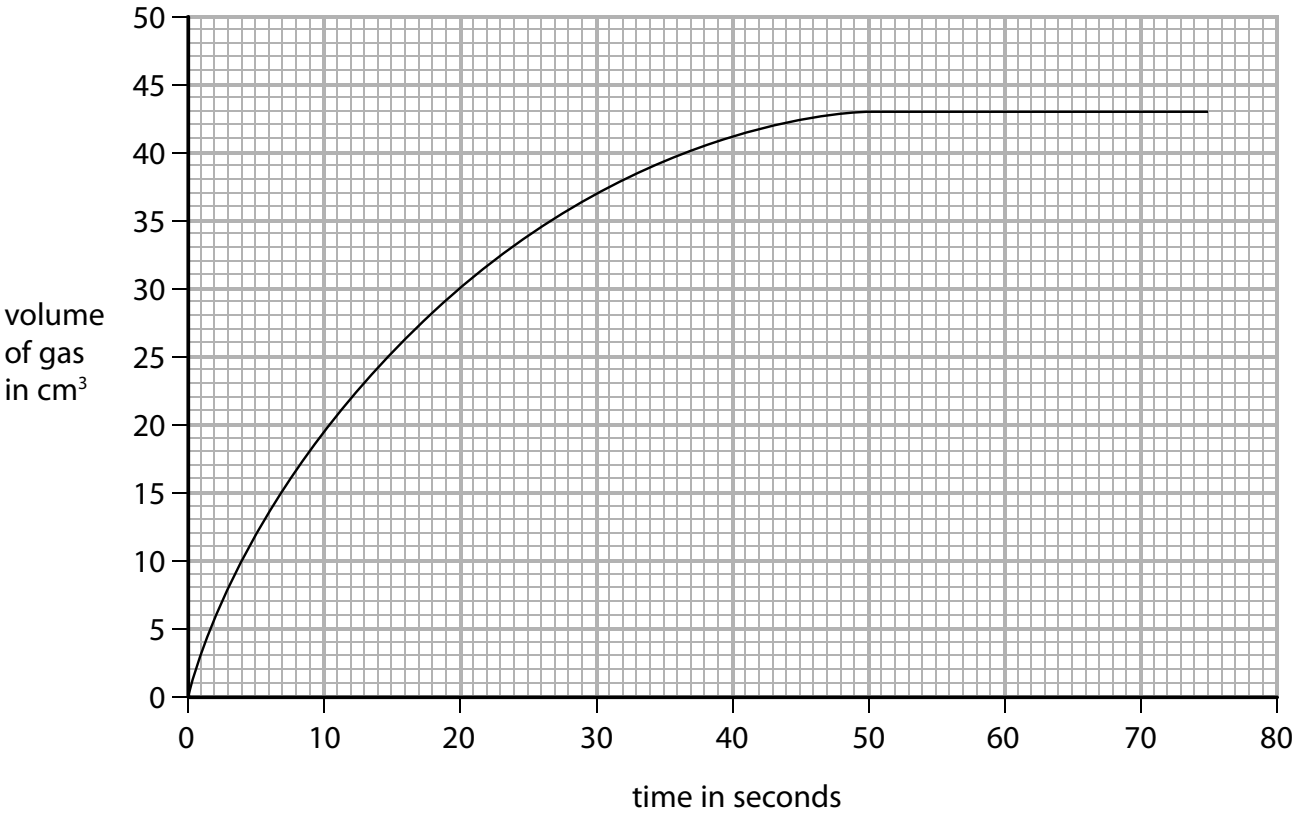

Figure 5

(a) At what time did this reaction stop?

(1)

(b) When the marble chips are crushed, they react faster.

Draw a line on the graph to show the result you would expect if the 20 g of marble chips were crushed and the experiment repeated.

(2)

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(c) The reaction between marble chips and hydrochloric acid gets faster when the acid is heated.

Explain, in terms of particles, why the reaction gets faster.

(2)

.....

.....

.....

.....

(Total for Question 7 = 5 marks)

TOTAL FOR PAPER = 25 MARKS

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Paper 3 Chemistry 2A

Question number	Answer	Mark
1	less dense/lighter than air (1) non-flammable (1)	**(2)**

Question number	Answer	Mark
2(a)	21	**(1)**

Question number	Answer	Mark
2(b)	endothermic change	**(1)**

Question number	Answer	Mark
2(c)	balance	**(1)**

Question number	Answer	Mark
3(a)	B	**(1)**

Question number	Answer	Additional guidance	Mark
3(b)	Test (damp/moist) blue litmus paper (1) Result turns (red then) white/bleached (1)	allow 1 mark for (red) litmus paper turns white/ bleached	**(2)**

Question number	Answer	Additional guidance	Mark
3(c)	iron + **chlorine** (1) → **iron chloride** (1)	ignore iron halide	**(2)**

Question number	Answer	Additional guidance	Mark
4(a)	melting point >114 (1) physical state – solid (1)	accept any number greater than 114 for the melting point of astatine	**(2)**

Question number	Answer	Mark
4(b)	red-brown	**(1)**

Question number	Answer	Mark
5(a)	alkali metals	**(1)**

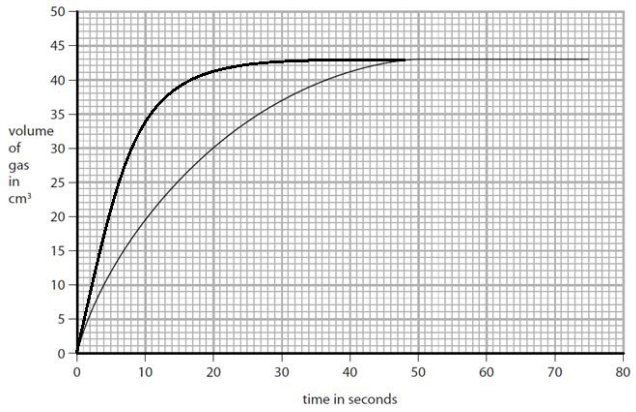
Question number	Answer	Mark
5(b)	C	**(1)**

Question number	Answer	Additional guidance	Mark
5(c)	When a piece of sodium is added to water it **floats** (1) and **melts** (1). As the sodium reacts, it forms a solution of sodium **hydroxide** (1).	'floats' and 'melts' can be reversed	**(3)**

Question number	Answer	Mark
6(a)	A	**(1)**

Question number	Answer	Mark
6(b)	hydrogen	**(1)**

Question number	Answer	Mark
7(a)	50 (s) ±2	**(1)**

Question number	Answer	Additional guidance	Mark
7(b)	 curve to the left of the original curve (1) curve finishes on the same horizontal line/same final volume of gas (1)	accept for the first mark, a straight diagonal line to the left of the original curve	**(2)**

Question number	Answer	Additional guidance	Mark
7(c)	(acid) particles move around more rapidly (1) more-frequent collisions between (acid and marble) particles (1)	accept (acid) particles have more energy accept more productive collisions between (acid and marble) particles accept more collisions for 1 mark	**(2)**

Write your name here

Surname	Other names

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Science

Paper 4: Chemistry 2B

Sample assessment material for first teaching September 2017

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Total Marks
/25

Instructions

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

Information

- The total mark for this paper is 25.
- 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.
- Check your answers if you have time at the end.

Turn over ▶

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Answer ALL questions.

1 Crude oil is a mixture of hydrocarbons.

(a) Complete the following statement by underlining the correct answer in the box.

(1)

Hydrocarbons are compounds of

hydrogen, oxygen and carbon only
hydrogen and carbon only
hydrogen and carbon dioxide only

.

(b) Crude oil is separated into fractions by fractional distillation.

Figure 1 shows a fractionating column and the fractions produced.

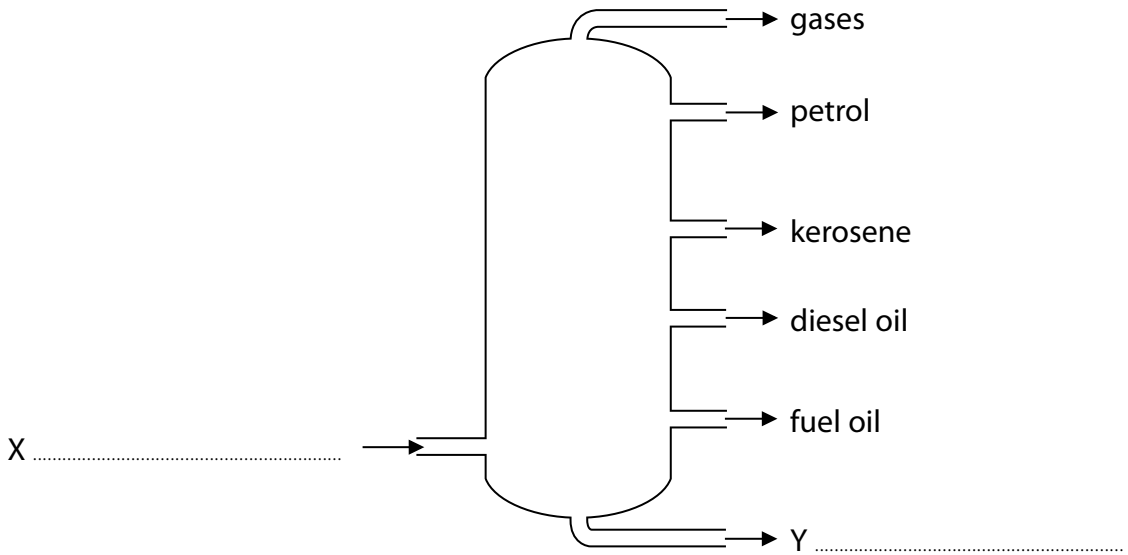

Figure 1

(i) Complete Figure 1 by labelling X and Y.

(2)

(ii) Which fraction is used as a fuel for aircraft?

(1)

.....

(Total for Question 1 = 4 marks)

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2 Here are some chemical processes and descriptions.

Draw one line from each process to its correct description.

process	description
condensing	produces oxygen using energy from light
cracking	produces small molecules from larger molecules
photosynthesis	produces liquids from gases
	produces acid rain

(Total for Question 2 = 3 marks)

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3 Give **one** advantage and **one** disadvantage of using hydrogen as a fuel for cars.

Advantage .....

.....

Disadvantage .....

.....

(Total for Question 3 = 2 marks)

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4 (a) Complete the following statement by underlining the correct line in the box.

(1)

The gases in the Earth's early atmosphere came from

the moon
the sea
volcanoes

.

(b) Figure 2 shows the amounts of nitrogen, oxygen and carbon dioxide in the Earth's early atmosphere and today's atmosphere.

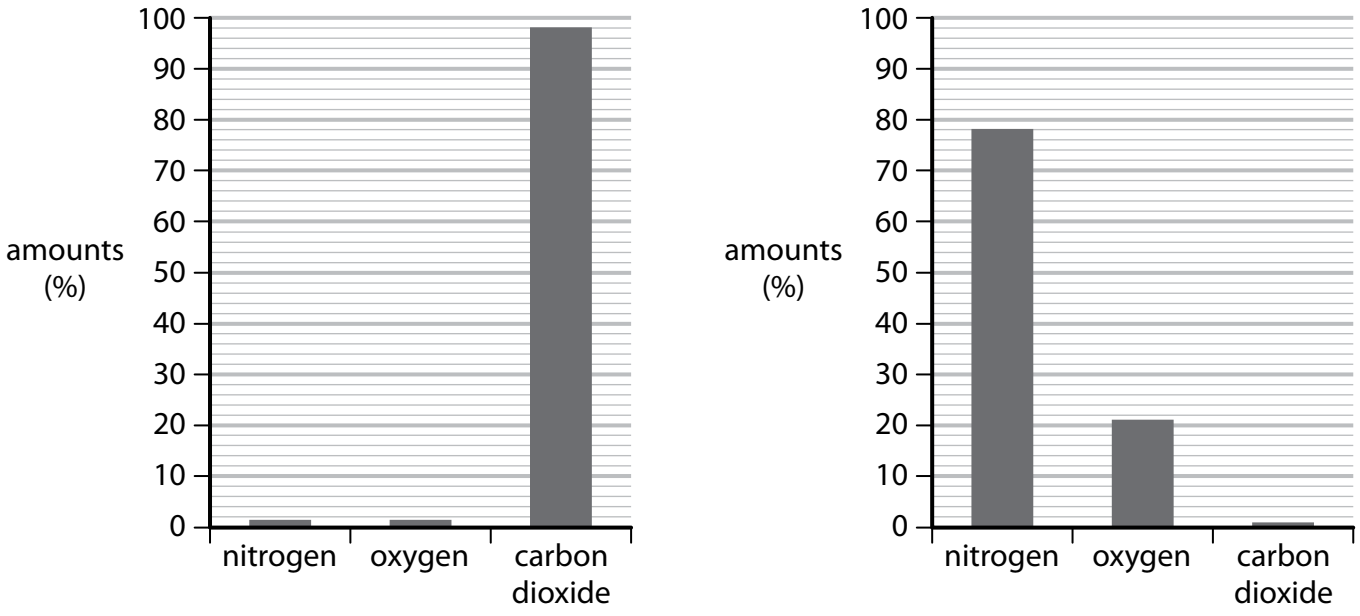

Figure 2

(i) Which gas has decreased by the largest amount since the Earth's early atmosphere?

(1)

.....

(ii) What is the percentage of nitrogen in today's atmosphere?

(1)

.....

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(c) In the Earth's early atmosphere there was much more water vapour than there is in today's atmosphere.

Explain what happened to the water vapour.

(2)

.....

.....

.....

.....

(Total for Question 4 = 5 marks)

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5 Wax is a hydrocarbon.

A student investigates the gases given off when a wax candle burns using the apparatus in Figure 3.

The pump sucks these gases through test tubes P and Q.

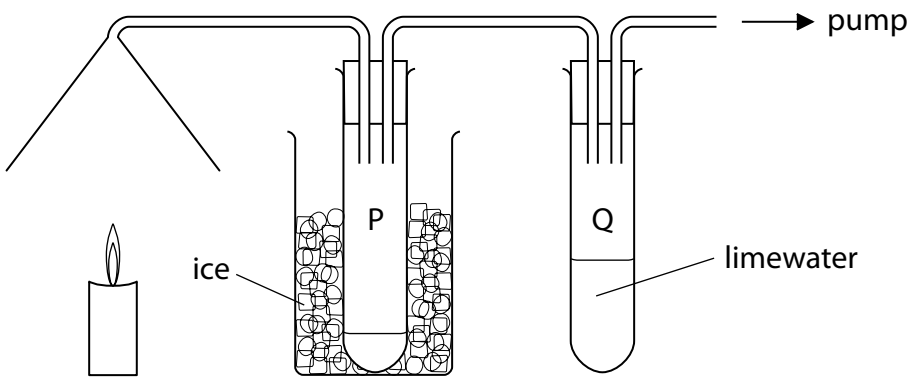

Figure 3

(a) A colourless liquid with a boiling point of 100 °C collects in test tube P.

What is the liquid?

(1)

.....

(b) Why has the student put ice around test tube P?

(1)

.....

.....

(c) The limewater in tube Q goes milky.

Which gas turns limewater milky?

(1)

.....

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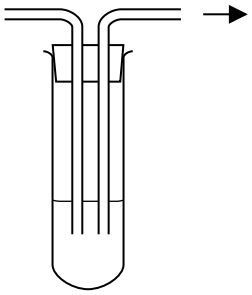
(d) The limewater in test tube Q went milky very slowly because the gas was not bubbling through the limewater.

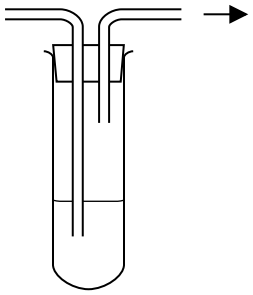
Which of the following arrangements would correct the problem?

Put a cross ☒ in the box next to your answer.

(1)



☒ **A**



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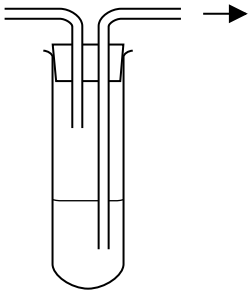
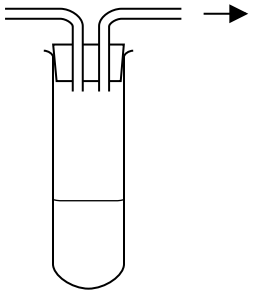


☒ **C**



☒ **D**

(e) During the experiment, black soot collects in the funnel above the candle flame.

Complete the following statement by underlining the correct answer in the box.

(1)

The soot is carbon produced by

complete combustion of the wax
impurities in the wax
incomplete combustion of the wax

.

(Total for Question 5 = 5 marks)

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6 Methane is a hydrocarbon fuel.

Methane is also a greenhouse gas.

(a) (i) Complete the word equation for the reaction that takes place when methane is burnt completely in air.

(2)

methane + oxygen → ..... + ...

(ii) Complete the following statement about this reaction by underlining the correct answer in the box.

(1)

This reaction is an example of

combustion
condensation
cracking

.

(b) Complete the following statements by underlining the correct answer in the boxes.

(2)

Methane is added to the atmosphere by

air travel
burning fossil fuels
livestock farming

.

Greenhouse gases

absorb heat radiated from the Earth and release it back
are produced by human activity only
react with oxygen in the atmosphere to produce heat

.

(c) Draw a ring around another greenhouse gas in the following list.

(1)

argon **carbon dioxide** **nitrogen**

(Total for Question 6 = 6 marks)

TOTAL FOR PAPER = 25 MARKS

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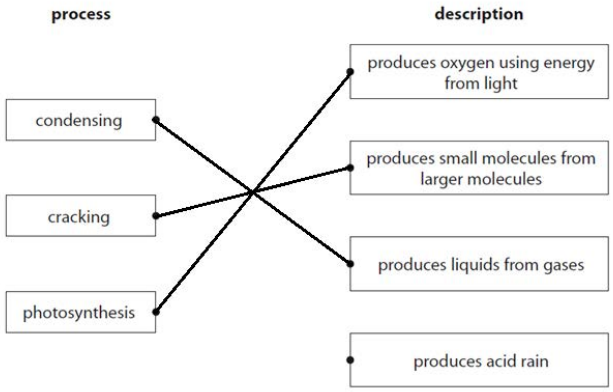
Paper 4 Chemistry 2B

Question number	Answer	Mark
1(a)	hydrogen and carbon only	(1)

Question number	Answer	Additional guidance	Mark
1(b)(i)	X (heated) crude oil (1) Y bitumen (1)	Accept tar	(2)

Question number	Answer	Mark
1(b)(ii)	kerosene	(1)

Question number	Answer	Additional guidance	Mark
2	 2 marks for two lines correct 1 mark for one line correct	Ignore both lines where two lines are joined from one process or to one description	(3)

Question number	Answer	Additional guidance	Mark
3	**Advantage** Any one from: • plentiful source of raw material/water to make hydrogen (1) • water is a renewable source of hydrogen (1) • produces only water as waste product (1) • the waste product is non-polluting (1) • does not produce carbon dioxide (when burnt) (1) **Disadvantage** Any one from: • expensive to produce (1) • difficult to store (1) • leaks easily (1) • requires stronger/heavier/bigger fuel tanks (1) • fewer places that sell hydrogen (1)	Do not accept 'it can explode'	**(2)**

Question number	Answer	Mark
4(a)	volcanoes	**(1)**

Question number	Answer	Mark
4(b)(i)	carbon dioxide	**(1)**

Question number	Answer	Mark
4(b)(ii)	78±1	**(1)**

Question number	Answer	Mark
4(c)	An explanation that combines two of the following: • the (early) Earth cooled (1) • the water vapour condensed/turned into water (1) • the (condensed) water formed the seas/oceans (1)	**(2)**

Question number	Answer	Mark
5(a)	water	**(1)**

Question number	Answer	Mark
5(b)	to cool the gases given off/to cool the contents of the tube/ to cool the water vapour/to condense the water vapour	(1)

Question number	Answer	Mark
5(c)	carbon dioxide	(1)

Question number	Answer	Mark
5(d)	B	(1)

Question number	Answer	Mark
5(e)	incomplete combustion of the wax	(1)

Question number	Answer	Additional guidance	Mark
6(a)(i)	methane + oxygen → **carbon dioxide** (1) + **water** (1)	water and carbon dioxide can be reversed	(2)

Question number	Answer	Mark
6(a)(ii)	combustion	(1)

Question number	Answer	Mark
6(b)	livestock farming absorb heat radiated from the Earth and release it back	(2)

Question number	Answer	Mark
6(c)	carbon dioxide	(1)

Write your name here

Surname	Other names

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Science

Paper 5: Physics 2A

Sample assessment material for first teaching September 2017

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Total Marks /25

Instructions

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

Information

- The total mark for this paper is 25.
- 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.
- Check your answers if you have time at the end.

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Answer ALL questions.

1 Figure 1 shows the three wires inside a plug used for an electric kettle.

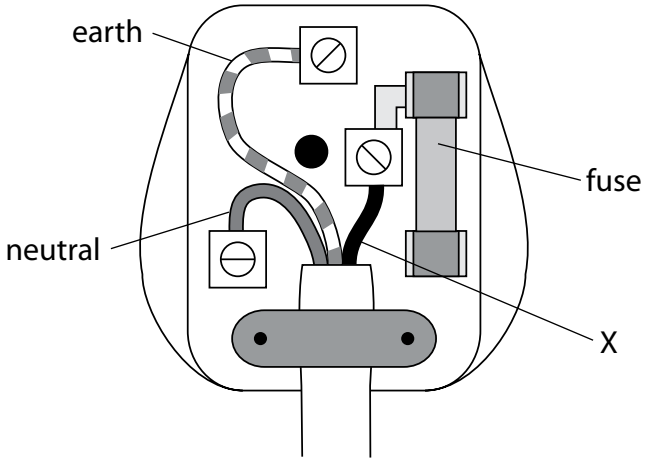

Figure 1

(a) What is X?

(1)

.....

(b) What colour is the neutral wire?

Draw a ring around the correct answer.

(1)

brown **blue** **green and yellow**

(c) What does the fuse do?

Put a cross ☒ in the box next to your answer.

(1)

☒ **A** boils when the current is too low

☒ **B** boils when the current is too high

☒ **C** melts when the current is too low

☒ **D** melts when the current is too high

(d) Fuses and earth wires are electrical safety devices.

Name one other electrical safety device.

(1)

.....

.....

(Total for Question 1 = 4 marks)

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2 (a) Figure 2 shows how the current in the mains supply changes with time.

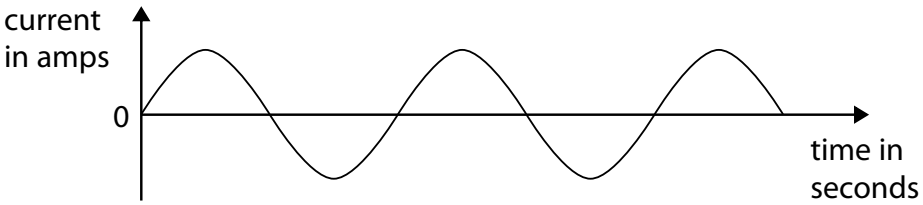

Figure 2

This type of current is called:

Put a cross ☒ in the box next to your answer.

(1)

☒ **A** direct current

☒ **B** indirect current

☒ **C** alternating current

☒ **D** transverse current

(b) Figure 3 shows how electrical energy is transferred from a power station to the houses in a nearby town.

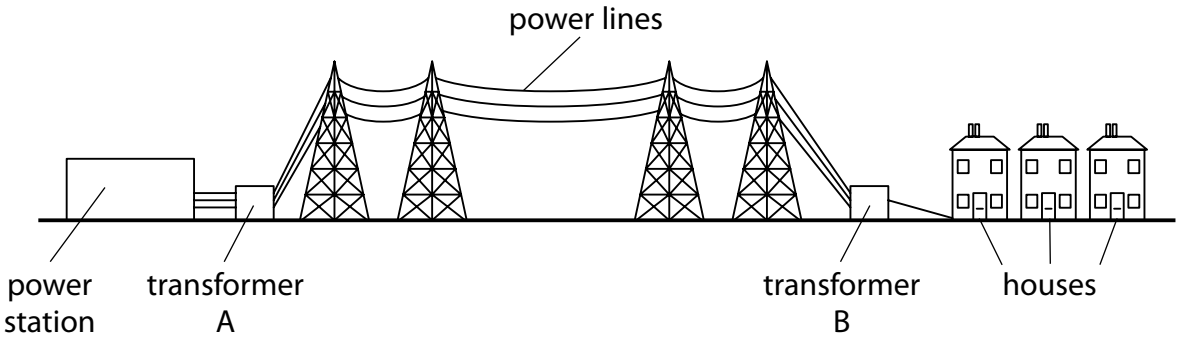

Figure 3

Transformer A increases the voltage of the electrical supply from the power station.

(i) Why is the voltage increased before it reaches the power lines?

(1)

.....

.....

(ii) What does transformer B do?

(1)

.....

.....

(Total for Question 2 = 3 marks)

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3 (a) Which of the following objects is attracted to a magnet?

Put a cross ☒ in the box next to your answer.

(1)

☒ **A** an aluminium can

☒ **B** an iron nail

☒ **C** a plastic toy

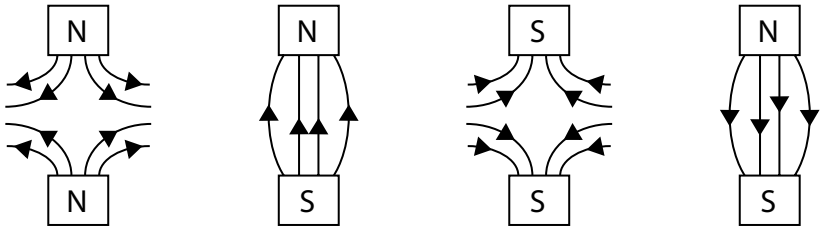
☒ **D** a wooden ruler

(b) The poles of two magnets attract each other.

Which of these shows the correct magnetic field for this?

Put a cross ☒ in the box next to your answer.

(1)



☒ **A** ☒ **B** ☒ **C** ☒ **D**

(c) Figure 4 shows two toy trains that have bar magnets inside them.

What will happen to the two toy trains in Figure 4?

(1)

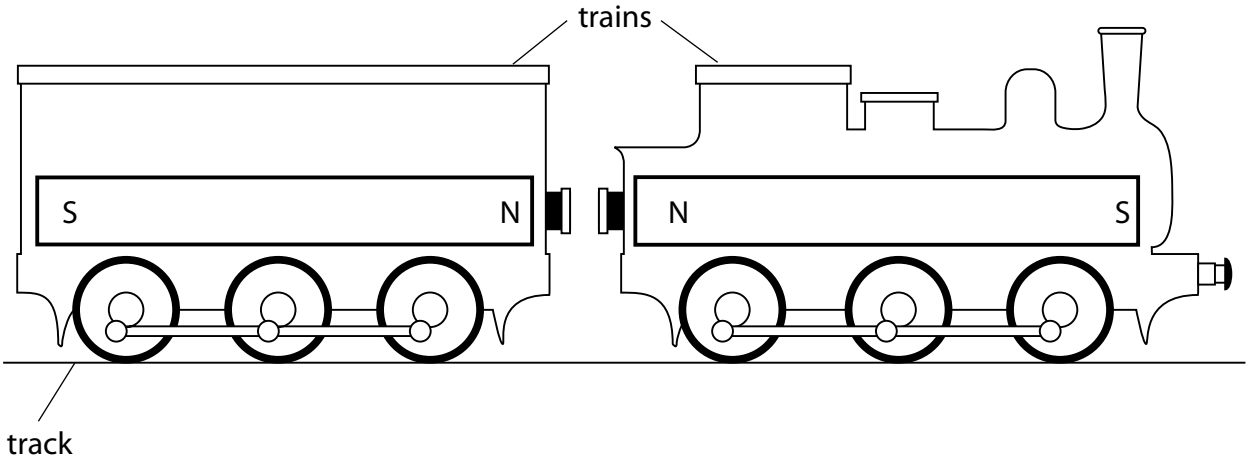


Figure 4

.....

.....

(Total for Question 3 = 3 marks)

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4 Complete the following sentences by using words from the box.

current	parallel	resistance	
series	voltage	batteries	charge

When voltmeters are used they are connected in ..... .

Voltmeters are used to measure ..... .

When ammeters are used they are connected in ..... .

Ammeters are used to measure ..... .

(Total for Question 4 = 4 marks)

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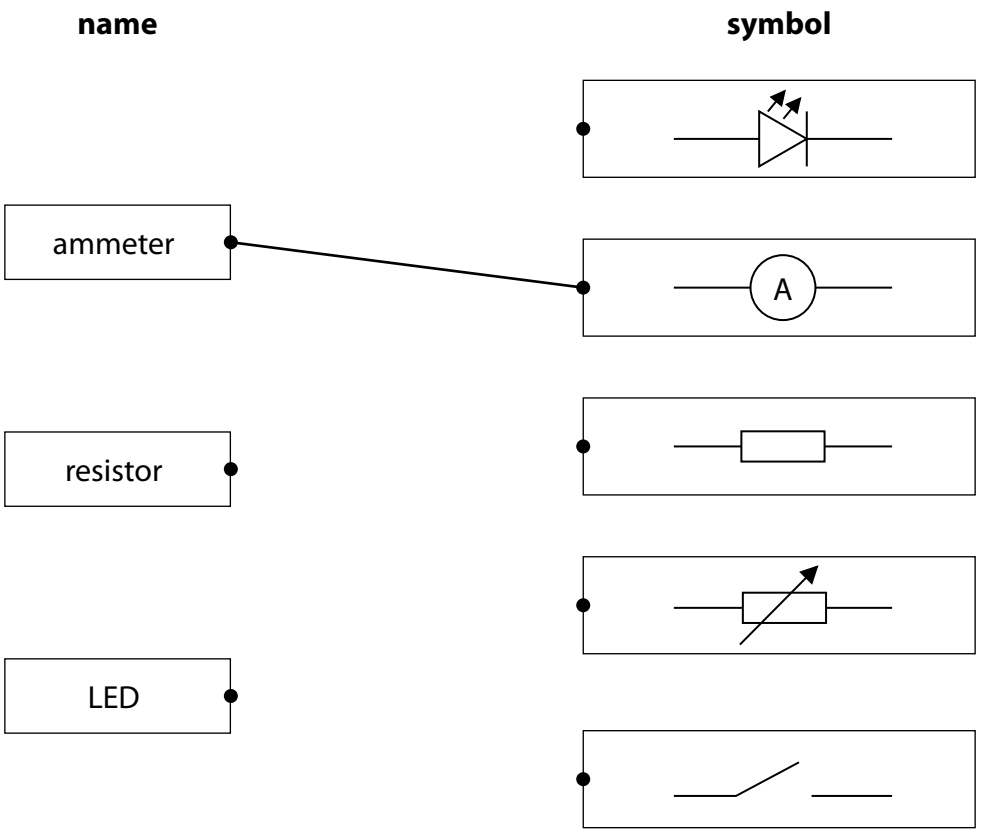
5 (a) Draw one line from each name of each piece of apparatus to its symbol.

One has been done for you.

(2)



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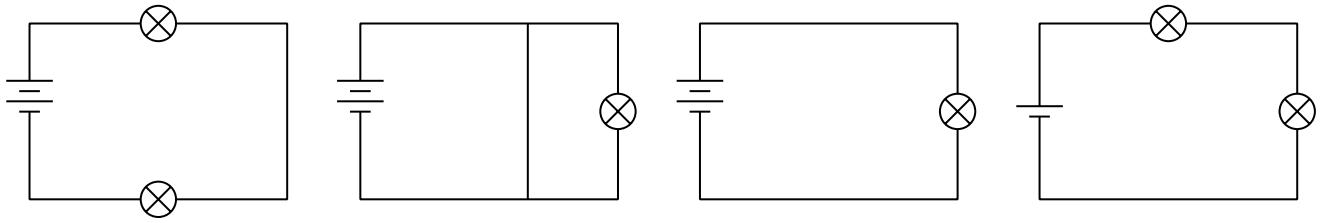
(b) Figure 5 shows four circuit diagrams: A, B, C and D.

The cells and lamps are identical.



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

Figure 5

(i) In which circuit will the lamp or lamps shine most?

(1)

.....

(ii) In which circuit will the lamp or lamps not shine?

(1)

.....

(Total for Question 5 = 4 marks)

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6 Some students investigate how the current and voltage change in a lamp.

They use the circuit in Figure 6.

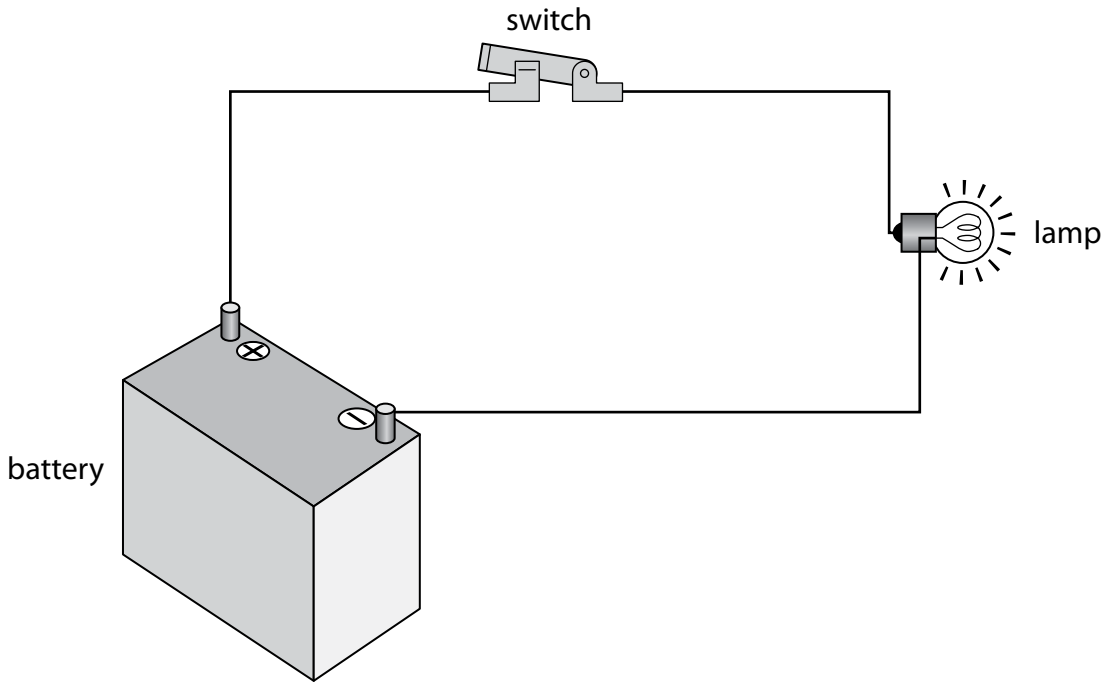

Figure 6

(a) The students need to be able to change the current in the circuit.

Pick one piece of apparatus they can use to change the current.

Put a ring around the correct answer.

(1)

ammeter **variable resistor** **voltmeter**

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(b) The students record the current and voltage as they increase the current.

They plot this graph of their results, as shown in Figure 7.

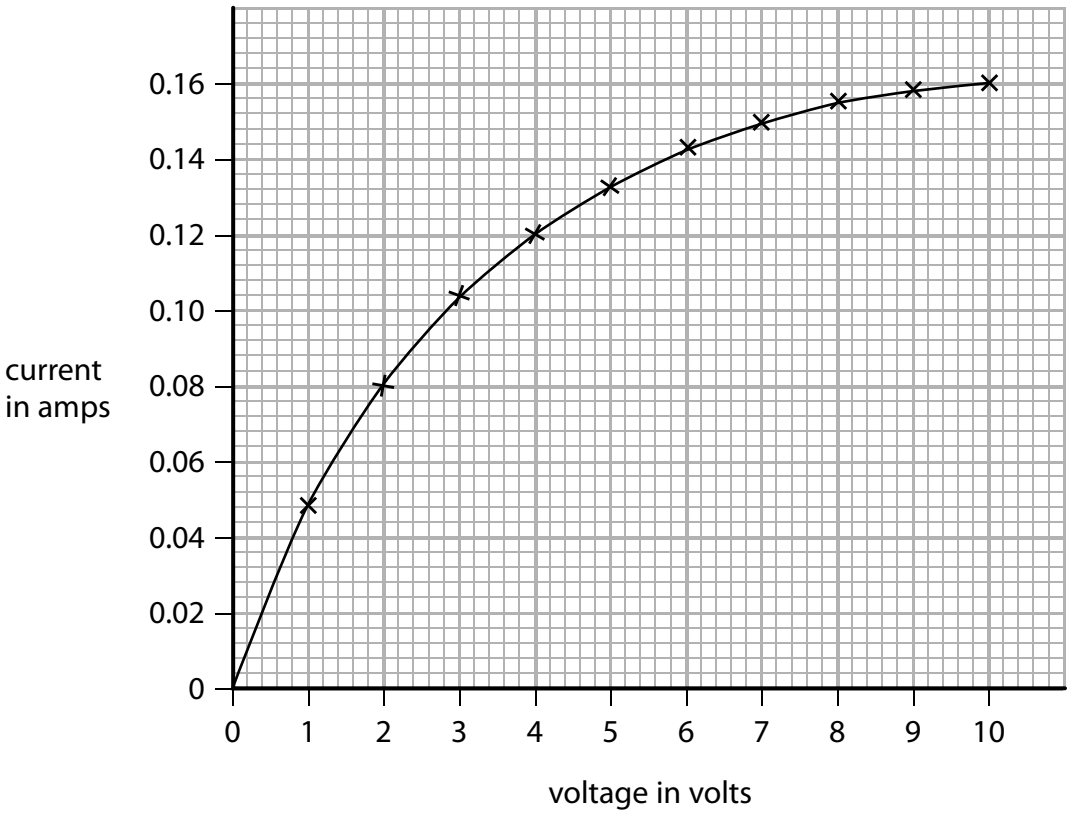

Figure 7

(i) What is the current when the voltage is 2 volts?

(1)

current = ... amps

(ii) Calculate the resistance of the lamp when the voltage is 4 volts and the current is 0.12 amps.

(2)

Use the equation

$$\text{resistance} = \frac{\text{voltage}}{\text{current}}$$

resistance = ... ohms

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(iii) Describe how the current changes when the voltage changes in Figure 7.

(2)

.....

.....

.....

.....

(c) Another group of students investigates how the current and voltage change in a fixed resistor.

Figure 8 shows their results.

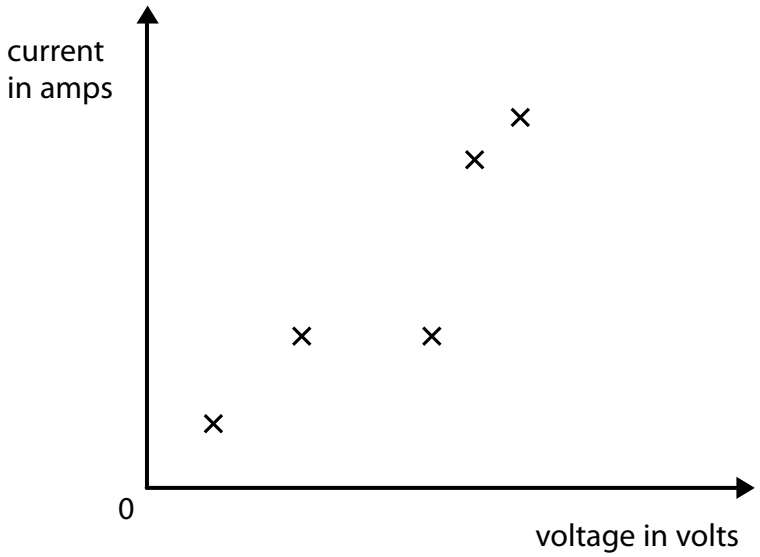

Figure 8

Draw the line of best fit on their results.

(1)

(Total for Question 6 = 7 marks)

TOTAL FOR PAPER = 25 MARKS

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Paper 5 Physics 2A

Question number	Answer	Mark
1(a)	live (wire)	**(1)**

Question number	Answer	Mark
1(b)	blue	**(1)**

Question number	Answer	Mark
1(c)	D	**(1)**

Question number	Answer	Additional guidance	Mark
1(d)	circuit breaker	accept other appropriate electrical safety measures, e.g. insulated wires, double insulation, residual current device	**(1)**

Question number	Answer	Mark
2(a)	C	**(1)**

Question number	Answer	Mark
2(b)(i)	to reduce energy losses in the overhead cables	**(1)**

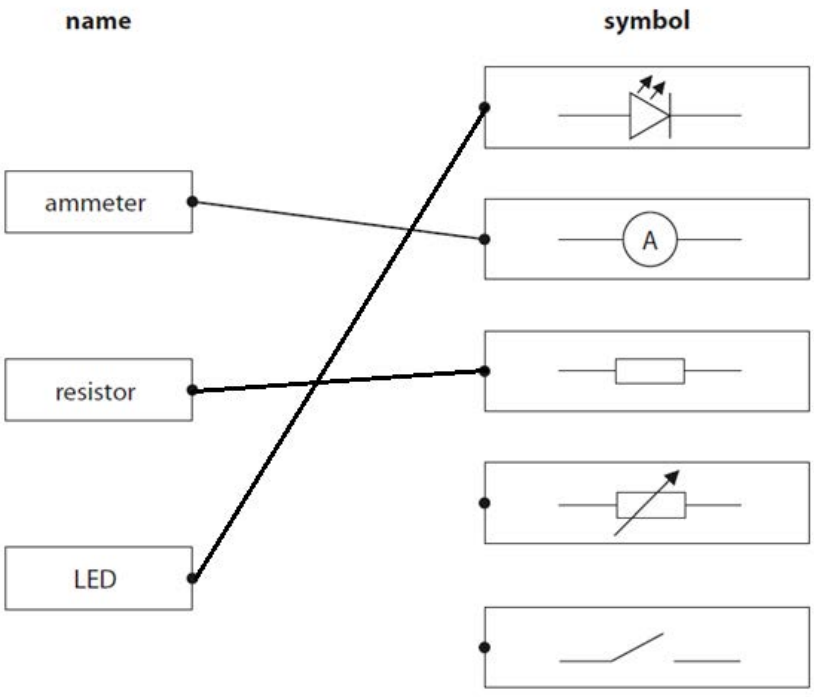
Question number	Answer	Additional guidance	Mark
2(b)(ii)	reduces the voltage/steps-down the voltage	accept increases the current	**(1)**

Question number	Answer	Mark
3(a)	B	**(1)**

Question number	Answer	Mark
3(b)	D	(1)

Question number	Answer	Additional guidance	Mark
3(c)	repel/move apart/eq	do not accept 'move' unqualified	(1)

Question number	Answer	Mark
4	1 mark for each correct answer, in the following order: parallel (1) voltage (1) series (1) current (1)	(4)

Question number	Answer	Mark
5	 1 mark for each correct line	(2)

Question number	Answer	Mark
5(b)(i)	C	(1)

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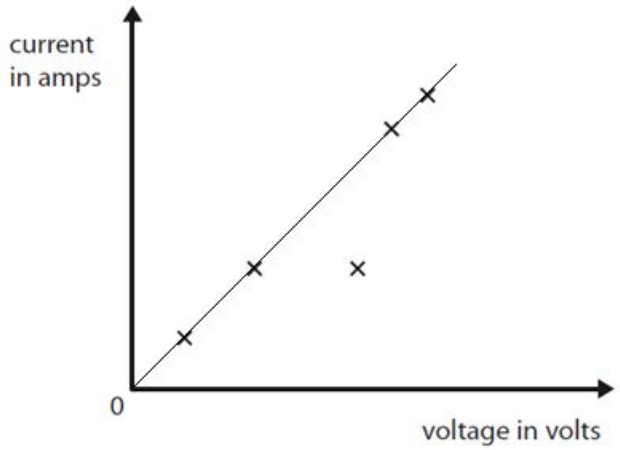
Question number	Answer	Mark
5(b)(ii)	B	**(1)**

Question number	Answer	Mark
6(a)	variable resistor	**(1)**

Question number	Answer	Mark
6(b)(i)	0.08 (amps)	**(1)**

Question number	Answer	Mark
6(b)(ii)	substitution (1) 4 ÷ 0.12 answer (1) 33.33 (ohms)	**(2)**

Question number	Answer	Mark
6(b)(iii)	a simple pattern sentence, e.g. current increases as voltage increases (1) increase is non-linear (however expressed) (1)	**(2)**

Question number	Answer	Mark
6(c)	a straight line avoiding the anomalous point, e.g.  	**(1)**

Write your name here

Surname	Other names

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Science

Paper 6: Physics 2B

Sample assessment material for first teaching September 2017

For teacher's use only

Total Marks /25

Instructions

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

Information

- The total mark for this paper is 25.
- 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.
- Check your answers if you have time at the end.

Turn over ▶

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S 5 6 3 9 7 A 0 1 1 2

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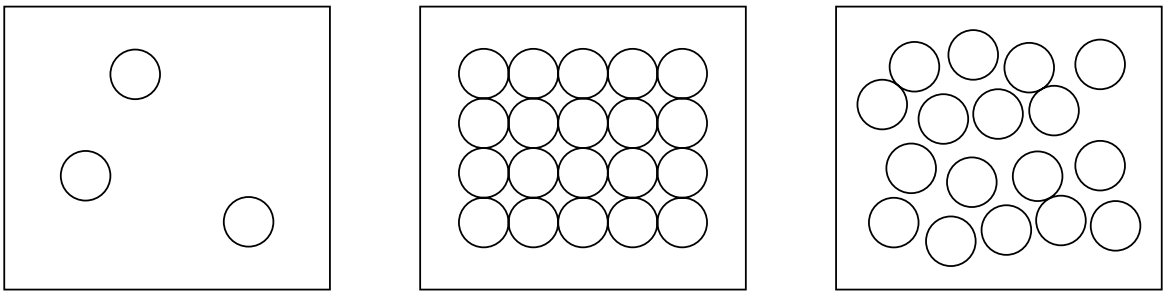
Answer ALL questions.

1 Matter can exist as solids, liquids and gases.

Figure 1 shows diagrams of how particles are arranged in solids, liquids and gases.

Place the labels **solid**, **liquid** or **gas** under the correct box in Figure 1.



_____ _____ _____

Figure 1

(Total for Question 1 = 2 marks)

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2 (a) Figure 2 shows a hot-air balloon.

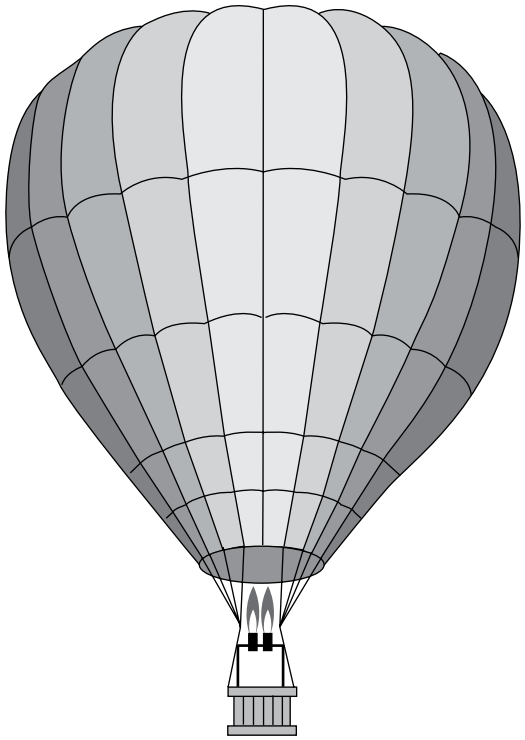

Figure 2

When the burner is switched on, the air particles in the balloon are heated.

Give **two** things that the air particles do when they get hotter.

(2)

1 .....

2 .....

(b) What happens to the pressure inside a container when the gas in the container is heated?

Put a ring around the correct answer.

(1)

increases **decreases** **stays the same**

(Total for Question 2 = 3 marks)

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3 (a) Which of the following will have the lowest density?

Put a cross ☒ in the box next to your answer.

(1)

☒ **A** gas

☒ **B** liquid

☒ **C** solid

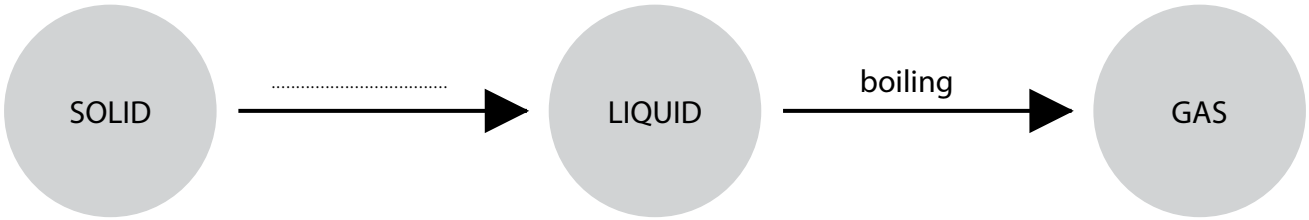
☒ **D** solution

(b) The states of matter can be changed from one form to another.

Use words from the box to complete the diagrams and sentences.

(4)

stretched	**cooled**	**freezing**	**heated**	**melting**	**shrinking**



This shows what happens when a solid is ..... .

This shows what happens when a gas is ..... .

(Total for Question 3 = 5 marks)

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4 Some students measure the force needed to pull a wooden block with masses on it across a table.

They use the equipment in Figure 3.

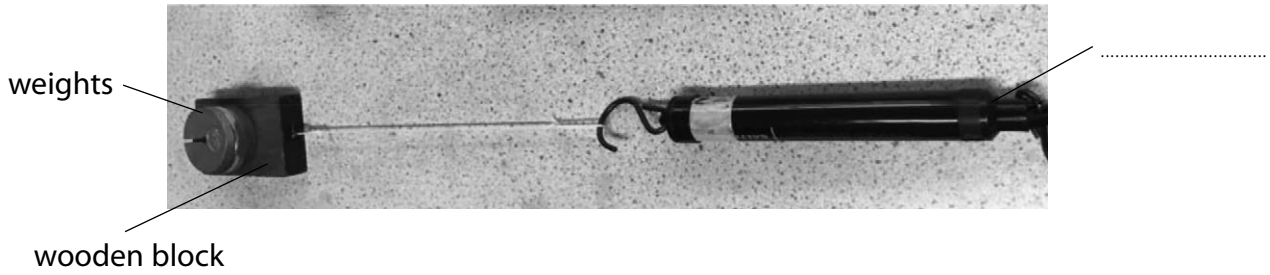

Figure 3

(a) Complete Figure 3 by labelling the equipment.

(1)

(b) The students plotted their results as a bar chart, in Figure 4.

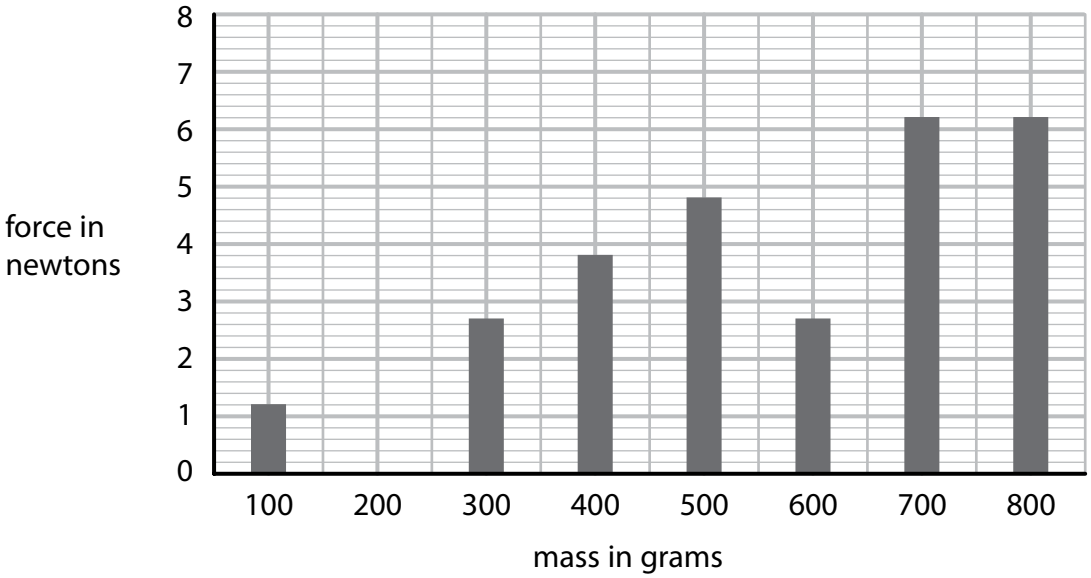

Figure 4

(i) What was the force needed to pull 700 g across the table?

(1)

force = ... newtons

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(ii) When there is 200 g on the wooden block, the force needed is 2.1 newtons.

Add a bar to Figure 4 to show this force.

(1)

(iii) Calculate the work done when the 2.1 N force moves 6 metres.

Use the equation:

work done = force × distance

(2)

work done = ... joules

(c) Complete the students' conclusions.

(2)

As the mass increases, the force needed to pull the wooden block across the table ..... .

The result for ..... grams is an anomalous result.

(d) What could the students do to improve their results?

(1)

.....

.....

(Total for Question 4 = 8 marks)

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5 Figure 5 shows a student lifting boxes of different weights onto some shelves.

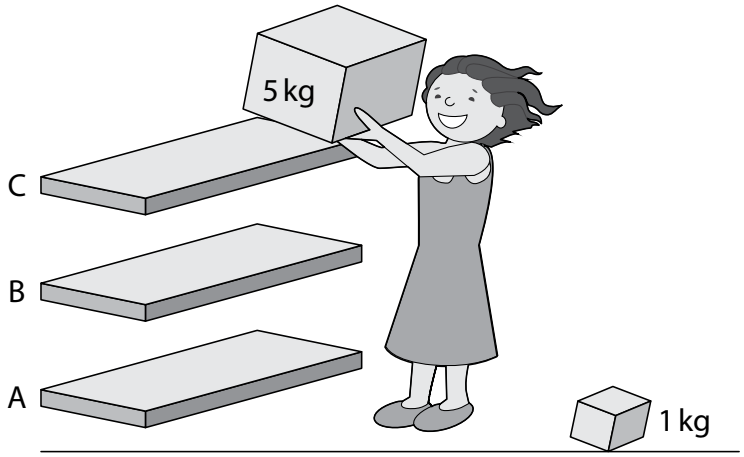

Figure 5

(a) When does the student do the most work?

Put a cross ☒ in the box next to your answer.

(1)

☒ **A** lifting the 5 kg box onto shelf A

☒ **B** lifting the 1 kg box onto shelf C

☒ **C** lifting the 5 kg box onto shelf C

☒ **D** lifting the 1 kg box onto shelf B

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(b) Figure 6 shows two children on a slide.

(Source: Shutterstock)

Figure 6

When the children slide down, the backs of their clothes get hot.

What is the most likely reason for this?

Put a cross ☒ in the box next to your answer.

(1)

☒ **A** the boy is heavier than the girl

☒ **B** there is friction between the clothes and the slide

☒ **C** the slide is 100% efficient

☒ **D** the children are pulled down the slide by gravity

(Total for Question 5 = 2 marks)

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6 Figure 7 shows an experiment to add weights to a spring.

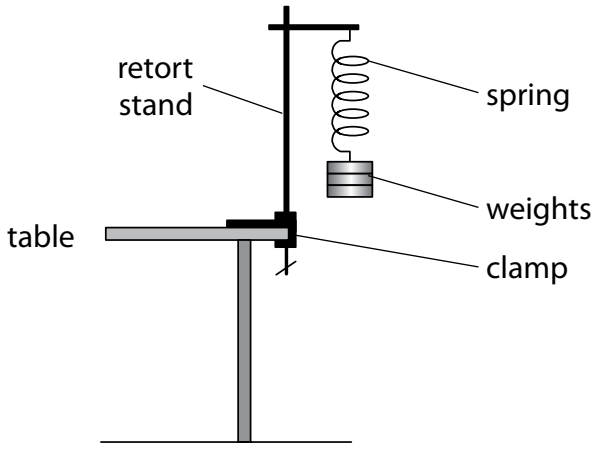

Figure 7

(a) When a weight is hung on the spring, the spring gets longer.

What is the increase in length called?

(1)

.....

(b) This experiment is an example of elastic stretching.

Describe what happens to the spring when the weight is removed.

(2)

.....

.....

.....

.....

(c) Give a reason why the retort stand must be clamped to the table.

(1)

.....

.....

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(d) The students repeat their experiment using a plastic loop.

In what way will the plastic loop behave differently to the spring?

(1)

.....

.....

(Total for Question 6 = 5 marks)

TOTAL FOR PAPER = 25 MARKS

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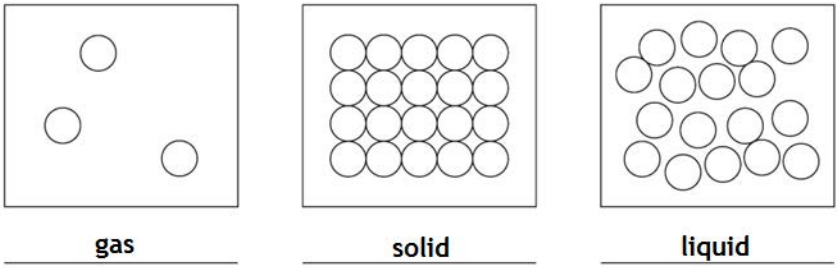
Paper 6 Physics 2B

Question number	Answer	Mark
1	 2 marks for 3 correct 1 mark for 1 correct	(2)

Question number	Answer	Mark
2(a)	Any two from: move around more quickly (1) get further apart (1) hit the walls of the balloon more often (1)	(2)

Question number	Answer	Mark
2(b)	increases	(1)

Question number	Answer	Mark
3(a)	A	(1)

Question number	Answer	Mark
3(b)	 heated (1)  cooled (1)	(4)

Question number	Answer	Mark
4(a)	newton-meter/force-meter	(1)

Question number	Answer	Mark
4(b)(i)	6.2 (newtons)	(1)

Question number	Answer	Mark
4(b)(ii)	bar added in correct place at 2.1 N in length	(1)

Question number	Answer	Mark
4(b)(iii)	substitution (1) 2.1 × 6 answer (1) 12.6 (joules)	(2)

Question number	Answer	Mark
4(c)	increases (1) 600 g (1)	(2)

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Question number	Answer	Additional guidance	Mark
4(d)	Any one from: repeat each result **and** average (1) do readings for in-between results/do readings at 50 g, 150 g, etc.(1) extended the results to larger masses (1)	accept any other suitable alternative	**(1)**

Question number	Answer	Mark
5(a)	C	**(1)**

Question number	Answer	Mark
5(b)	B	**(1)**

Question number	Answer	Mark
6(a)	extension	**(1)**

Question number	Answer	Mark
6(b)	the spring contracts/eq (1) to its original length (1)	**(2)**

Question number	Answer	Additional guidance	Mark
6(c)	Any one from: to stop the retort stand from falling over/to keep it stable (1) to allow the spring to stretch more/below the table (1) to stop the equipment falling on students (1)	accept any other suitable alternative	**(1)**

Question number	Answer	Additional guidance	Mark
6(d)	it will not return to its original length/it will stay stretched	accept 'it breaks'	**(1)**

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