Candidate surname

Other names

Pearson Edexcel International Award in Lower Secondary

Centre Number

Candidate Number

Thursday 17 October 2019

Afternoon (Time: 1 hour 20 minutes) | Paper Reference **LSC11/01**

Science
Achievement test

You must have:
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 candidate 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 80.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Candidates may use a calculator.

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 ▶

P 6 5 0 4 9 A 0 1 4 0

PEARSON

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SECTION A

Answer ALL questions.

For questions 1–5 put a cross in one box ☒ to indicate your answer.
If you change your mind, put a line through the box ☒ and then put a cross in another box ☒.

1 Which is the primary consumer in this food chain?

corn → mouse → snake → eagle

- ☒ **A** corn
- ☒ **B** eagle
- ☒ **C** mouse
- ☒ **D** snake

(Total for Question 1 = 1 mark)

2 The picture shows a saucepan that is used for cooking food.

Which property of copper makes it suitable for making a saucepan?

- ☒ **A** copper is a good conductor of electricity
- ☒ **B** copper is a reddish-brown colour
- ☒ **C** copper is malleable
- ☒ **D** copper is shiny

(Total for Question 2 = 1 mark)

3 Which is a correct symbol for a unit of speed?

- ☒ **A** kmh
- ☒ **B** kms
- ☒ **C** ms
- ☒ **D** m/s

(Total for Question 3 = 1 mark)

P 6 5 0 4 9 A 0 2 4 0

4 The first part of the word equation for the reaction between copper oxide and sulfuric acid is

copper oxide + sulfuric acid →

Which of the following correctly completes the equation?

- ☒ **A** copper + hydrogen
- ☒ **B** copper + water
- ☒ **C** copper sulfate + hydrogen
- ☒ **D** copper sulfate + water

(Total for Question 4 = 1 mark)

5 The diagram shows two forces acting on a car.

backward force from
air resistance = 2500 N

forward force from
engine = 6000 N

What is the resultant forward force acting on the car?

- ☒ **A** 2500 N
- ☒ **B** 3500 N
- ☒ **C** 5500 N
- ☒ **D** 8500 N

(Total for Question 5 = 1 mark)

P 6 5 0 4 9 A 0 3 4 0
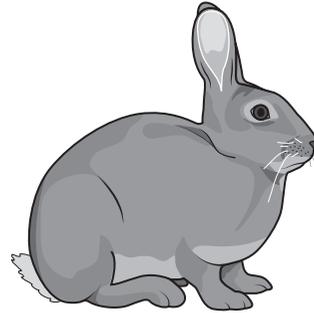
6 Picture A shows a rabbit that lives in a hot desert environment.

Picture B shows a rabbit that lives in a cold environment.
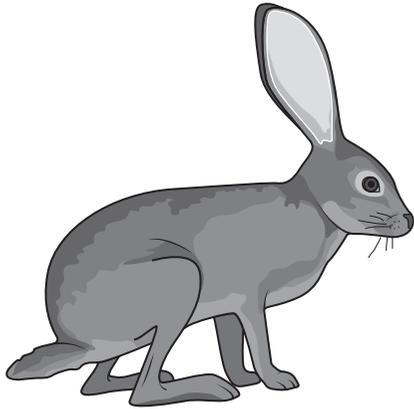
Picture A   **Picture B**

State how the rabbit in picture A is adapted to living in a hot desert environment.

....

....

(Total for Question 6 = 1 mark)

7 An atom is made up of different parts.

Draw **one** straight line from each description to the part of the atom it describes.

description

part of the atom

electron

a subatomic particle
with a negative charge

electron shell

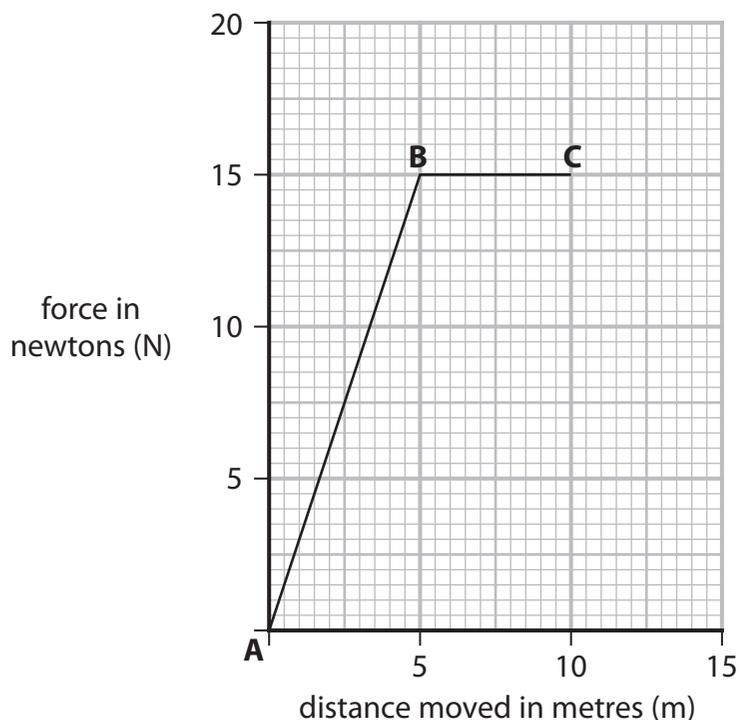neutron

a subatomic particle
with no charge

nucleus

proton

(Total for Question 7 = 2 marks)

8 The graph shows how the force used to move an object changes with the distance the object moves.

force in newtons (N)

distance moved in metres (m)

The table shows some statements about the work done when moving the object.

Complete the table by putting **one** tick (✓) in each row to show if each statement is true or false.

Use the relationship: work done = force × distance moved

Statement	True	False
the work done when moving the object from B to C is 75 J		
the work done when moving the object from A to B is equal to the work done in moving the object from B to C		
the work done when moving the object from A to B is half the work done in moving the object from B to C		

(Total for Question 8 = 2 marks)

9 Different parts of a plant have adaptations for particular functions.

Draw **one** straight line from each part of the plant to the correct adaptation for its function.

part of the plant

adaptation

have a small surface area to absorb sunlight and dissolved minerals

have a large surface area to absorb sunlight and dissolved minerals

leaves

have a large surface area to absorb water and dissolved minerals

roots

have a small surface area to absorb sunlight

have a large surface area to absorb sunlight

(Total for Question 9 = 2 marks)

10 X, Y and Z are three metals.

Table 1 and Table 2 show if a displacement reaction occurs when each of the metals is placed in a solution of metal X sulfate and in a solution of metal Z sulfate.

Metal	Reaction with metal X sulfate solution
metal X	no reaction
metal Y	reaction
metal Z	no reaction

Table 1

Metal	Reaction with metal Z sulfate solution
metal X	reaction
metal Y	reaction
metal Z	no reaction

Table 2

State the order of reactivity of metals X, Y and Z starting with the most reactive.
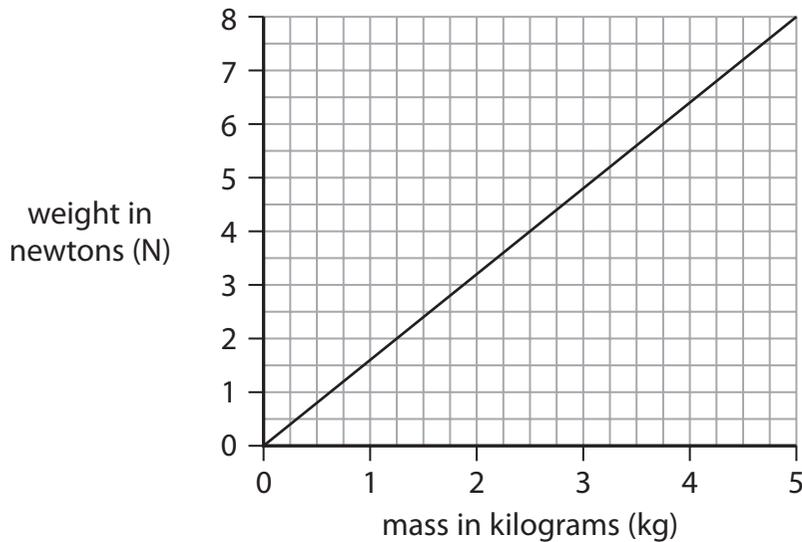
most reactive ....

....

least reactive ....

(Total for Question 10 = 1 mark)

P 6 5 0 4 9 A 0 8 4 0

11 The graph shows the relationship between the mass and the weight of an object on the Moon.

weight in newtons (N)

mass in kilograms (kg)

(a) State the weight of a 4 kg object on the Moon.

(1)

....

(b) An object of mass 5 kg has a weight of 8 N on the Moon.
The same object has a weight of 50 N on Earth.

The table shows some statements about mass and gravitational field strength on the Earth and on the Moon.

Complete the table by putting **one** tick (✓) in each row to show if each statement is true or false.

(1)

Statement	True	False
the mass of the same object is less on the Moon than on the Earth		
the gravitational field strength on the Moon is less than on the Earth		
the mass of the same object is greater on the Moon than on the Earth		
the gravitational field strength on the Moon is the same as on the Earth		

(Total for Question 11 = 2 marks)

Turn over ▶

12 The food chain shows the amount of energy available at each trophic level.

corn $\rightarrow$ mouse $\rightarrow$ snake $\rightarrow$ eagle
10 000 J   1000 J   100 J   10 J

Explain the change in the amount of energy available between the trophic levels of the food chain.

....

....

....

....

(Total for Question 12 = 2 marks)

13 This symbol represents an atom of sodium.

$$^{23}_{11}\text{Na}$$

(a) State the number of electrons in this atom.

(1)

....

(b) State the number of neutrons in this atom.

(1)

....
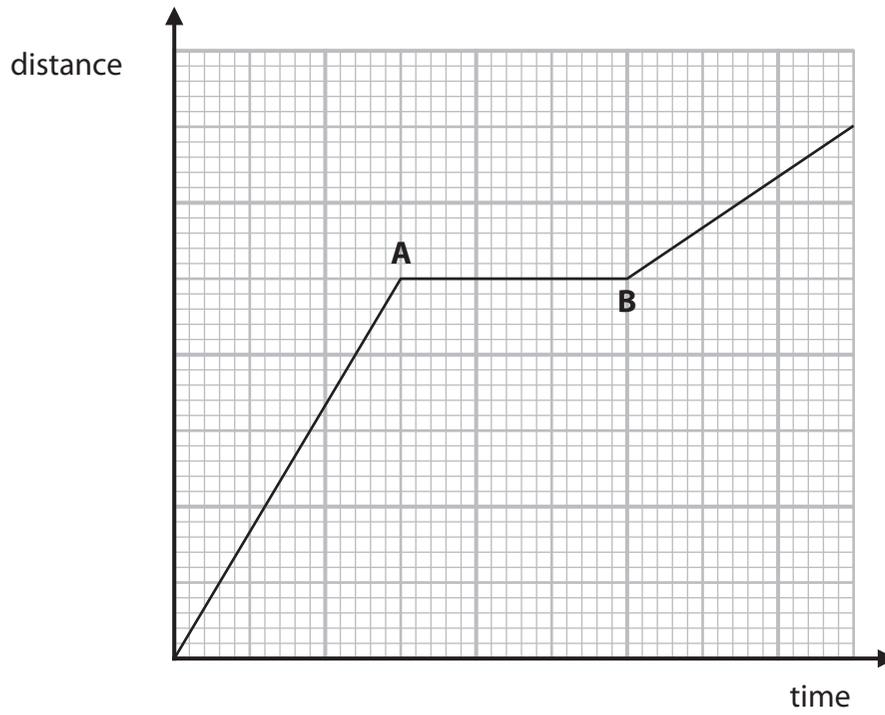
(Total for Question 13 = 2 marks)

14 This is a distance-time graph for a person walking along a path.

Circle the phrase in the box that describes the motion of the person between points A and B.
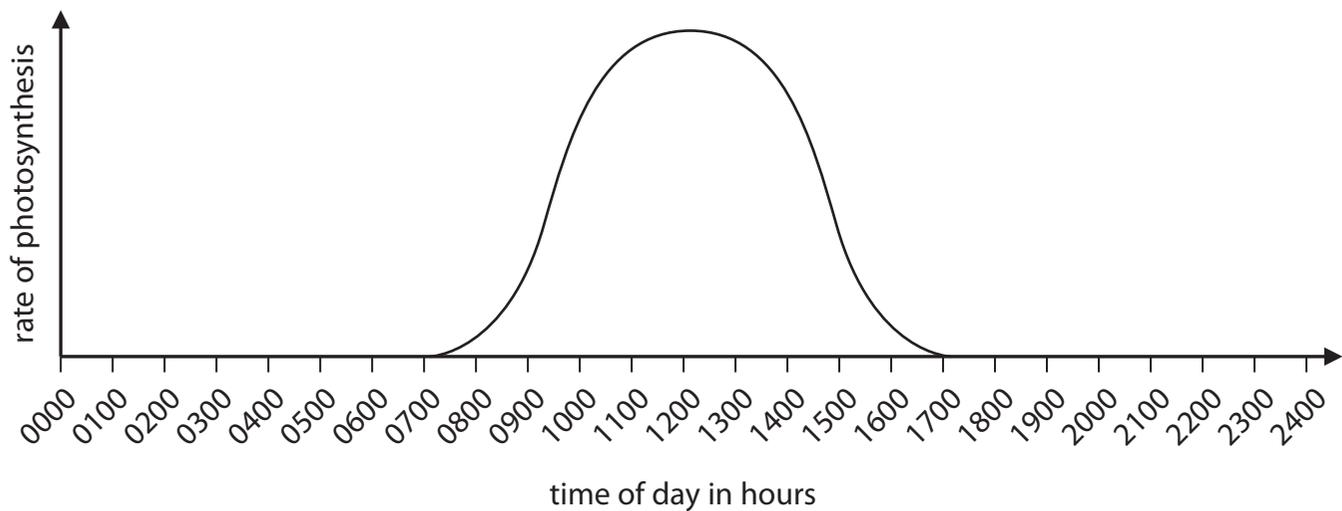
constant speed	slowing down	speeding up	stationary

(Total for Question 14 = 1 mark)

15 The graph shows the rate of photosynthesis of some pondweed during different times of the day.

time of day in hours

Which statement is a correct interpretation of the graph?

☒ **A** rate of photosynthesis is increasing between 0300 and 0600 hours

☒ **B** rate of photosynthesis is increasing between 0700 and 1200 hours

☒ **C** rate of photosynthesis is increasing between 1200 and 1700 hours

☒ **D** rate of photosynthesis is increasing between 1800 and 2100 hours

(Total for Question 15 = 1 mark)

16 The diagram shows the chromatogram produced using four different inks, P, Q, R and S. Each ink contains three separate coloured dyes.
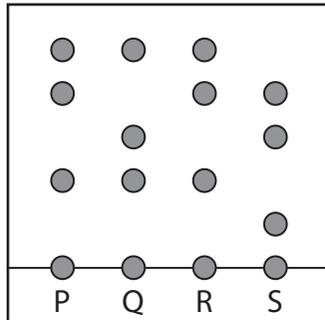
Which two inks contain the same three coloured dyes?

☒ **A** P and Q

☒ **B** Q and S

☒ **C** R and S

☒ **D** P and R

(Total for Question 16 = 1 mark)

17 Pairs of plastic strips with various charges are held close to each other.

Which pair of plastic strips will repel each other?

☒ **A**

☒ **B**

no overall charge

☒ **C** no overall charge

☒ **D**
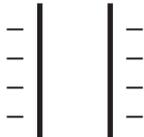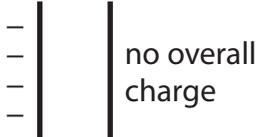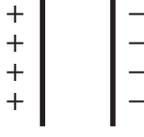
(Total for Question 17 = 1 mark)

Turn over ▶

18 The table shows information about the amount of energy and nutrition in 100 g of a meal.

Content	Amount of energy and nutrition per 100 g
carbohydrate	74 g
protein	22 g
fat	4 g
energy	1600 kJ

A person eats 150 g of the meal.

Which row of the table shows the amount of protein and energy in this meal?

	Protein	Energy
☒ **A**	22 g	1600 kJ
☒ **B**	22 g	2400 kJ
☒ **C**	33 g	1600 kJ
☒ **D**	33 g	2400 kJ

(Total for Question 18 = 1 mark)

19 A passenger aeroplane is flying through the air.

Which energy stores are stored in the aeroplane as it flies through the air?

☒ **A** chemical and elastic potential

☒ **B** elastic potential and kinetic

☒ **C** gravitational potential and kinetic

☒ **D** gravitational potential and nuclear

(Total for Question 19 = 1 mark)

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20 A student is sitting down to take a rest. Twenty minutes after sitting down, he has a drink.

The graph shows the pulse rate of the student at 10-minute intervals.

pulse rate in beats per minute

time in minutes (min)
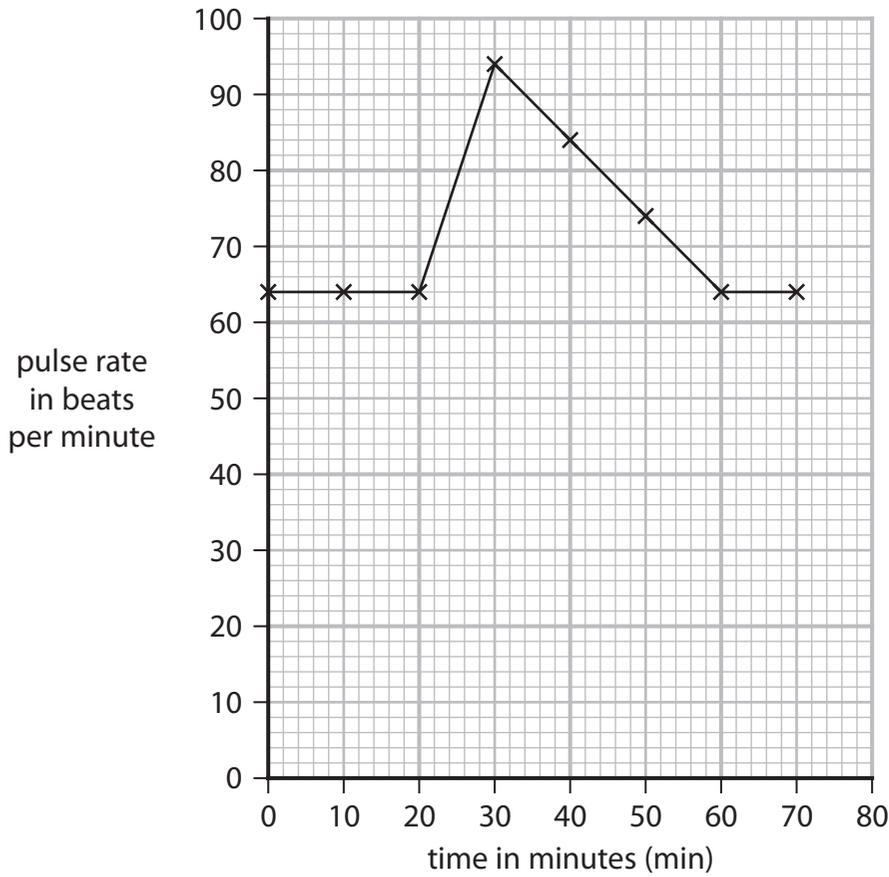
(a) (i) State the effect the drink has on the student's pulse rate.

(1)

....

....

(ii) How many minutes does it take for the pulse rate to return to normal after taking the drink?

(1)

.... minutes

(b) Name the organ that produces the pulse.

(1)

....

(c) Arteries carry blood away from the heart.
The diagram shows a cross-section of an artery.
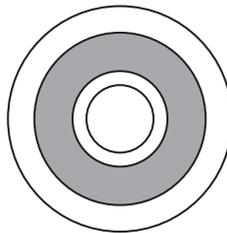
Explain how the structure of an artery is adapted to carry blood away from the heart.

(2)

....

....

....

....

(Total for Question 20 = 5 marks)

21 The diagram shows some sugar being dissolved in water to make a mixture of sugar and water.

Complete the sentence by using one word from the box.

solid	solution	solute	solvent

When all the sugar dissolves in water a .... is formed.

(Total for Question 21 = 1 mark)

22 The diagram shows a mechanical toy moving across the floor.
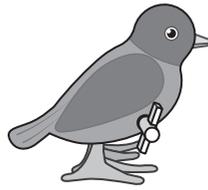
A teacher draws a Sankey diagram to show the energy transfers taking place as the mechanical toy moves.
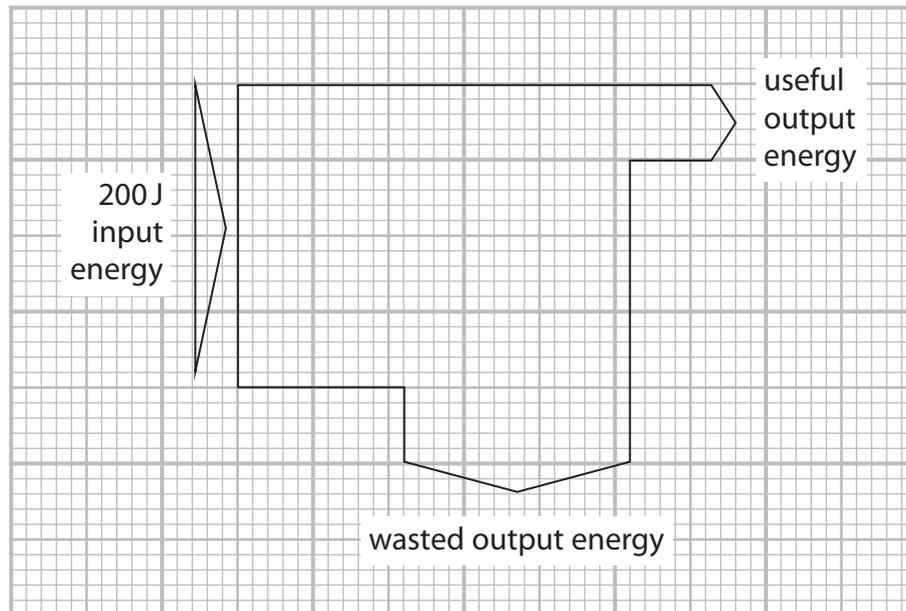
(a) (i) State the reason why the total output energy of the mechanical toy is 200 J.

(1)

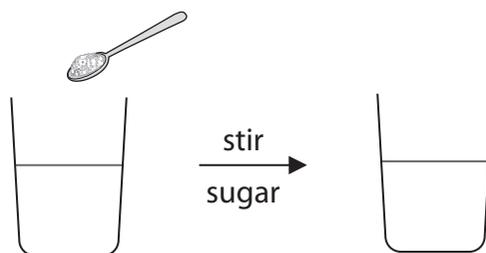...

....

(ii) The Sankey diagram has been drawn to scale.
Calculate the amount of useful energy output when the energy input is 200 J.

(1)

.... J

(Total for Question 22 = 2 marks)

23 Photosynthesis produces glucose in plants.

Complete the chemical equation for photosynthesis.

$$6\text{............} + \text{............}H_2O \rightarrow C_6H_{12}O_6 + 6\text{............}$$

carbon dioxide water   glucose oxygen

(Total for Question 23 = 2 marks)

24 A student places two beakers on a balance to measure their mass.
One beaker contains $25\,cm^3$ of solution A, the other beaker contains $25\,cm^3$ of solution B.
Both solutions are colourless.

The total mass of the beakers and the solutions is 165.5 g.

The student pours solution A into the beaker containing solution B.
There is a permanent colour change.

solution A   solution B

| 165.5g | | 165.5g |

mass before mixing solutions A and B   mass after mixing solutions A and B
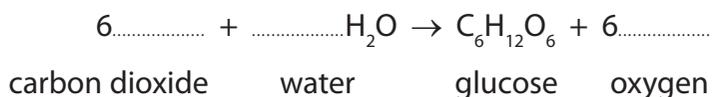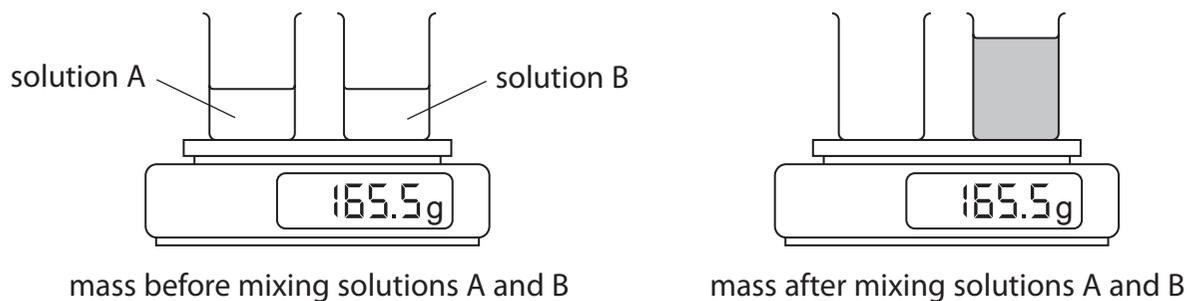
(a) State what happens to cause the permanent colour change after mixing solutions A and B.

(1)

....

....

(b) Explain why the reading on the balance does not change after mixing solutions A and B.

(2)

....

....

....

....

(Total for Question 24 = 3 marks)

Turn over ▶

25 The diagram shows an incident ray of light at the boundary between glass and air.

normal

incident ray

glass

air
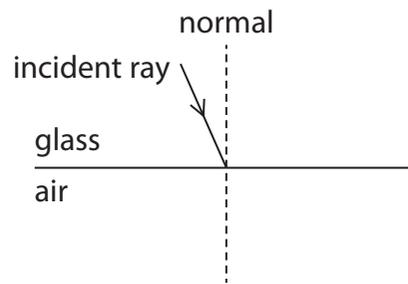
(a) What name is given to the change in direction of this incident ray as it moves from the glass to the air?

(1)

....

(b) Complete the ray diagram to show the direction the ray of light takes as it moves from glass to air.

(1)

glass

air

(Total for Question 25 = 2 marks)

26 The diagram shows a pie chart representing the percentages of four gases, W, X, Y and Z, found in dry air.

gas W 78%

gas X 21%

gas Z less than 0.1%　　gas Y 0.9%
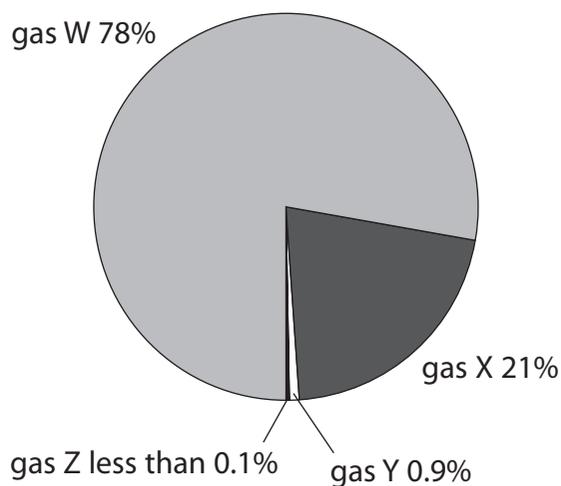
Which row of the table correctly identifies the four gases W, X, Y and Z?

	W	X	Y	Z
⊠ **A**	argon	carbon dioxide	oxygen	nitrogen
⊠ **B**	nitrogen	argon	carbon dioxide	oxygen
⊠ **C**	nitrogen	oxygen	argon	carbon dioxide
⊠ **D**	oxygen	nitrogen	carbon dioxide	argon

(Total for Question 26 = 1 mark)

27 The diagram shows an animal cell with two labels, Label 1 and Label 2.
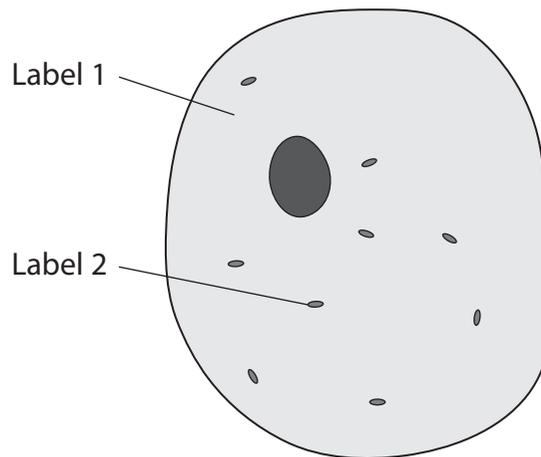
Label 1

Label 2

Which row of the table correctly completes Label 1 and Label 2?

	Label 1	Label 2
☒ **A**	cell membrane	cytoplasm
☒ **B**	cell membrane	nucleus
☒ **C**	cytoplasm	mitochondria
☒ **D**	mitochondria	nucleus

(Total for Question 27 = 1 mark)

28 A student uses the electrical circuit shown in the diagram to investigate electromagnetism.

copper rod

battery
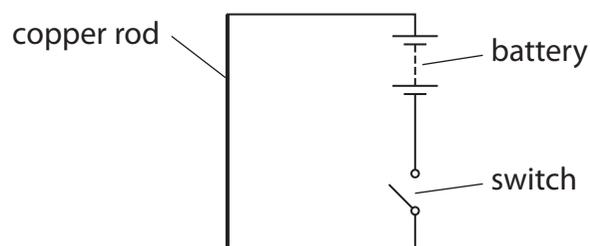
switch

What happens when the switch in the circuit is closed?

☒ **A**   a magnetic field is produced around the copper rod

☒ **B**   a magnetic field is produced by the copper rod

☒ **C**   a magnetic field is produced by the switch

☒ **D**   no magnetic field is produced

(Total for Question 28 = 1 mark)

29 Calcium metal reacts with oxygen to form calcium oxide, which is a white solid.

Which is the correct chemical equation for this reaction?

☒ **A** $Ca(s) + O_2(g) \rightarrow CaO(s)$

☒ **B** $2Ca(s) + O_2(s) \rightarrow 2CaO(g)$

☒ **C** $Ca(s) + O(g) \rightarrow CaO(s)$

☒ **D** $2Ca(s) + O_2(g) \rightarrow 2CaO(s)$

(Total for Question 29 = 1 mark)

30 The graph shows the number of microorganisms on an agar plate over a period of 36 hours.
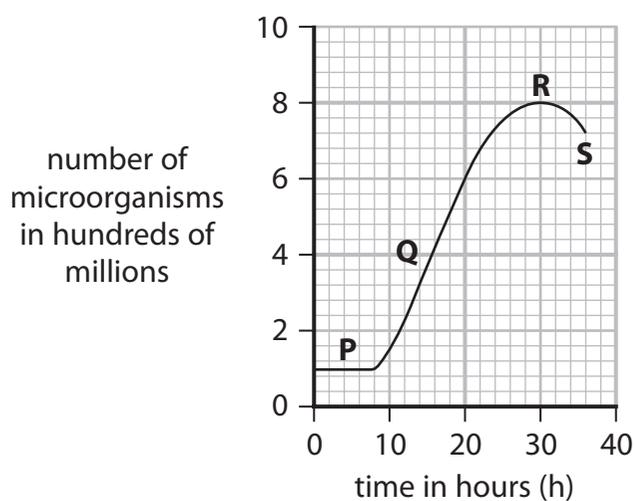
Where on the graph are the microorganisms reproducing fastest?

☒ **A** at P and Q

☒ **B** at Q only

☒ **C** at P and R

☒ **D** at S only

(Total for Question 30 = 1 mark)

31 A farmer measures the pH value of the soil in four different fields, A, B, C and D. The table shows the results.

Field	pH value of the soil
A	4.0
B	6.5
C	7.0
D	7.5

(a) Use information from the table to complete the following sentence.

The field with the most acidic soil has a pH value of ....

(1)

(b) State what the farmer should do to neutralise the soil in this field.

(1)

....

(Total for Question 31 = 2 marks)

32 Light is an example of a resource that plants compete for in order to survive.

Give **one** other resource that plants compete for in order to survive.

....

(Total for Question 32 = 1 mark)

33 The diagram shows apparatus that can be used to investigate the thermal decomposition of copper carbonate.
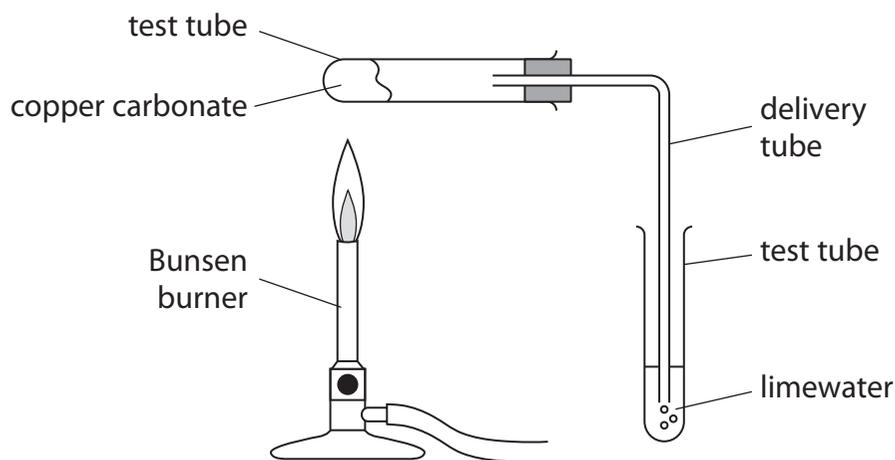
(a) State what happens to the limewater during the reaction.

(1)

....

(b) Complete the word equation for the thermal decomposition of copper carbonate.

(1)

copper carbonate → .... + ...

(Total for Question 33 = 2 marks)

P 6 5 0 4 9 A 0 2 5 4 0

34 The diagram shows two magnets, A and B.

S	N

Magnet A

S	N
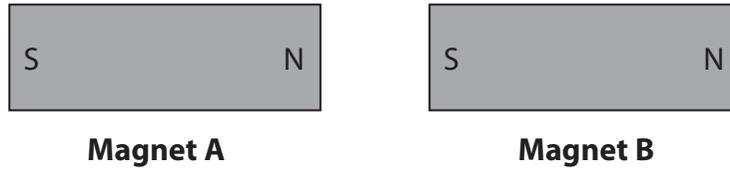
Magnet B

Complete the sentence by using one phrase from the box.

a force of attraction	a contact force	no force	a force of repulsion

There will be .... between Magnet A and Magnet B.

(Total for Question 34 = 1 mark)

35 Pathogens can cause disease in humans.

Draw **one** straight line from each disease to the correct pathogen causing the disease.

disease   **pathogen causing the disease**

| malaria | | fungus |

| athlete's foot | | virus |

| cholera | | protoctist |

| flu | | bacteria |

(Total for Question 35 = 2 marks)

P 6 5 0 4 9 A 0 2 7 4 0

36 Calcium carbonate reacts with dilute hydrochloric acid.

A student investigates the effect of the temperature of the acid on the time it takes for the reaction to end.

The table shows the student's results.

Temperature in °C	Time for reaction to end in seconds (s)
20	240.0
25	150.0
30	120.0
35	75.0
40	60.0
45	37.5

Describe the relationship between the temperature of the acid and the time it takes for the reaction to end.

....

....

....

....

(Total for Question 36 = 2 marks)

37 The diagram shows an electric circuit.
Four components in the circuit are labelled W, X, Y and Z.
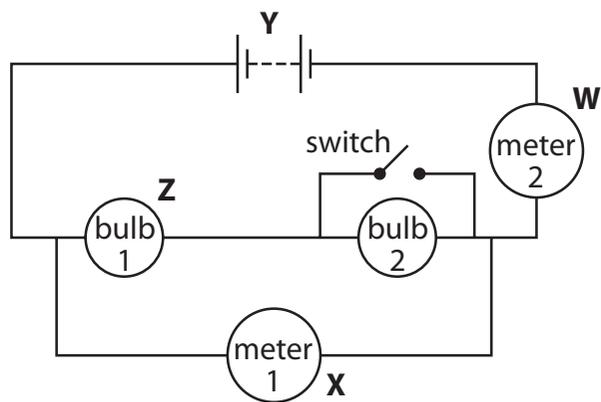
(a) (i) Give the letter of the part of the circuit that provides the potential difference in the circuit.

(1)

....

(ii) The potential difference across bulbs 1 and 2 together is 12 V.
The total resistance of bulbs 1 and 2 is 10 Ω.

Calculate the current in the circuit. You must include the correct unit.

(2)

Use the relationship current $= \dfrac{\text{voltage}}{\text{resistance}}$

current = ... unit ....

(b) Explain what happens to the current in the circuit when the switch is closed.

(2)

....

....

....

....

(Total for Question 37 = 5 marks)

TOTAL FOR SECTION A = 60 MARKS

38 Penguins are animals that live in very cold conditions.
The diagram shows penguins huddling together.
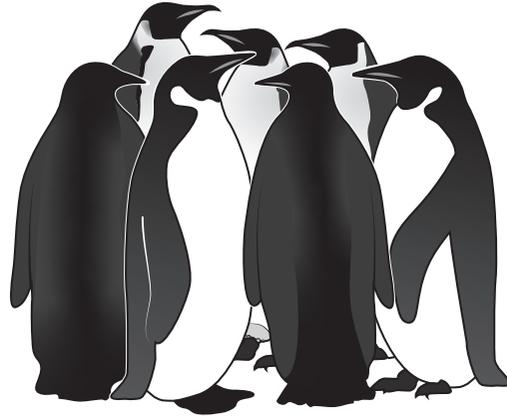
A student investigates if penguins huddling together is an adaptation for living in cold conditions.

The diagram shows the equipment the student uses.
Each test tube represents a penguin.
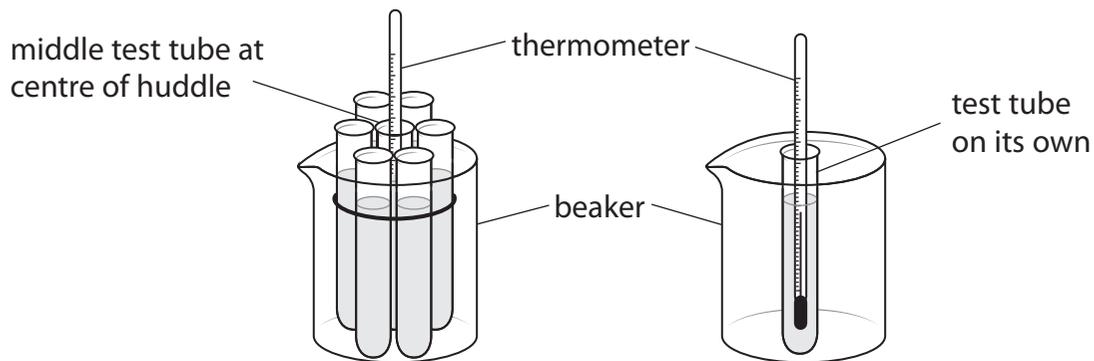
The student's investigation involves the following five steps.
They are not in the correct order.

A   place thermometers in the water of the middle test tube of the seven test tubes and in the single test tube on its own

B   use a rubber band to hold the seven test tubes together

C   record the temperature readings of both thermometers every 2 minutes for 10 minutes

D   pour the same volume of hot water into each test tube

E   place the seven empty test tubes in one beaker and place the single empty test tube in the other beaker

(a) Complete the flow chart by putting the steps for this investigation in the correct order.
The first step has been done for you.

(2)

B	→		→		→		→	

(b) The table shows the student's results.

Time in minutes	Temperature of water in centre test tube of huddle in °C	Temperature of water in single test tube in °C
0	76	76
2	67	61
4	64	57
6	63	54
8	61	49
10	60	45

The student uses his results to produce this graph.
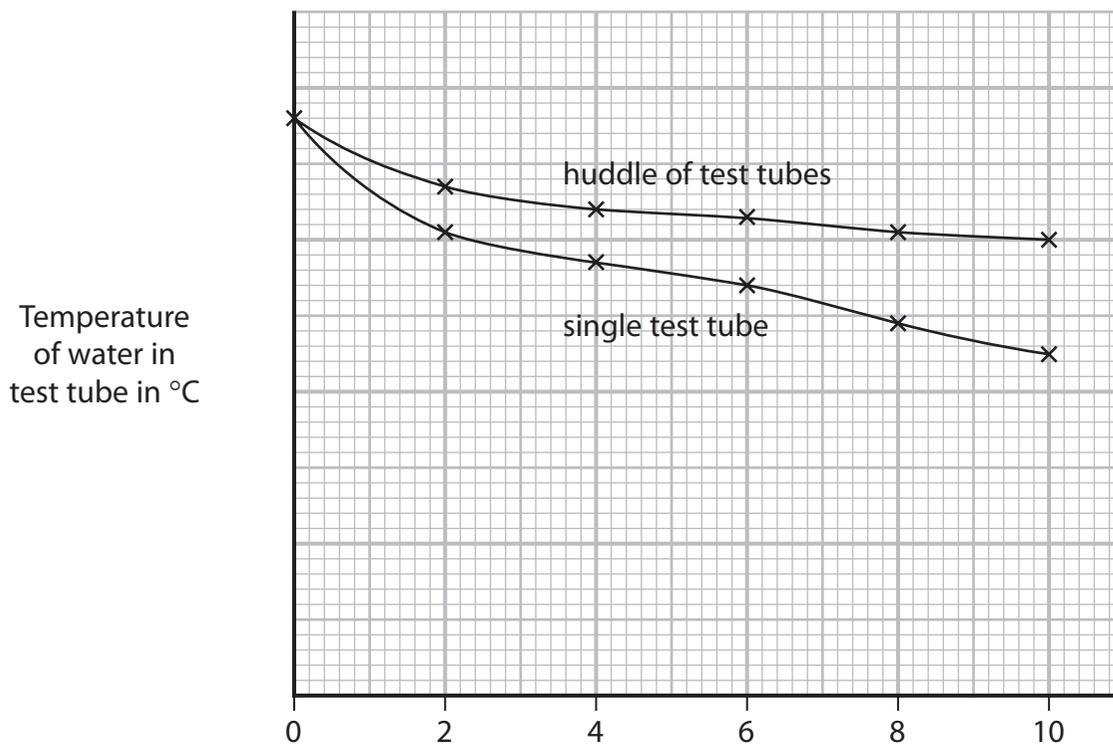
(i) The student has **not** put the scale on the 'temperature of water' axis.

Complete the graph by adding the scale.

(1)

(ii) The student has not labelled the other axis on the graph.

Give the label for this axis.

(1)

....

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DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(iii) Before conducting the investigation, the student makes this prediction:

A penguin at the centre of a huddle will be hotter compared to a penguin on its own when left for the same amount of time.

Give **one** reason why the results support the student's prediction.

(1)

....

....

(iv) In the investigation there is an independent variable and a dependent variable.

Draw **one** straight line from the type of variable to the description of the variable.

(1)

type of variable   **description of variable**

single or huddled test tube

independent variable   the starting temperature of the water

the temperature every 2 minutes

dependent variable   the size of the test tubes

the volume of water in each test tube

(Total for Question 38 = 6 marks)

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

39 A student investigates the effect of temperature on the solubility of a solid. She is given a small glass bottle containing the solid.
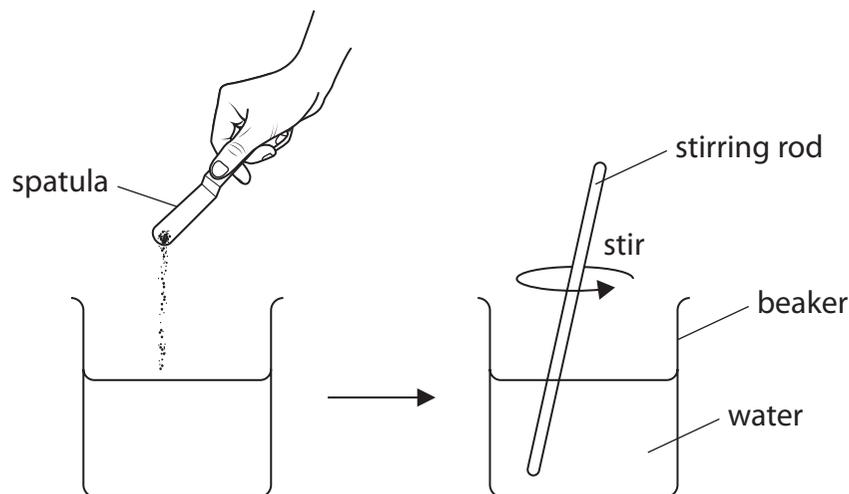
This is the student's method:

- measure 100 cm³ of water and pour it into a beaker
- heat the water until it reaches 30 °C
- measure the total mass of the glass bottle and solid
- use a spatula to add some solid from the bottle to the water, a little at a time, and stir until no more dissolves
- measure the mass of the bottle and the solid left in it
- calculate the mass of the solid that has been dissolved in the water
- repeat the method using temperatures of 40 °C, 50 °C, 60 °C, 70 °C and 80 °C

(a) (i) Name the apparatus that the student should use to measure 100 cm³ of water.

(1)

....

(ii) Explain why the volume of the water used each time is always 100 cm³.

(2)

....

....

....

....

(iii) The table shows some possible safety control measures when handling hot liquids.

Complete the table by placing a tick (✓) in the correct column beside each statement to show if it is suitable or is not suitable for handling hot liquids.

(1)

Safety control measure	Suitable	Not suitable
wear heat resistant gloves		
label the hot water container 'corrosive'		
place equipment away from the edge of the bench		
stand up to pour the hot water		

(b) The student uses her results to produce this graph, showing the maximum mass of solid that dissolves in 100 cm³ of water at the different temperatures.
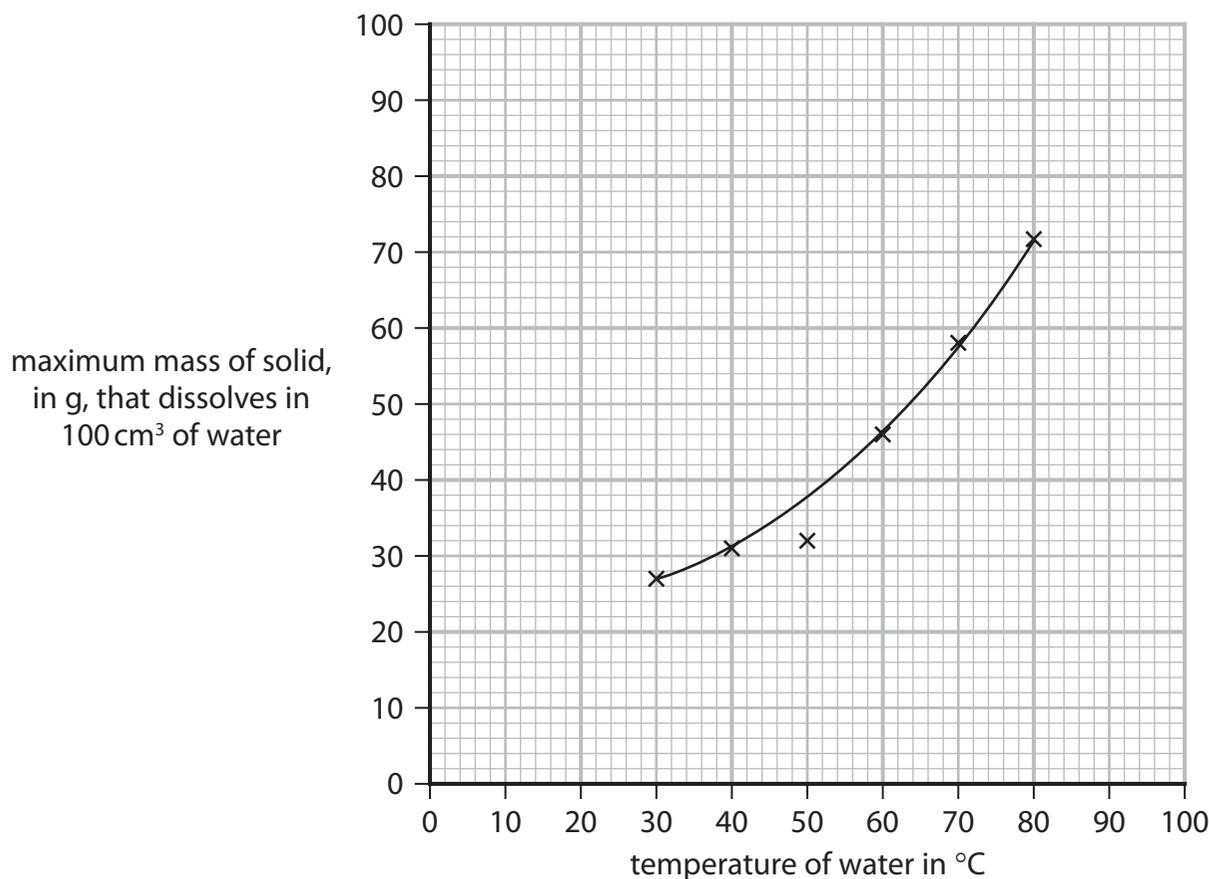
The result at 50 °C is anomalous.

State **one** mistake the student could have made when doing her investigation that could cause this anomalous result.

(1)

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....

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(c) The graph shows the maximum masses of three different solids, A, B and C, that dissolve in 100 cm³ of water at different temperatures.
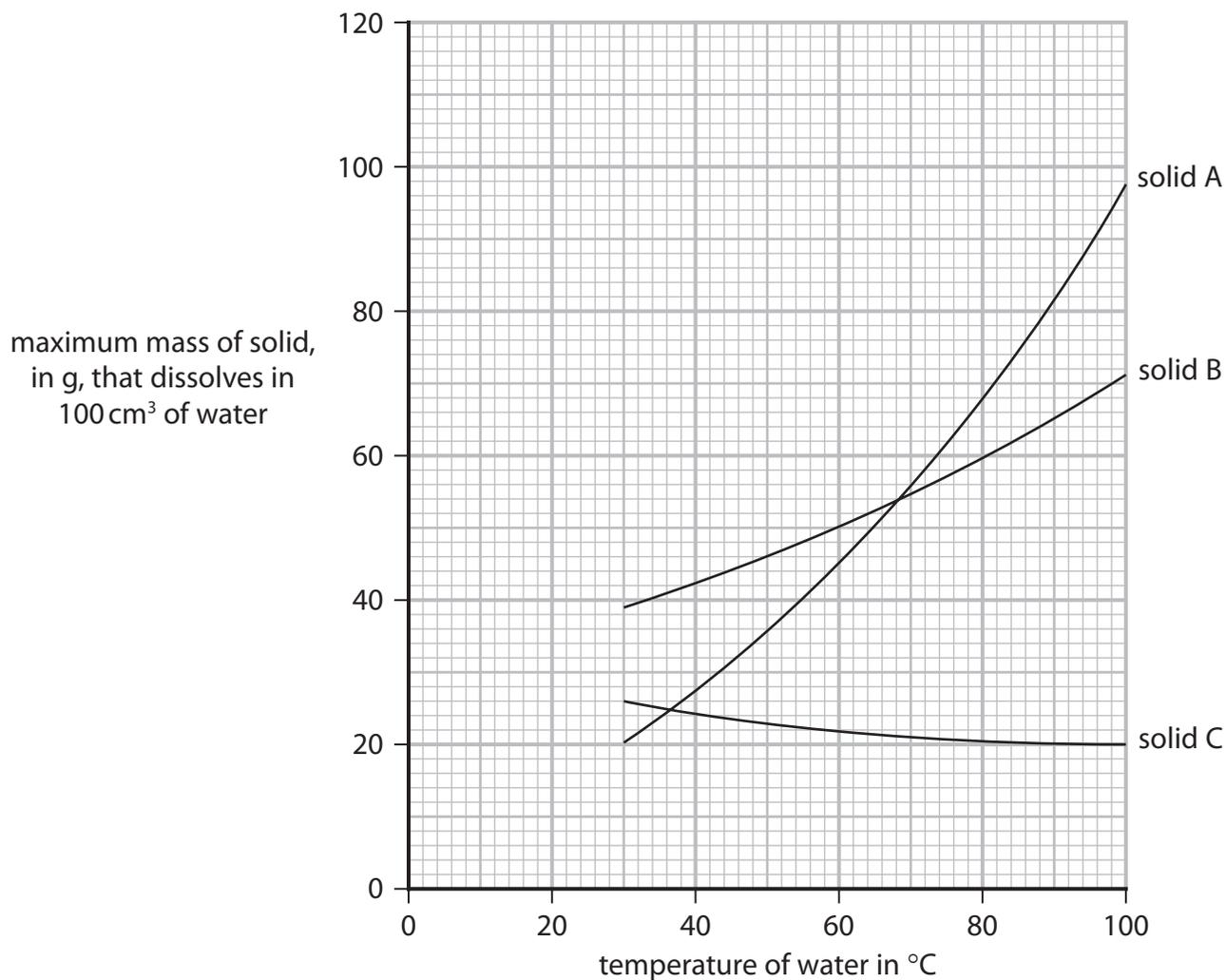
(i) State the temperature at which the maximum mass of solid A and the maximum mass of solid B that dissolve in 100 cm³ of water are the same.

(1)

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(ii) What conclusion can be made about the solubility of solid C?

(2)

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(Total for Question 39 = 8 marks)
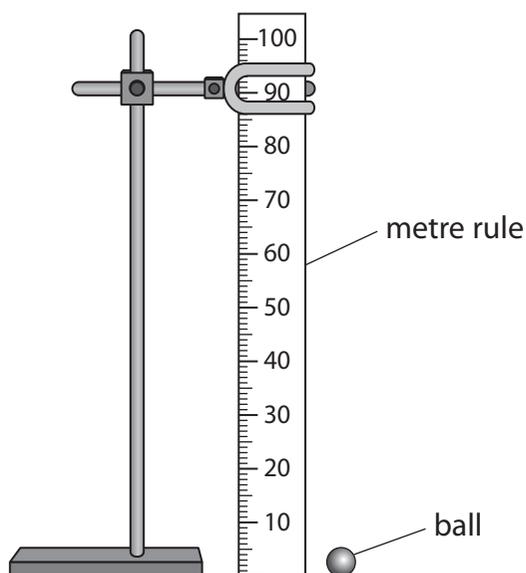
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P 6 5 0 4 9 A 0 3 7 4 0

40 A student investigates the scientific question:

How does the height from which a ball is dropped affect the height that the ball bounces?

The diagram shows the apparatus the student uses.

This is the student's method:

● drop the ball from a height of 20 cm

● measure the height that the ball bounces

● repeat two more times, from the same height

● calculate the average height that the ball bounces

The student repeats the method from heights of 40 cm, 60 cm, 80 cm and 100 cm.

The table shows the student's results.

| Drop height in cm | Bounce height in cm | | | |
	Test 1	Test 2	Test 3	Average
20	4.5	5.0	5.5	5.0
40	5.5	6.5	2.0	6.0
60	7.0	8.0	7.5	7.5
80	9.5	8.5	9.0	9.0
100	10.5	11.5	11.0	....

(a) (i) Complete the table by calculating the average bounce height for the 100 cm drop height.

(1)

(ii) Explain why the student calculates the average bounce height value for the 40 cm drop to be 6.0 cm.

(3)

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....

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....

(b) State **one** other variable that could affect the bounce height of the ball.

(1)

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(c) State the change the student should make to the metre rule in order to improve the results.

(1)

....

(Total for Question 40 = 6 marks)

TOTAL FOR SECTION B = 20 MARKS
TOTAL FOR PAPER = 80 MARKS

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