ST EDWARD'S
OXFORD

13+ Entrance Assessment
2013-14

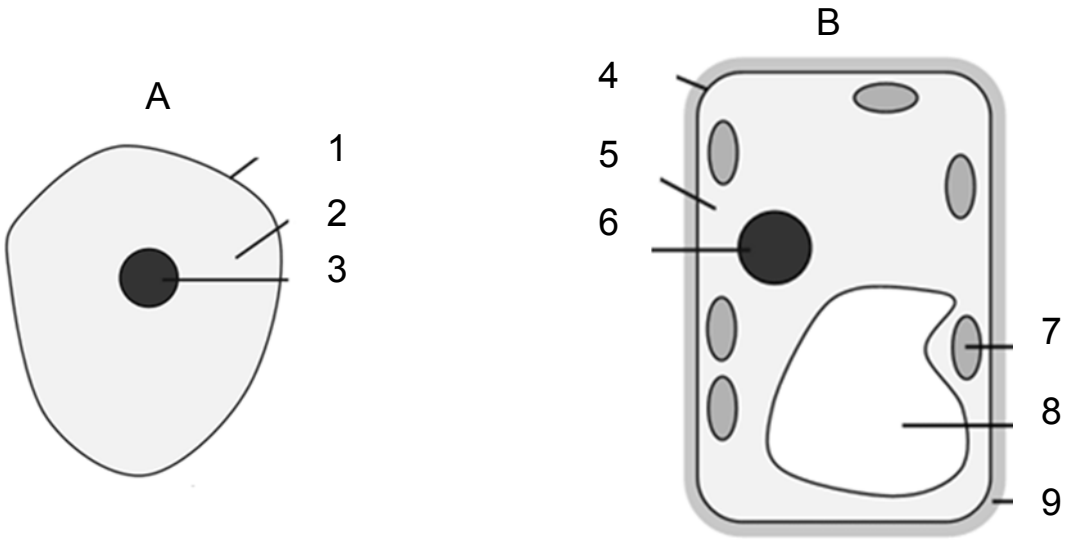
SCIENCE

1 Hour

Candidate Name _____

Question 1:

(a) The diagram below shows two different cells. Complete the table below with the names of the numbered structures.



1		4	
2		5	
3		6	
		7	
		8	
		9	

9 marks

(b) Identify each cell type and give a reason for your answer:

Cell A:……..

Reason:…….

1 mark

Cell B: ……

Reason:…….

1 mark

(Total = 11 marks)

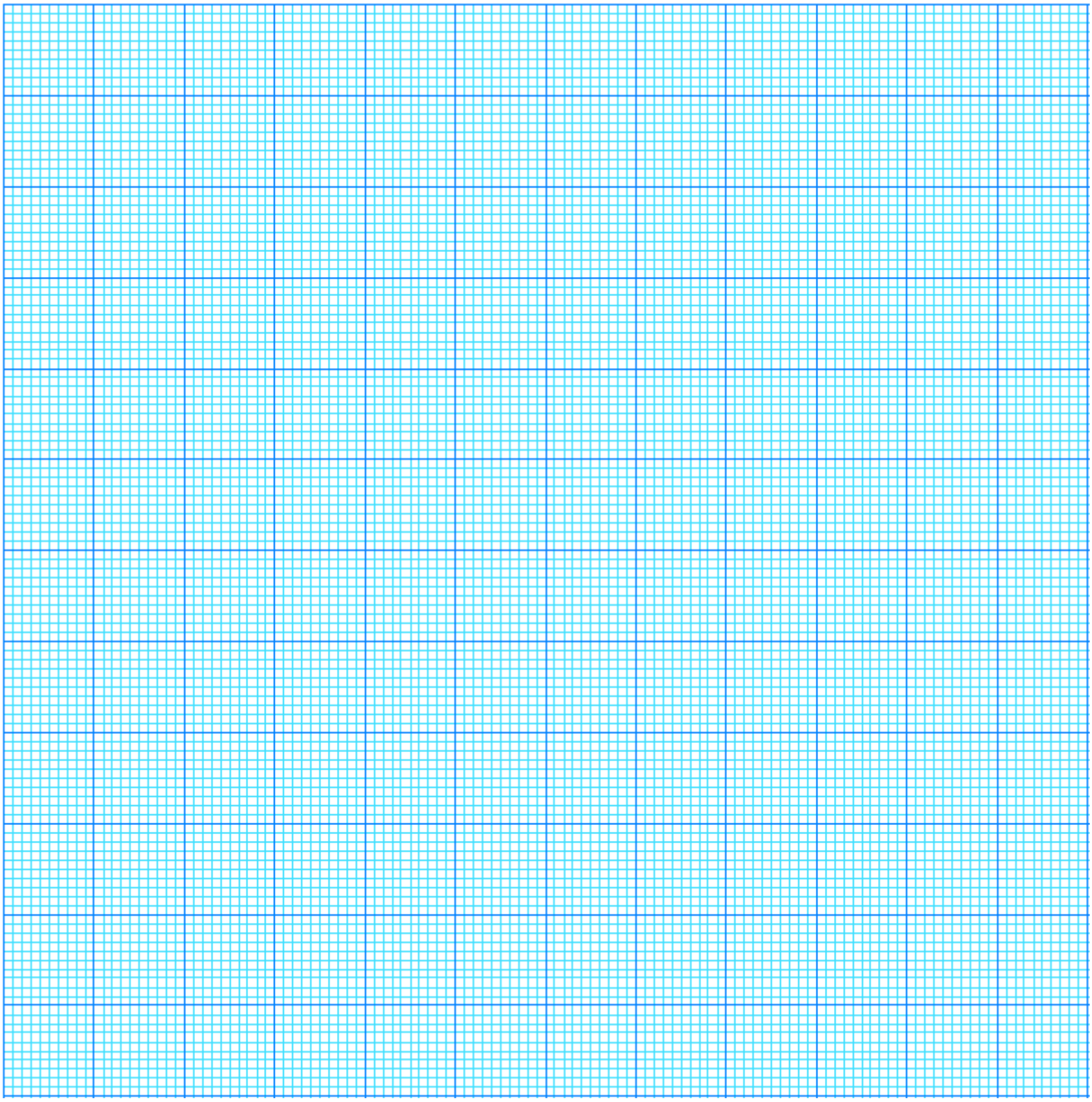
Question 2:

Enzymes are found in the human digestive system where they break large molecules down into smaller molecules. Some students investigated how changing the concentration of an enzyme called neutrase affected how quickly a milk solution changed from opaque to clear. They took their measurements twice and calculated an average. Their data is in the table below:

Concentration of neutrase/%	**Time taken for milk to clear/seconds**		
	Trial 1	**Trial 2**	**Average**
5	54	58	**56**
4	68	72	**70**
3	82	86	**84**
2	97	103	**100**
1	117	119	**118**

(a) Plot a graph to show the outcome of this investigation on the graph paper provided overleaf. The concentration of neutrase should be on the x-axis and the <u>average</u> time taken for the milk to clear should be on the y-axis. Remember to use as much of the graph paper as possible.

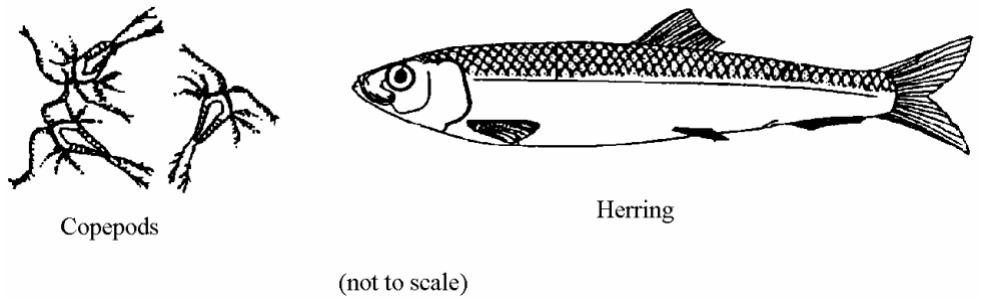
5 marks



(Total = 5 marks)

Question 3.

Copepods are tiny animals which live in the sea.



During the day they live deep down near the sea bed.
At night they move up to the surface where they feed on tiny plants.
When the sun rises they move down to the bottom again.

(a) Suggest why the tiny **plants** live near the surface of the sea.

.....

.....

2 marks

(b) Herring feed on copepods.

Where will herring be found during the day? Give a reason for your answer.

.....

.....

.....

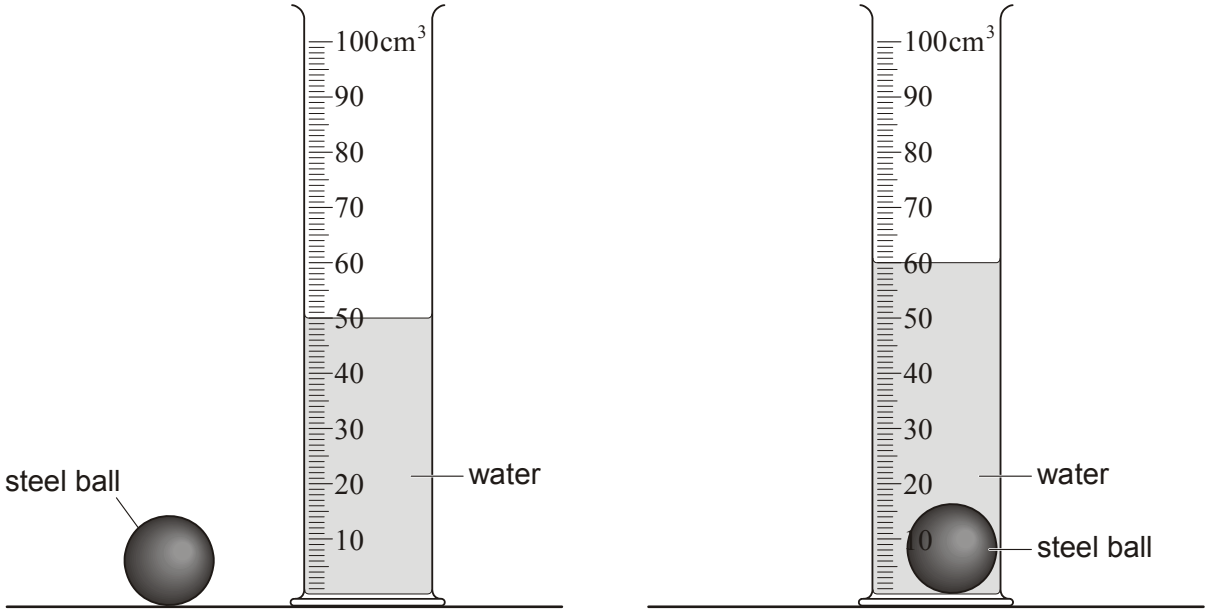
2 marks

(Total 4 marks)

END OF BIOLOGY QUESTIONS

Physics

1. (a) Gary poured 50 cm^3 of water into a measuring cylinder.
He then put a steel ball into the measuring cylinder.



(i) What is the new reading on the measuring cylinder?

..... cm^3

1 mark

(ii) What is the volume of the steel ball?

..... cm^3

1 mark

(b) The table below shows the mass and volume of four objects.

object	mass (g)	volume (cm^3)
aluminium figure	230	85
lead weight	800	70
steel block	200	25
wood puzzle	400	500

(i) Which object is the heaviest? .....

1 mark

(ii) Which object takes up the most space? .....

1 mark

(c) The frame of a bike is made of aluminium.



(i) Give **one** reason why aluminium is a suitable material for the frame.

.....

.....

1 mark

(ii) A force between the tyres and the road stops the bike skidding.

What is the name of this force?

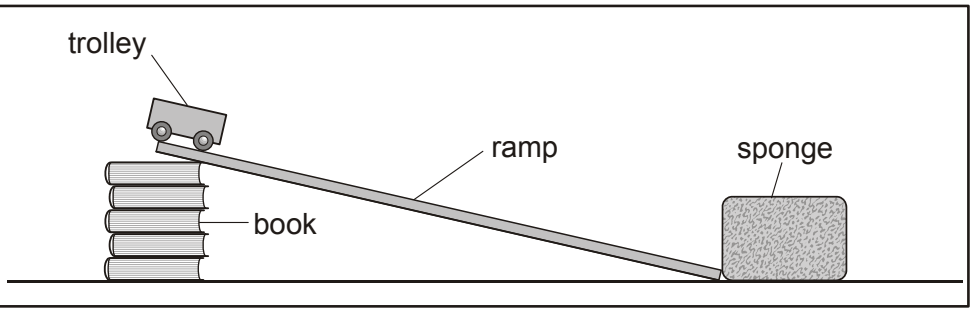
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1 mark
maximum 6 marks

2. Yasmin investigated the stopping distance of a trolley.

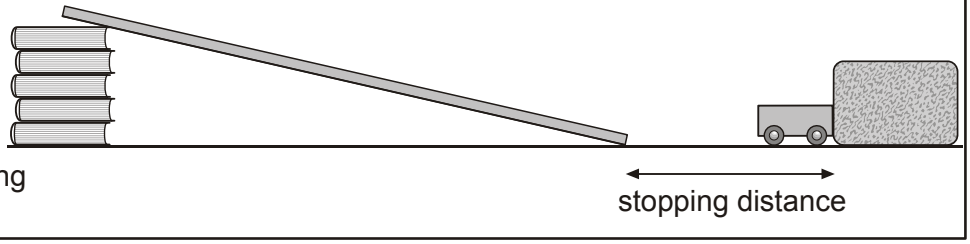
She let go of the trolley.

It hit a sponge at the bottom of the ramp.



She measured how far the sponge moved.

This is the stopping distance.



(a) Yasmin did the investigation five times.
She changed the steepness of the ramp each time.

(i) How could she make this ramp steeper?

.....

.....

1 mark

(ii) Yasmin's results are shown in the table.

steepness of ramp	stopping distance (cm)
A	10
B	16
C	16
D	28
E	34

She predicted, 'The steeper the ramp, the greater the stopping distance'.
If Yasmin was correct, which ramp was the steepest? Write the letter.

.....

1 mark

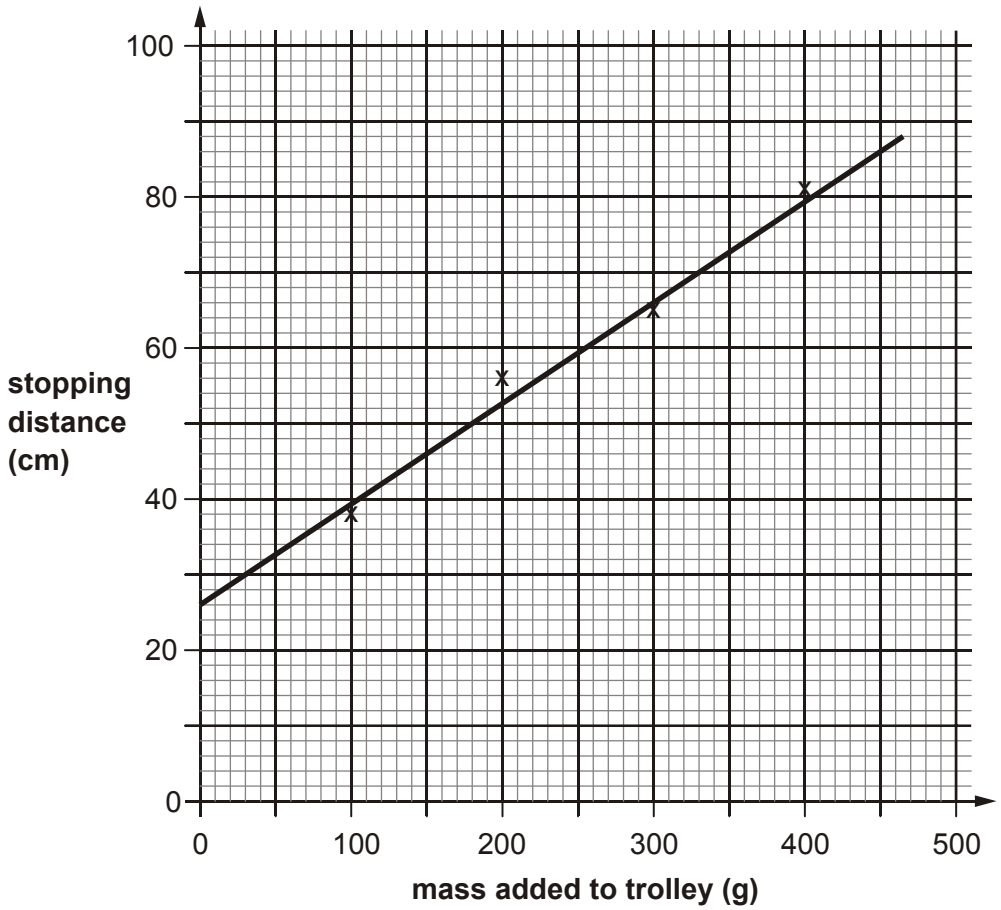
(iii) Yasmin looked at her results and decided she should repeat her investigation.
Look at Yasmin's results.

Suggest why she decided to repeat her investigation.

.....

1 mark

(b) Yasmin then investigated the stopping distance of a trolley with different masses on it.
The graph shows her results.



(i) What would be the stopping distance if 0 g were on the trolley?

..... cm

1 mark

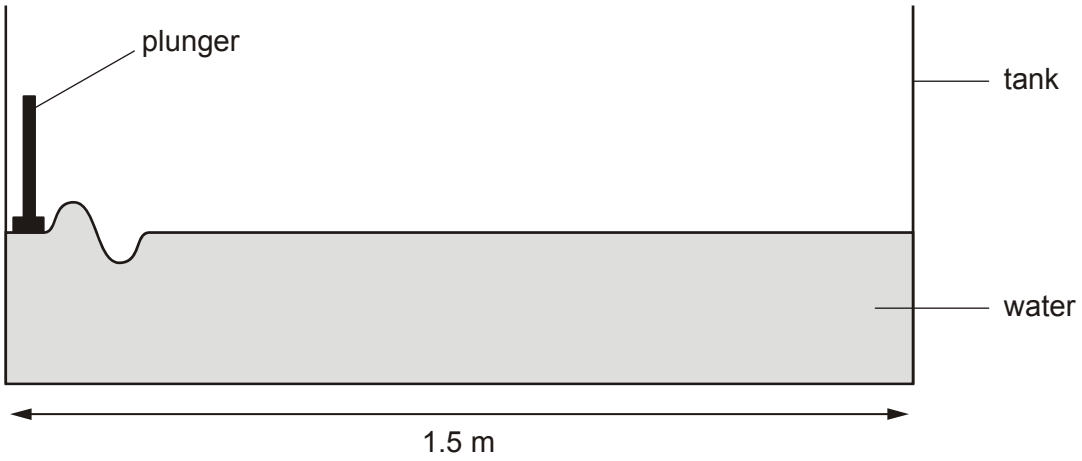
(ii) Complete the sentence with **decreases**, **increases** or **stays the same**.

As the mass added to the trolley increases,

the stopping distance ..... .

1 mark
maximum 5 marks

3. (a) Satish poured some water into a long tank in the school laboratory.
He used a plunger at one end to make a wave.



not to scale

(i) The wave travelled to the other end of the tank.
The speed of the wave was 2 m/s.

How long did the wave take to travel to the other end?

.....

..... s

1 mark

(ii) Satish investigated how the depth of water in his tank affected the speed of the waves.
Write a plan to show how he could do this.

.....

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.....

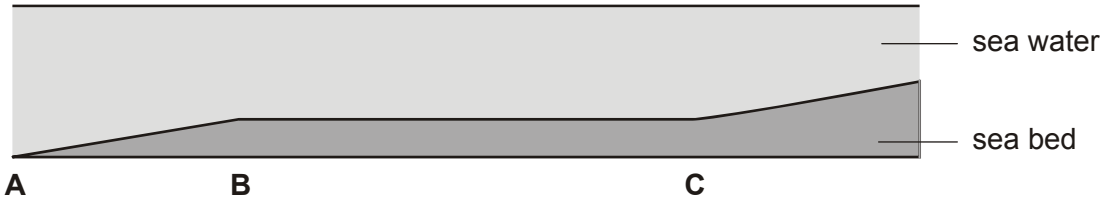
.....

3 marks

(b) Satish found the following information about waves in the sea.

depth of sea water (m)	speed of wave (m/s)
10	9.9
20	14.0
30	17.2
40	19.8

The diagram below shows how the depth of sea water changes.



Use the information in the table above to help you describe the speed of a wave as it travels from **A to B** and from **B to C**.

A to B .....

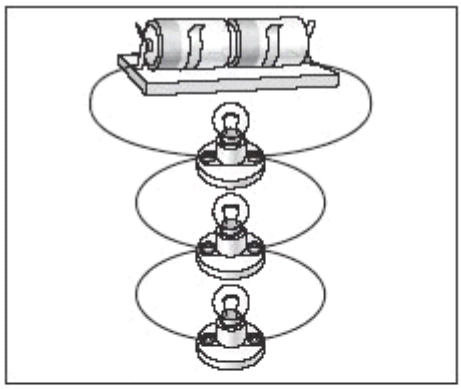
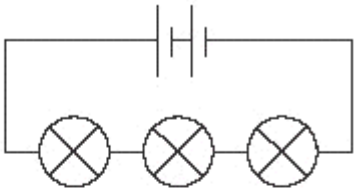
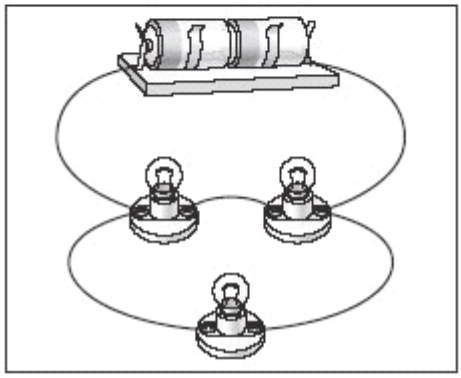
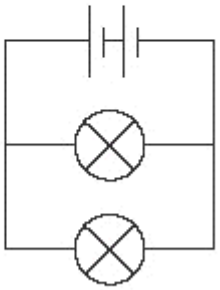
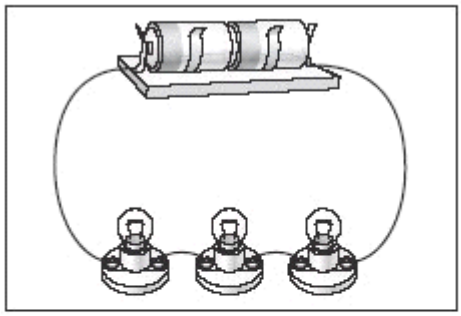
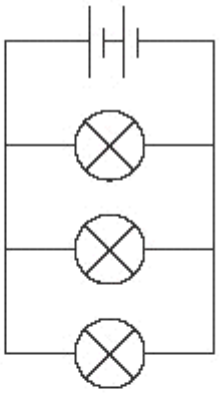
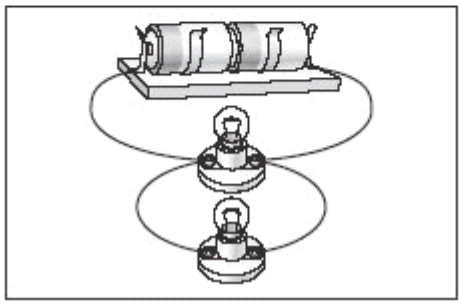
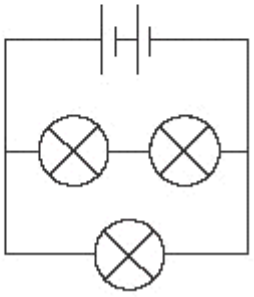
1 mark

B to C .....

1 mark

maximum 6 marks

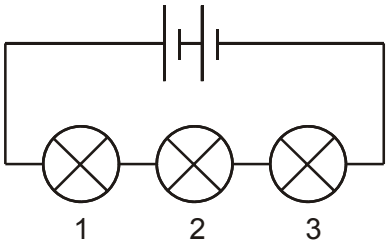
4. (a) Draw a line from each electrical circuit to the correct circuit diagram.
Draw only **four** lines.

electrical circuit	**circuit diagram**
	
	
	
	

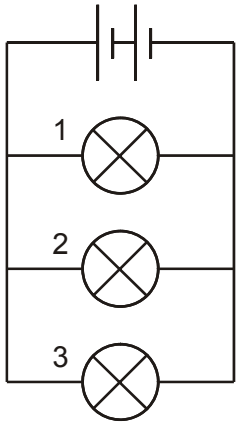
2 marks

(b) In each circuit below, **bulb 1 breaks** and goes off.

Under each circuit diagram below, tick the correct boxes to show if bulb 2 and bulb 3 are **on** or **off**.



circuit A



circuit B

	on	off
bulb 1 breaks		✓
bulb 2		
bulb 3		

	on	off
bulb 1 breaks		✓
bulb 2		
bulb 3		

2 marks

(c) Give the name of the part that provides energy for each circuit.

.....

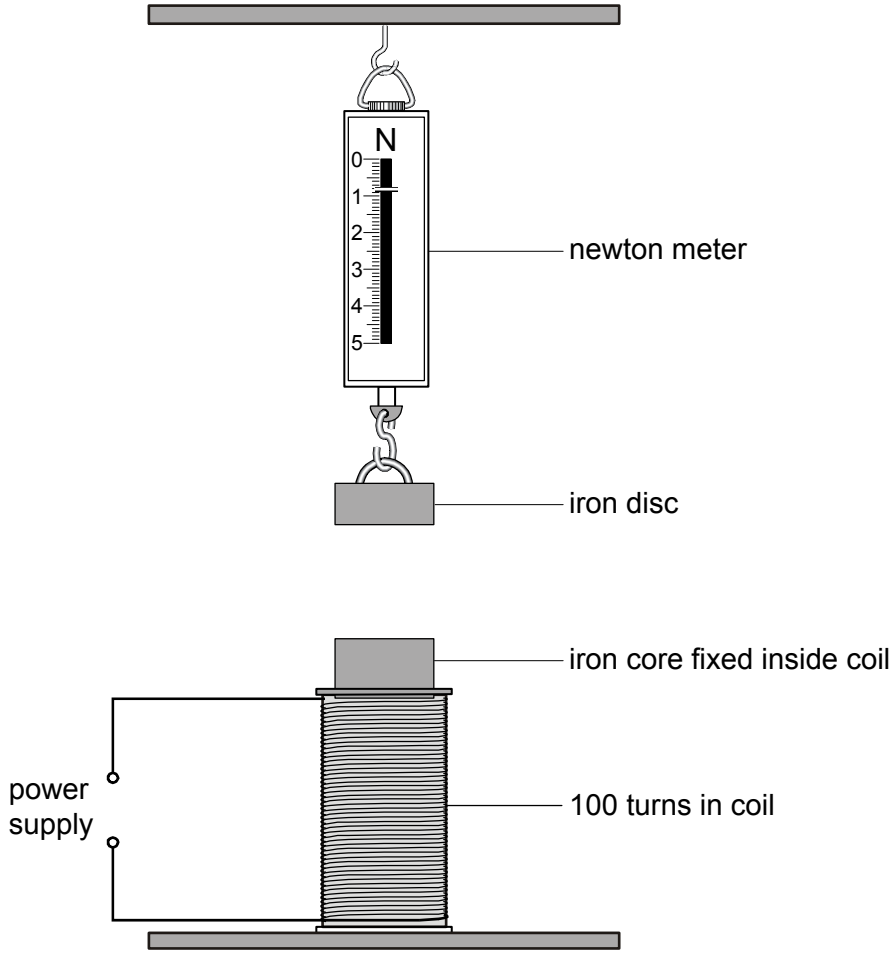
1 mark

(d) Why is copper used for wires in a circuit?
Tick the correct box.

Copper does **not** stick to a magnet.	☐	Copper is a good conductor of electricity.	☐
Copper is a brown metal.	☐	Copper is a good conductor of heat.	☐

1 mark
maximum 6 marks

5. Mary used the apparatus below to test the strength of an electromagnet.
She used the reading on the newton meter to measure the force of the magnet on the iron disc.



(a) Explain why the reading on the newton meter increases when a current passes through the coil.

.....

.....

.....

.....

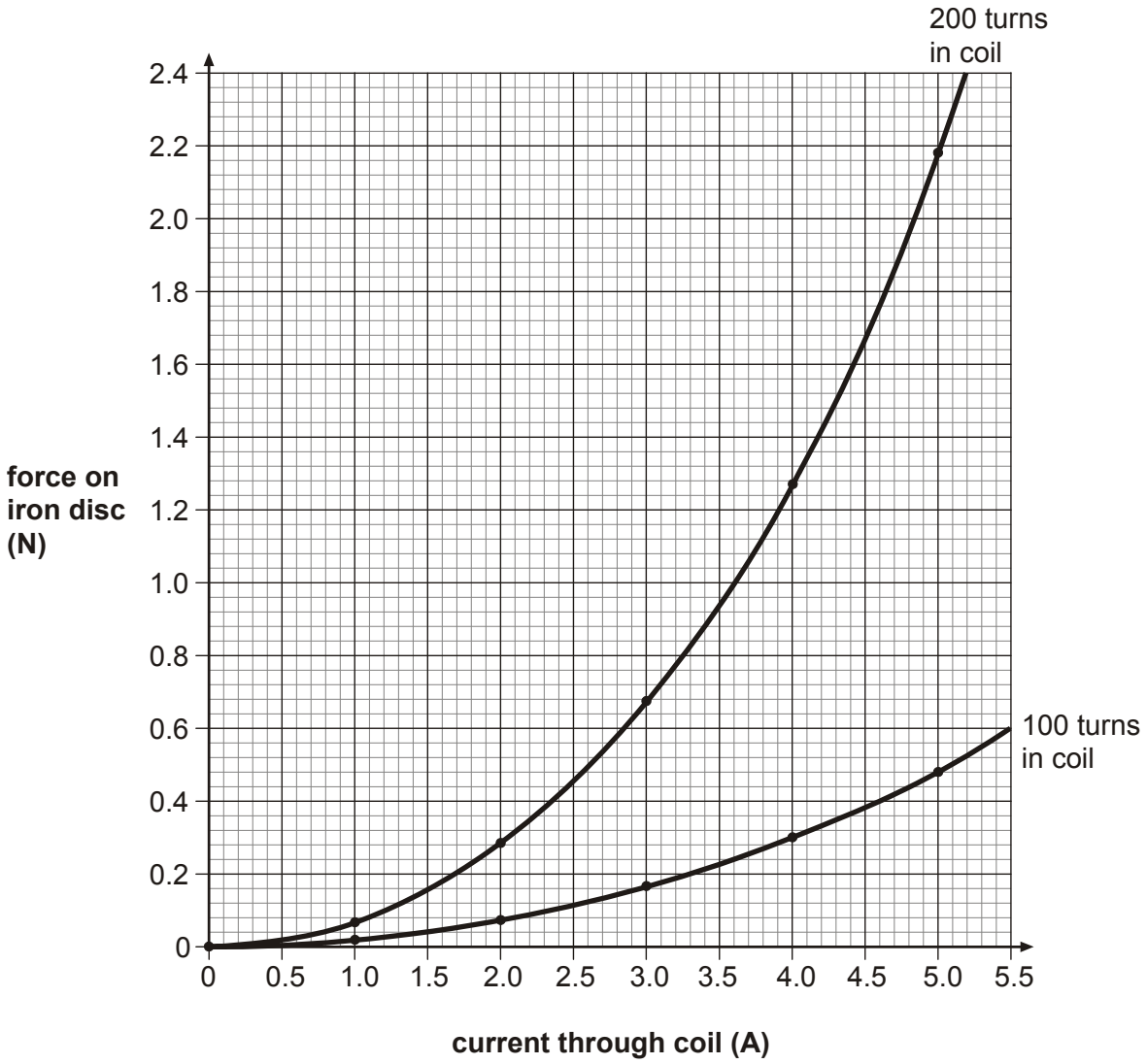
2 marks

(b) When a current passes through the coil, some of the electrical energy is changed to thermal energy.
What would happen to the coil if the current passing through it was too large?

.....

1 mark

(c) Mary made two electromagnets, one with 100 turns of wire in the coil and one with 200 turns.
She varied the current through the coil of each electromagnet.
She measured the force of each electromagnet on the iron disc.
The graph shows her results.



Write **two** conclusions that Mary could make from these results.

1. .....

.....

2. .....

.....

2 marks
maximum 5 marks

End of Physics Questions

Chemistry

1. Paul had four substances:

citric acid	copper sulphate	indigestion tablet	sugar

He dissolved 1 g of each substance in 20 cm^3 of distilled water.
He used universal indicator to find the pH of each solution.

(a) (i) Sugar solution does **not** change the colour of green universal indicator.

What does this tell you about sugar solution?
Tick the correct box.

It is an acid.	☐	It is an alkali.	☐
It is neutral.	☐	It is sweet.	☐

1 mark

(ii) Suggest the pH of citric acid.

.....

1 mark

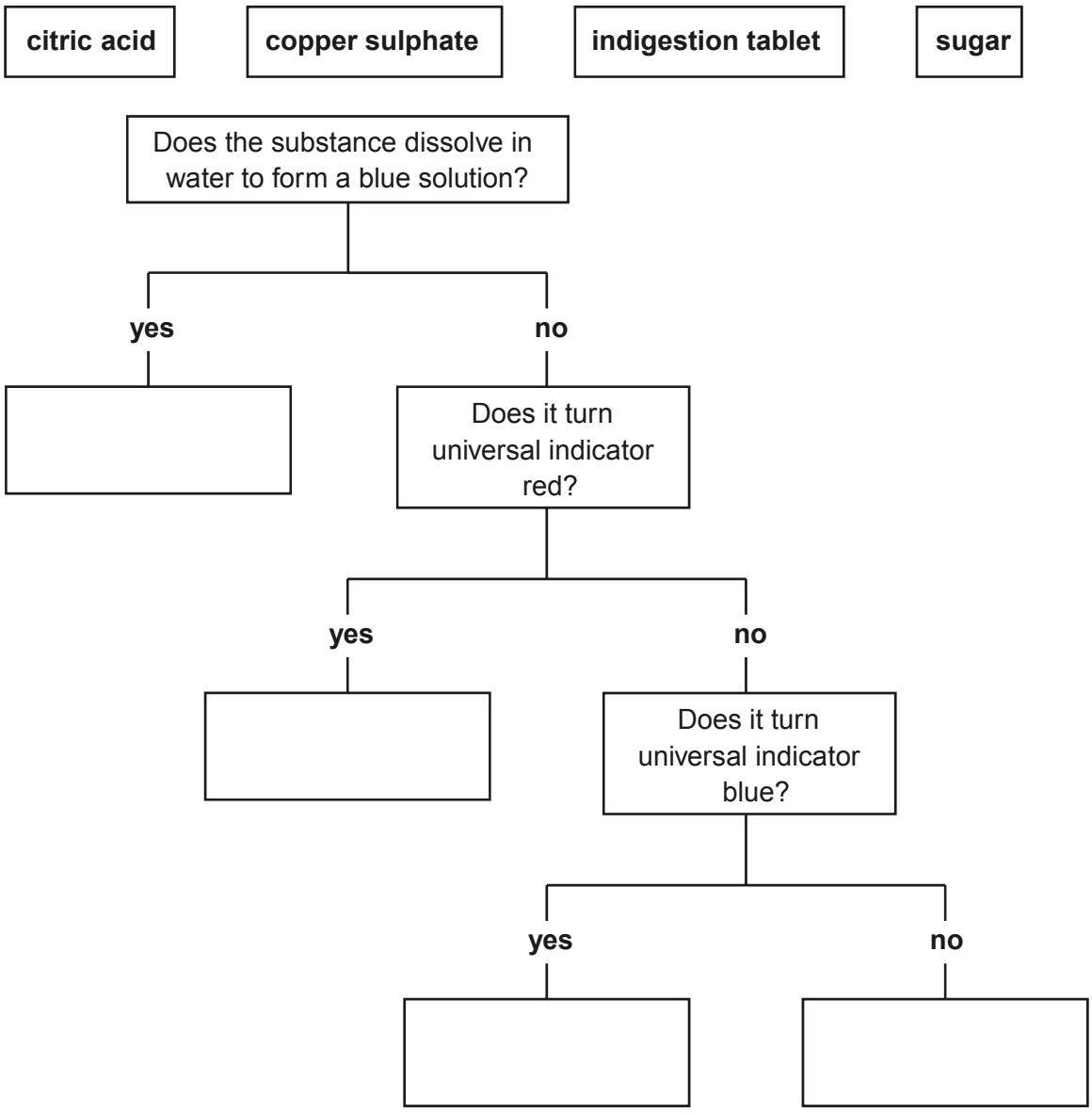
(iii) Indigestion tablets neutralise acid in the stomach.

What does this tell you about indigestion tablets?

.....

1 mark

(b) Complete the flow chart below with the names of the substances in the boxes.



3 marks
maximum 6 marks

2. Two groups of pupils investigated the factors affecting the time taken for an indigestion tablet to dissolve in 100 cm^3 of water.



Group 1 recorded their results in the table below.

results of group 1

tablet	time taken to dissolve (s)
whole tablet	34
broken tablet	28
finely crushed tablet	22

(a) What factor did group 1 change as they carried out their investigation?

.....

1 mark

(b) Before the investigation, group 1 made a prediction.
They found this prediction was supported by the results in the table.

What prediction did group 1 make?

.....

.....

1 mark

(c) Group 2 investigated how the temperature of the water affects the time taken for a whole tablet to dissolve.

Here are their results.

results of group 2

temperature of water (°C)	time taken to dissolve (s)
65	24
40	35
15	90
5	100

What factor did group 2 change as they carried out their investigation?

.....

.....

1 mark

(d) What pattern do the results recorded by group 2 show?

.....

.....

1 mark

(e) Look at the results presented by group 1 and group 2.

Both groups used the same type of tablet.

Estimate the temperature of water used by group 1.

.....°C

1 mark

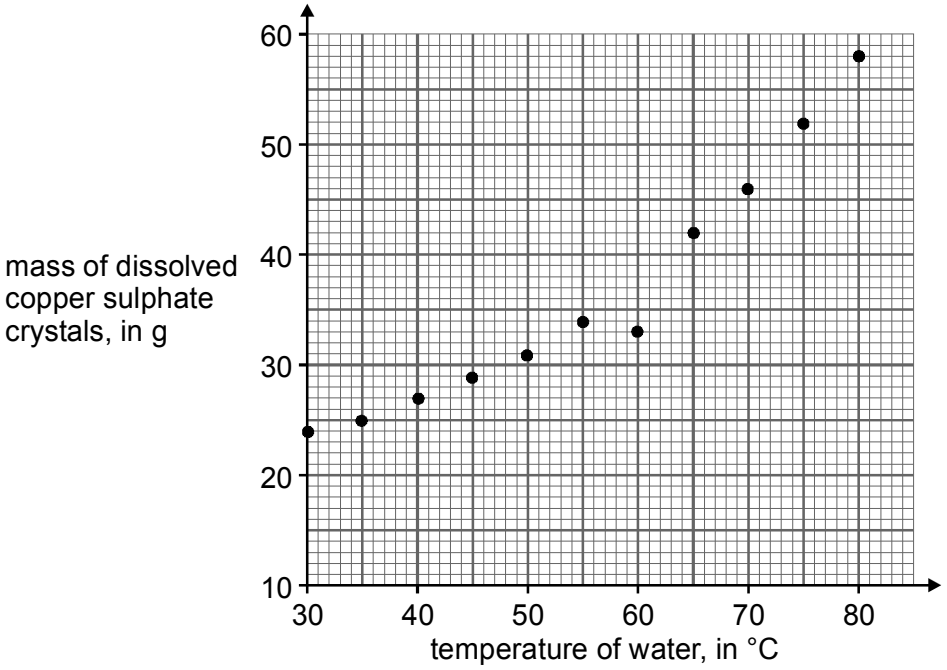
maximum 5 marks

3. Sarah and Jim investigated the effect of temperature on the solubility of copper sulphate.

They dissolved copper sulphate crystals in the same volume of water until **no** more would dissolve. This means the solution was saturated.
They measured the mass of copper sulphate needed to make a saturated solution using water at different temperatures.



They plotted their results on a grid.



(a) (i) One of the mass readings appears to be wrong (anomalous).

Circle the anomalous result on the graph.

1 mark

(ii) Draw a smooth curve of best fit on the graph.

1 mark

(iii) Use the graph to predict a more likely measurement of mass for the anomalous result.

..... g

1 mark

(b) Suggest **one** mistake Sarah might have made to produce this anomalous result.

.....

.....

1 mark

Maximum 4 marks

4. The elements in group 7 of the periodic table are known as the halogens.

	melting point in °C	**boiling point in °C**	**relative atomic mass**	**colour of element at room temperature, 20°C**
fluorine	–220	–188	19	very pale yellow
chlorine	–101	–34	35.5	greenish yellow
bromine	–7	59	80	reddish brown
iodine	114	184	127	dark grey
astatine			210	

(a) (i) Predict the physical state of astatine at room temperature.

.....

1 mark

(ii) Predict the colour of astatine at room temperature.
Tick the correct box.

colourless ☐

yellow ☐

brown ☐

black ☐

1 mark

(b) The reactions of chlorine and bromine with some sodium salts are given below.

salt	colour of salt solution	colour after addition of chlorine solution, which is greenish yellow	colour after the addition of bromine solution which is orange
sodium chloride	colourless	pale greenish yellow	orange
sodium bromide	colourless	orange	orange
sodium iodide	colourless	dark brown	dark brown

(i) Use these observations to put the elements bromine, chlorine and iodine in order of reactivity.

least reactive .....

.....

most reactive .....

1 mark

(ii) A solution of iodine, which is dark brown, is added to a solution of sodium bromide. What will be the colour of the resulting solution?

1 mark

(c) Predict, with a reason, if there will be a reaction between:

(i) fluorine and sodium chloride solution.

.....

.....

1 mark

(ii) astatine and sodium iodide solution.

.....

.....

1 mark

Maximum 6 marks

End of Chemistry questions