

FULL NAME:	SCIENCE TEACHER: (circle code)	10B
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SCIENCE

Year 10 Examination 2011

10B – 80 marks

Make sure that you have answered all the questions in this paper before you start paper 10A or 10C

Time allowed for both examinations: 2 hours

Answer all questions in the spaces provided on the paper.

You may use a calculator.

Show all your working in calculations; marks are awarded for it.

Give units for all answers (eg kg or m) unless they are already provided.

For Teacher Use

Question	m/c	1	2	3	4	5	6	Total
Marks gained								
Marks available	40	8	7	7	4	7	7	80

Question One: Electricity & Magnetism. [8 marks]

(a) A student rubs a nylon comb on the sleeve of his jumper.

(i) Use words from the box to complete the following sentence.

electrons ● hand ● jumper ● protons

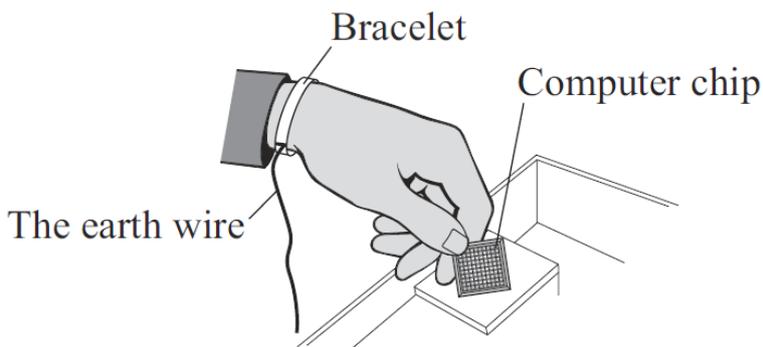
The comb becomes negatively charged because _____
 move from the student's _____ to the comb.



(ii) The negatively charged comb is placed close to a charged plastic ruler. The comb and the ruler attract each other. Complete the following sentence by drawing a ring around the correct answer.

The ruler is: negatively charged / positively charged / uncharged

(b) Electrostatic charge can damage computer chips. People working with computer chips may wear a special bracelet, with a wire joining the bracelet to earth (the earth wire). Any negative charge on the person will flow through the wire to earth.

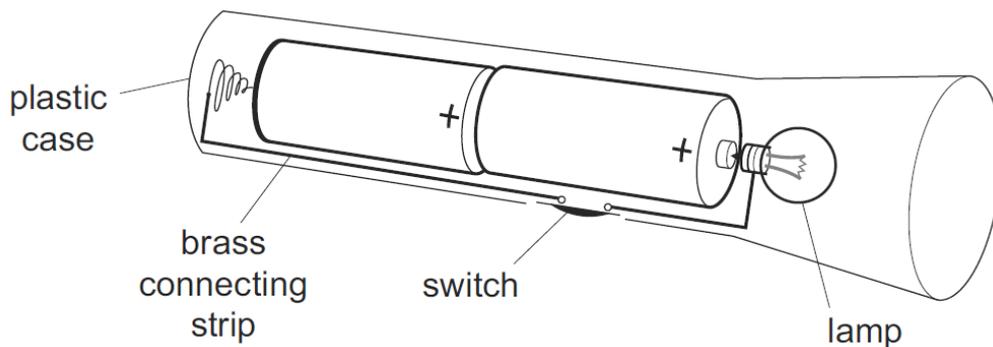


Which one of the following materials should the bracelet be made from? Draw a ring around your answer.

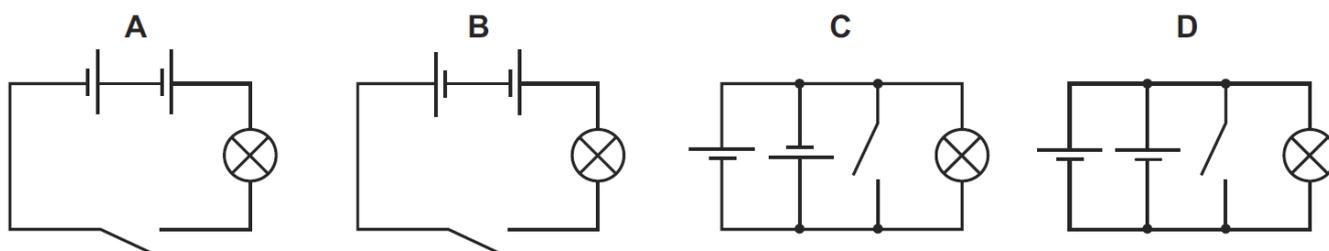
copper / plastic / rubber

Give a reason for your answer.

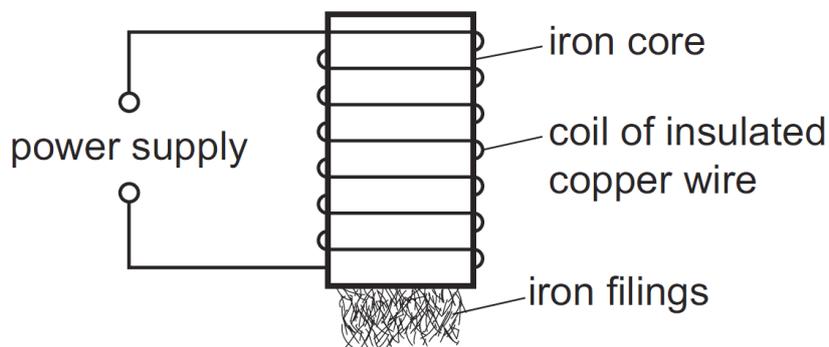
(c) The diagram shows a torch containing two batteries, a switch and a lamp.



What is the circuit diagram for the torch? Circle your answer.

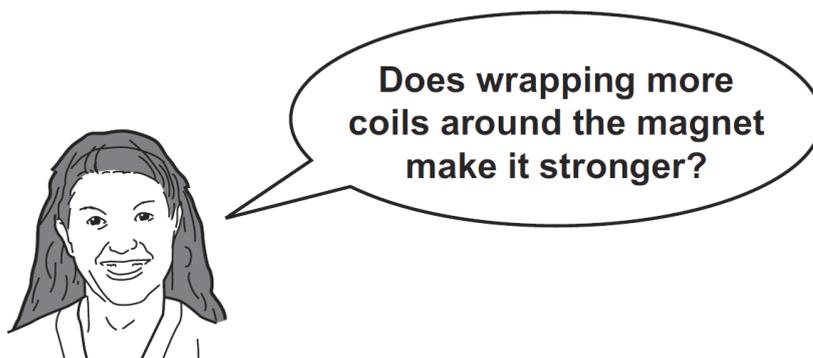


(d) In class, Sam and Shakira make an electromagnet as shown.

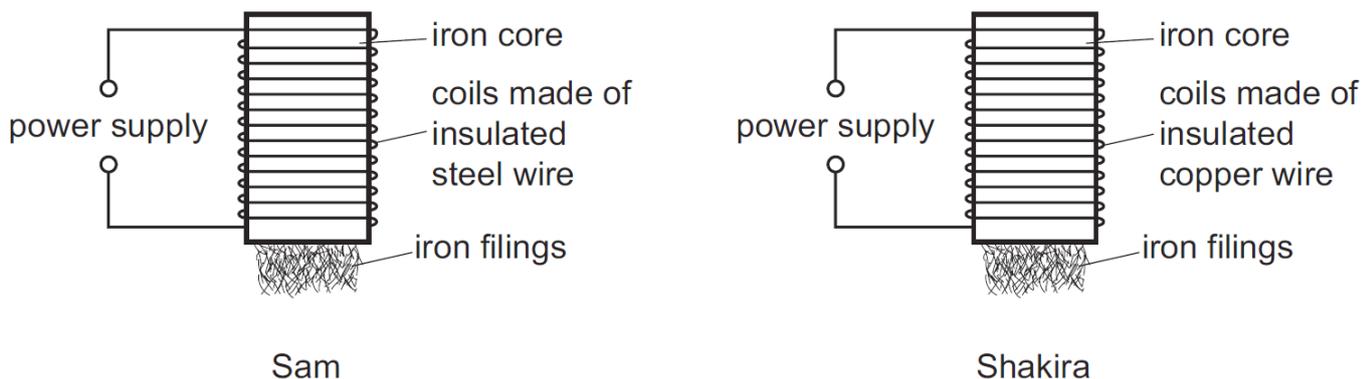


Their teacher asks them to plan an experiment to answer this question.

She tells them that they can test the strength of their magnets by measuring the mass of iron filings that they pick up.



The diagram shows the changes that Sam and Shakira make to their magnets when they begin their experiment.



(i) Explain why Sam’s experiment will not answer the teacher’s question.

These are the results that Shakira writes down. She writes them in the order that she collects them.

number of coils 5, 10, 15, 20, 25, 30
mass of iron filings in grams 2, 6, 23, 18, 22, 25

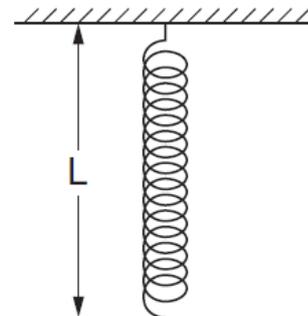
(ii) In the space, draw a results table and complete it by writing in Shakira’s results. Use a ruler to draw your results chart.

(iii) Describe the pattern in Shakira’s results.

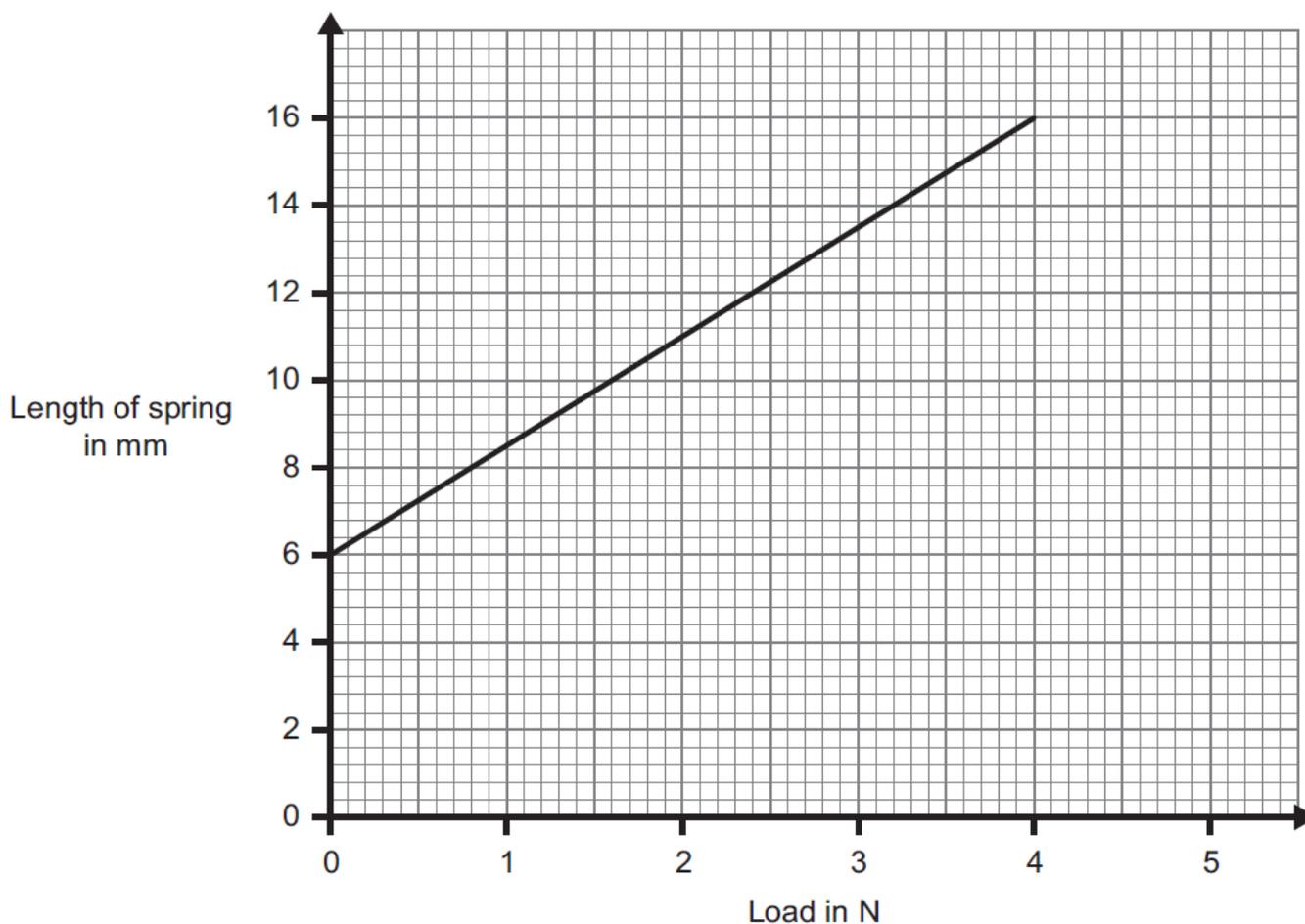
(iv) **In your results chart**, draw a circle around the result that does not fit the pattern.

Question Two: Forces. [7 marks]

(a) Robert carries out an experiment using a spring of length L .



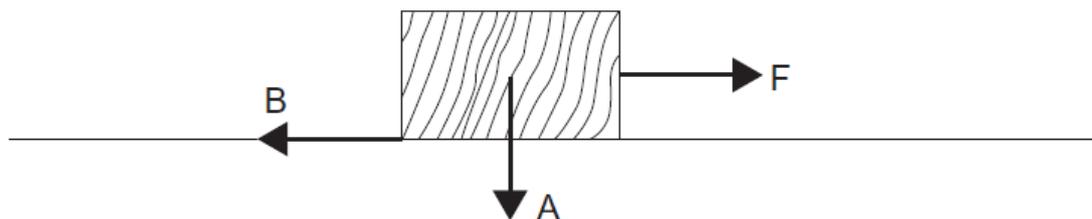
He plots his results on a graph as shown below.



Use the graph to answer the following questions.

- (i) What is the unstretched length, L , of the spring? _____ mm
- (ii) An unknown load is hung on the spring and the **extension** produced is 8 mm. Use the graph to find the unknown load. Show your working.

(b) Kevin pulls a block of wood over rough surface with a force F.



Other forces act on the block. One force acts in a downward direction and the other in a horizontal direction.

(i) Give the names of the downward force A and the horizontal force B.

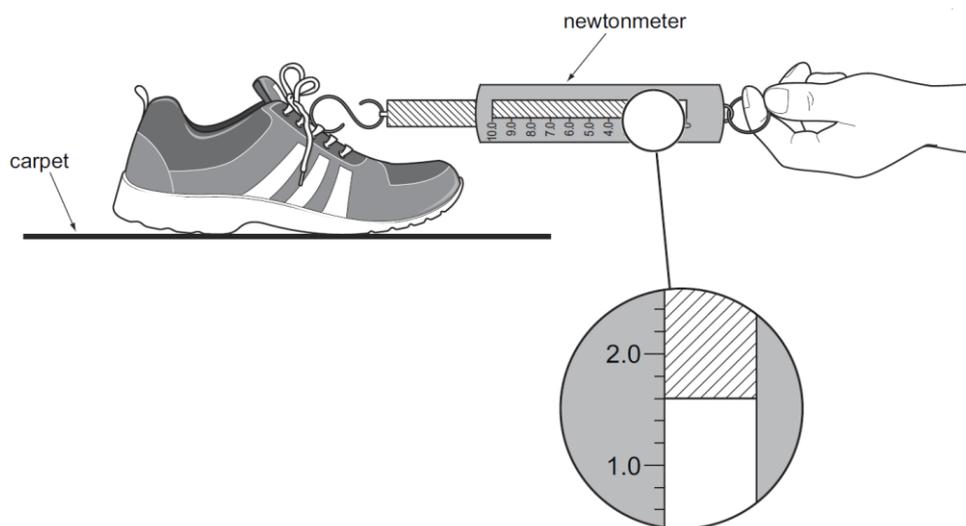
A	B
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(ii) The block is accelerating. What must happen if it is to now **move at constant speed** to the right?

Tick (✓) the correct box.

- Force B must become greater than force F.
- Force B must become equal to force F.
- Force B must become zero.

(c) Lynda carried out an experiment to find out how the sole of a sports shoe affected its grip on different surfaces.



(i) What is the reading on the newtonmeter? _____ N

These are Lynda's results.

Type of shoe	Force needed to move shoe/N		
	Carpet	Wooden floor	Sand
Rugby boot	1.4	0.2	1.5
Running shoe	1.6	0.1	1.7
Tennis shoe	1.0	0.7	0.9
Trainers	0.9	0.6	0.8

- (ii) The game of squash is played on wooden floors and involves a lot of movement and changing direction. Suggest which shoe type would be best to wear when playing squash and explain your choice.



Shoe type:
Reason:

Question Three: Plants. [7 marks]

A plant called Himalayan balsam produces seed pods. These pods explode and the seeds shoot out in all directions.

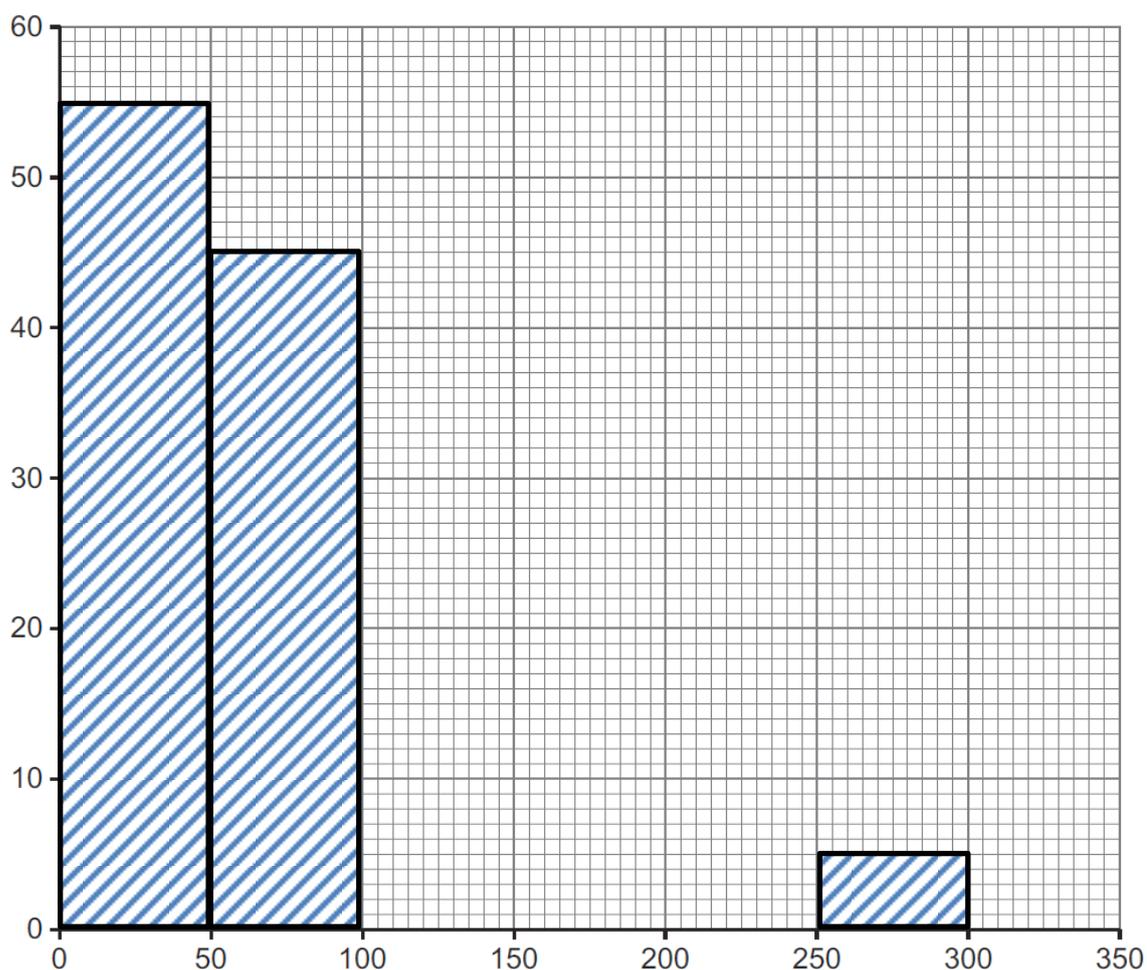


- (a) Carlos finds 175 seeds on the ground around a Himalayan balsam plant. He measures the distance of each seed from the plant. The table shows his results.

distance of seeds from plant / cm	0–50	51–100	101–150	151–200	201–250	251–300
number of seeds	55	45	30	25	15	5

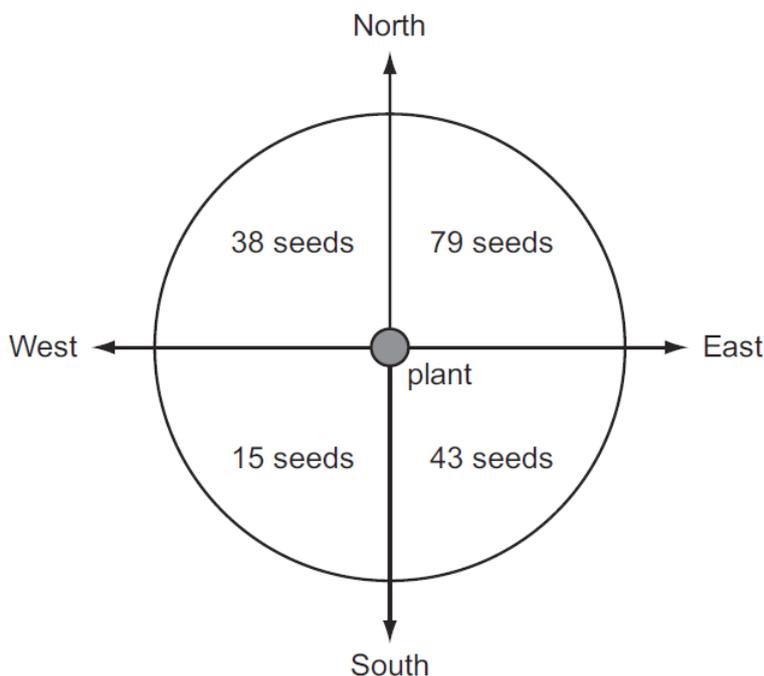
- (i) Complete the bar chart or histogram to display these results.

Label the x and y axes



- (ii) How many seeds travelled more than 150 cm?

Although the seeds shot out in all directions, they were not spread evenly around the plant. The diagram shows where Carlos finds the seeds around the plant.



Carlos thinks that more seeds are in the north-east section because the wind blew from the south-west. He wants to find more evidence to decide if his explanation might be correct.

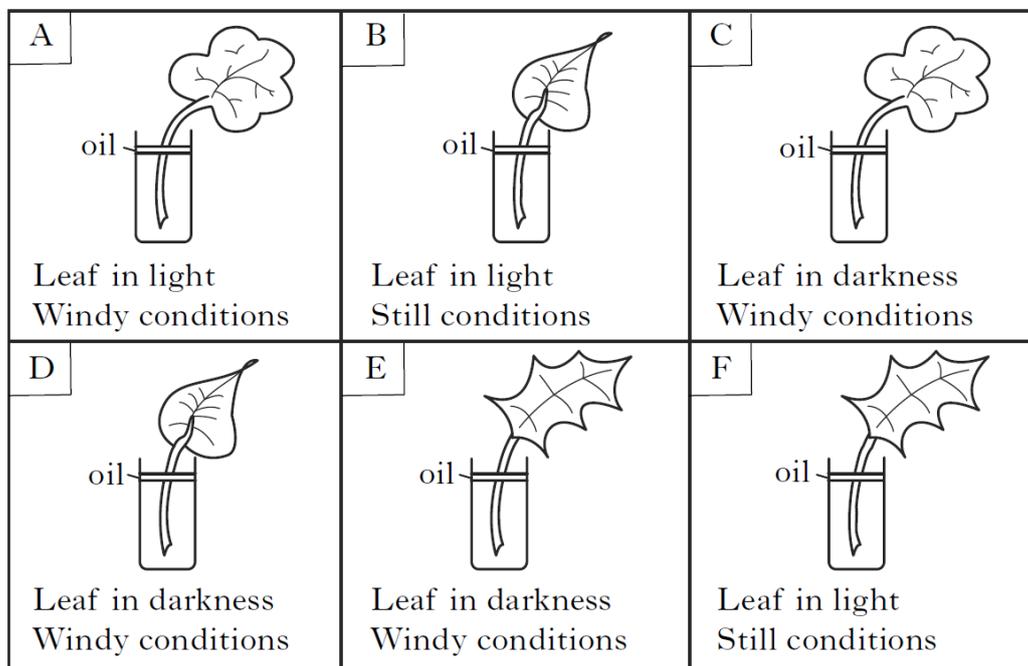
(iii) Which two pieces of evidence would support his explanation?

Tick (✓) the two correct boxes.

- There are always more seeds close to the plant than further away.
- When the wind blows from the south-east, the smallest number of seeds is found in the south-east section.
- When there is no wind, the seeds are found in equal numbers in each section.

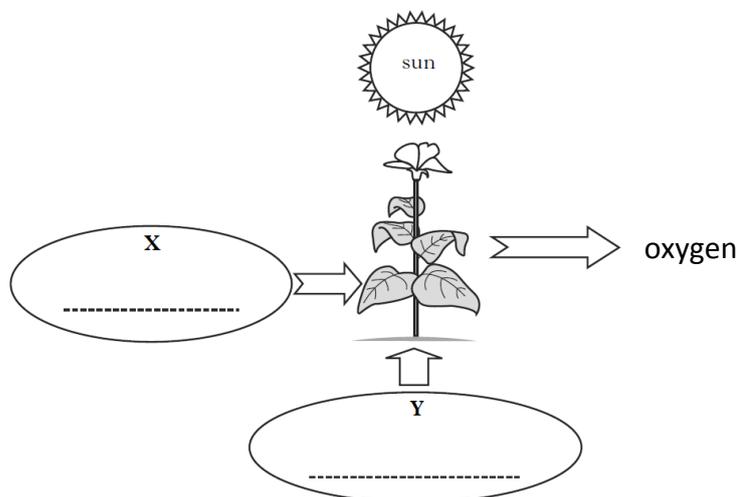
(iv) The spreading of seeds away from the parent plant is called dispersal. Suggest a reason why seed dispersal is useful to Himalayan balsam plants.

(b) Reece and Mark investigated how water can travel through leaves and evaporate through tiny pores on the leaf surface. They set up six different experiments. In each experiment, a leaf was placed in a small tube of water. The water was covered with a layer of oil and the starting level was marked on the tube. At the end of the experiment, the boys measured the water level again to find out how much had evaporated through the leaf.



What would they be trying to find out if they compared experiments C, D and E?

(c) Plants make glucose and oxygen gas during photosynthesis. On the diagram below, write the **names** for substances X and Y.



Question Four: The Earth moves [4 marks]

- (a) The table below shows the effects of different strengths of earthquakes.

Number on Richter Scale	Effect of earthquake
2	Trees sway, ponds ripple, doors swing slowly. People cannot tell that it is an earthquake
4	Buildings shake, dishes rattle, windows rattle.
6	Furniture moves, plaster can fall, walls may crack.
8	Buildings fall down, bridges collapse, lives are lost.

Earthquakes are quite common in New Zealand. They are not as common in England. Those that occur there are mostly less than 2 on the Richter Scale.

- (i) Suggest one reason why most earthquakes are not reported in England and explain your answer.

- (ii) Given below are some comments from a news report just after an earthquake in New Zealand

“Everything started wobbling. The windows were rattling and the blinds were moving.”

“I went outside in my dressing gown to see if the roof had collapsed.”

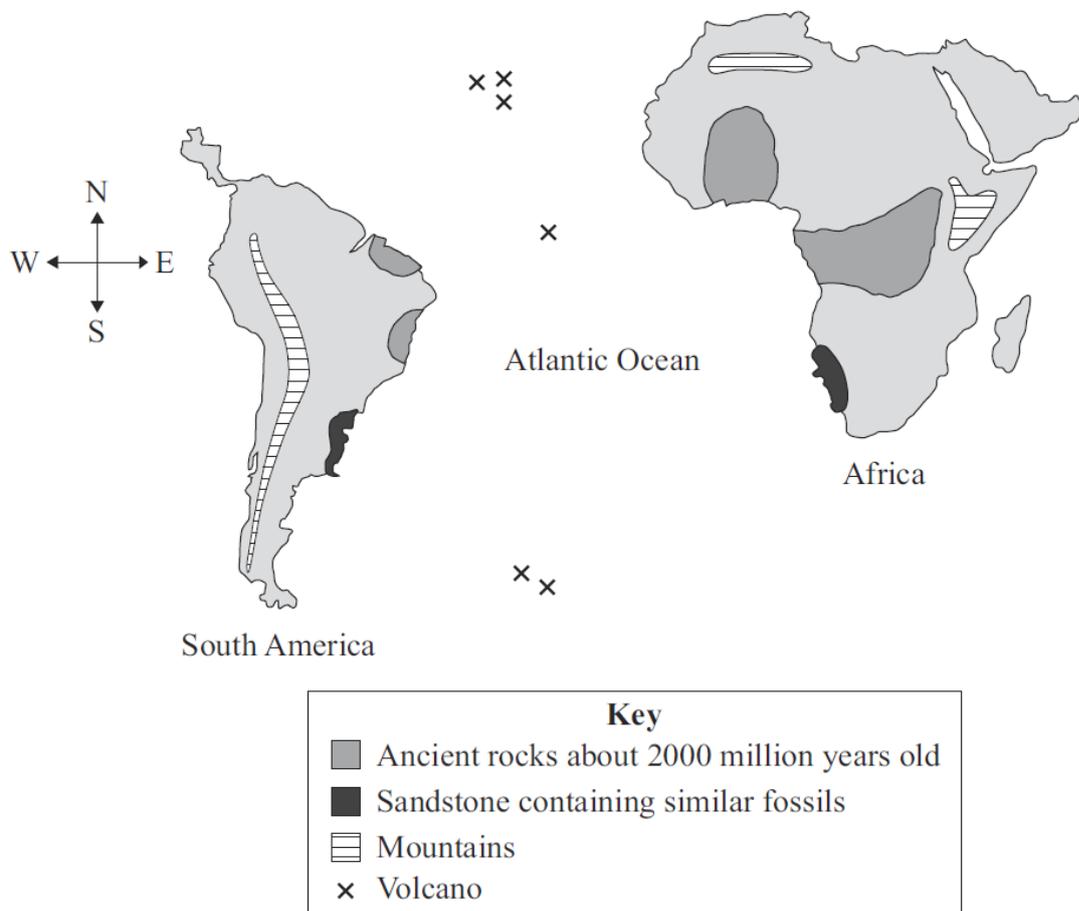
“Cracks appeared in the ceiling and some plaster fell. All the cupboard doors flew open.”

Using this information and the table, suggest what number on the Richter Scale **best describes** this earthquake.

Circle the correct answer.

1 3 5 7 9

(b) The diagram shows the positions of the continents of South America and Africa today. Some of the rock formations are also shown.



(i) The shape of the east coast of South America suggests that it would fit into the west coast of Africa. What other evidence suggests that South America and Africa had once been joined together?

(ii) South America and Africa are on different tectonic plates. From the evidence on the diagram, where is the boundary between these tectonic plates? Circle your answer.

- A Along the east coast of South America
- B From north to south through the middle of the Atlantic Ocean
- C From east to west across the Atlantic Ocean
- D Along the west coast of Africa

Question Five: Analysis & Forensic Science. [7 marks]

- (a) The photograph was taken at the scene of a crime. Look at the photograph. The Scenes of Crime Officers have taken a number of precautions to prevent the contamination of evidence.

Give two precautions that you can see.

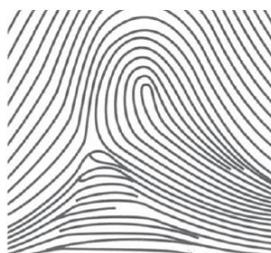
1
2



- (b) Below are the four types of fingerprints.



A



B



C



D

- (i) From the fingerprints above (A, B, C or D) identify the:

Loop _____

Whorl _____

(ii) A fingerprint was found on the door of a stolen white BMW car. Forensic scientists used the stages below to make a copy of the fingerprint. The stages are not in the correct order.

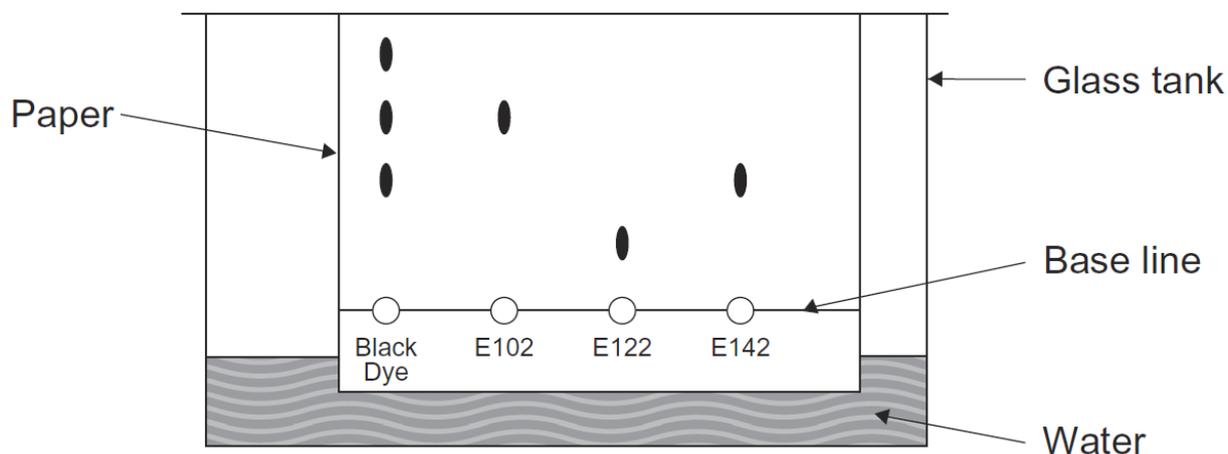
- A Use a brush to dust off the excess powder
- B Gently lift off the sellotape
- C Place some sellotape over the fingerprint
- D Gently spread some carbon powder over the fingerprint

Using the letters A, B, C and D, give the correct order.

Order _____

(c) A student set up a chromatography experiment to investigate the dyes in a black food colouring. He wanted to compare the dyes with the colours E102, E122 and E142 and to find out if any other dyes were present.

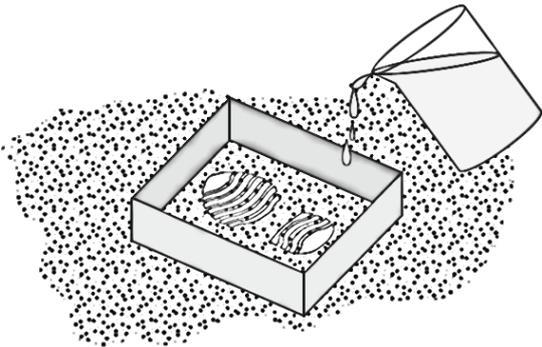
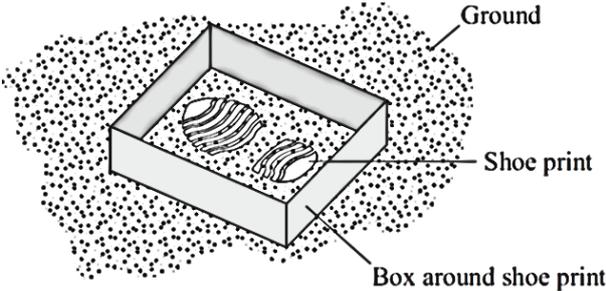
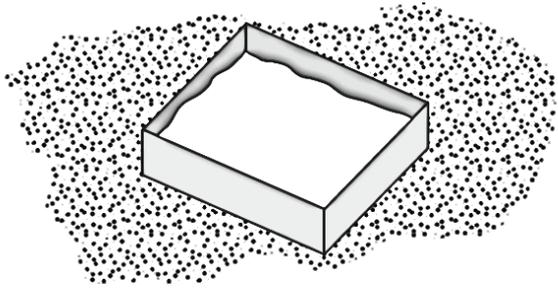
His results are shown below.



Describe **fully** what the student discovered as a result of this experiment.

(d) A shoe print was found in some mud at the crime scene. The Scenes of Crime Officer made a cast of the shoe print. The diagrams show the stages in making a cast of the shoe print. They are not in the correct order.

In the table, label the diagrams 1, 2, 3 and 4 to put them in the correct order. Write a sentence next to each diagram to describe the stage.

	Diagram number	Description of stage
		
		
	<p>4</p>	<p><i>The plaster of Paris is left until it has set hard. It can then be removed from the mould and measured or photographed.</i></p>
		

Question Six: Chemistry in the lab. [7 marks]

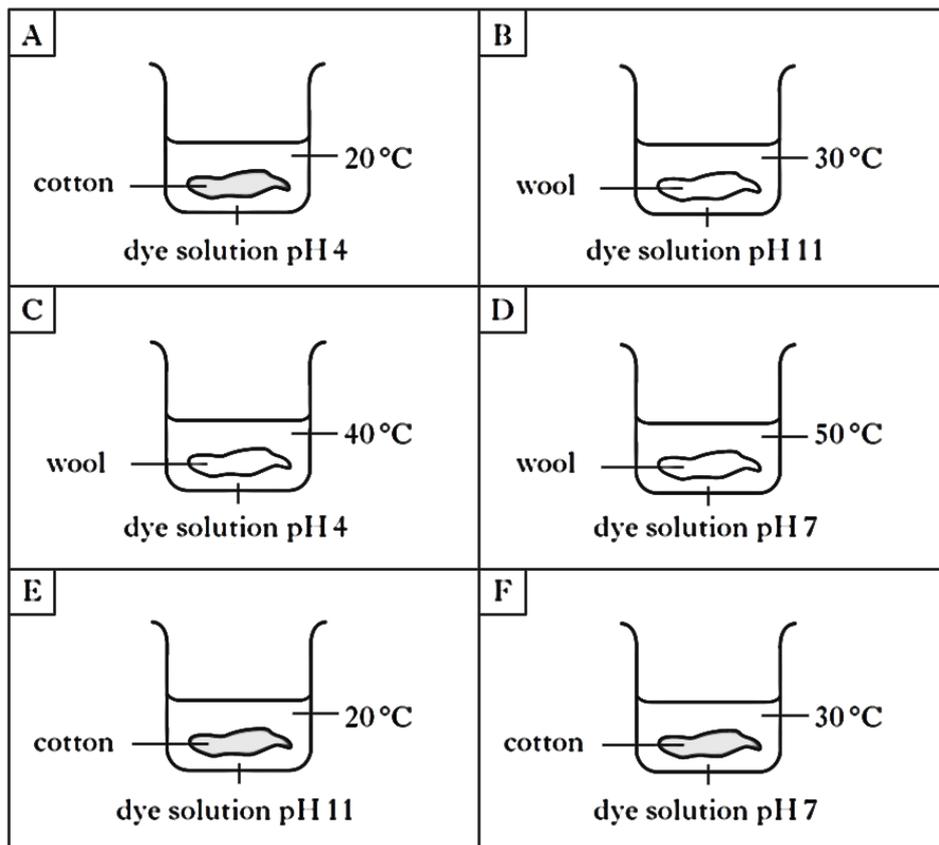
The colours of universal indicator at different pH values are given below.

Colour of universal indicator	Red	Orange	Yellow	Green	Dark green	Blue	Purple
pH	1	3	5	7	9	11	13

- (a) Use the information given and your knowledge to complete the following sentences.
- Stomach acid has a pH of 1 and turns universal indicator _____.
 - Washing soda crystals are weakly alkaline. They have a pH of around _____.
 - Sodium hydroxide turns universal indicator purple. It is the _____ alkali in the table.
 - Universal indicator is a _____ colour in pure water.
- (b) Red rose petals can be used to make an indicator.
Describe how you could make an indicator from the petals.

Space for a diagram if needed

(c) A teacher set up some experiments to investigate the dyeing of cloth.



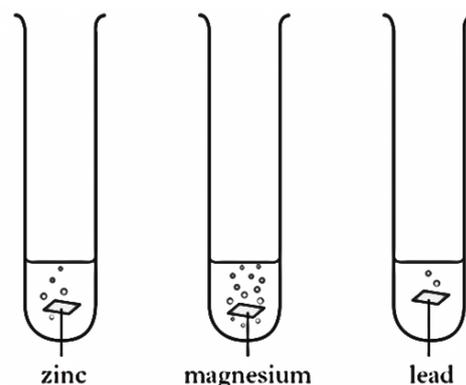
Which experiments which should be compared to show the effect of pH on the dyeing of cloth?

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(d) Tipene carried out an experiment to investigate the reactivity of metals with dilute sulfuric acid.

(i) Place the metals in order of reactivity (most reactive first).

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(ii) Describe how to **identify the gas** produced when a metal such as zinc reacts with dilute sulfuric acid.

End of Paper B