

NAME:	SCIENCE TEACHER: (circle code)	10C
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SCIENCE

Year 10 Examination 2011

10 C – 40 marks

Make sure that you have answered all the questions in Paper 10B before you start this paper

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 (e.g. kg or m) unless they are already provided.

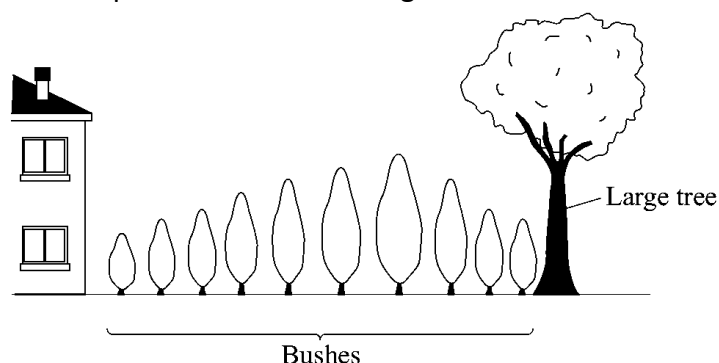
For Teacher Use

Question	1	2	3	4	5	6	7	8	9	10	Total
Marks gained											
Marks available	3	5	3	4	4	2	4	5	5	5	40

ANSWER ALL THE QUESTIONS IN THE SPACES PROVIDED

Question One: Science skills – Science Skills. [3 marks]

- (a) The diagram shows bushes in a hedge growing near to a house. The bushes were the same species and the same age.



Sarah said, "I have noticed that the short bushes grow next to the house. I think that the more light the bushes get, the faster they will grow."

Draw lines to match each of the student's statements to the correct term.
Draw only **two** lines.

Statement

The short bushes grow next to the house

Plants will grow faster if they have more light

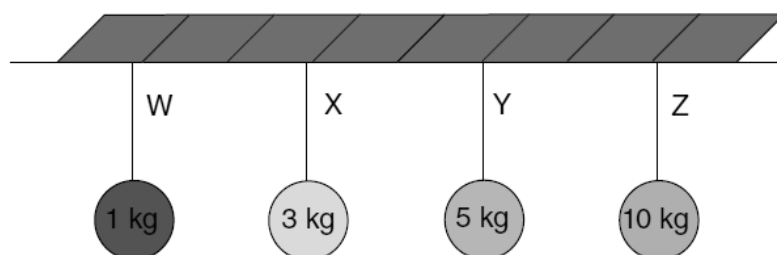
Term

A conclusion

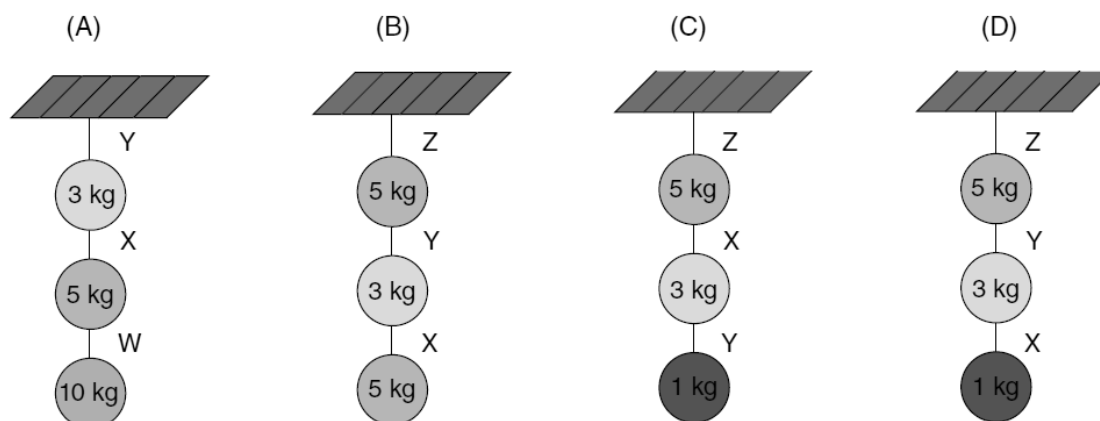
A prediction

An observation

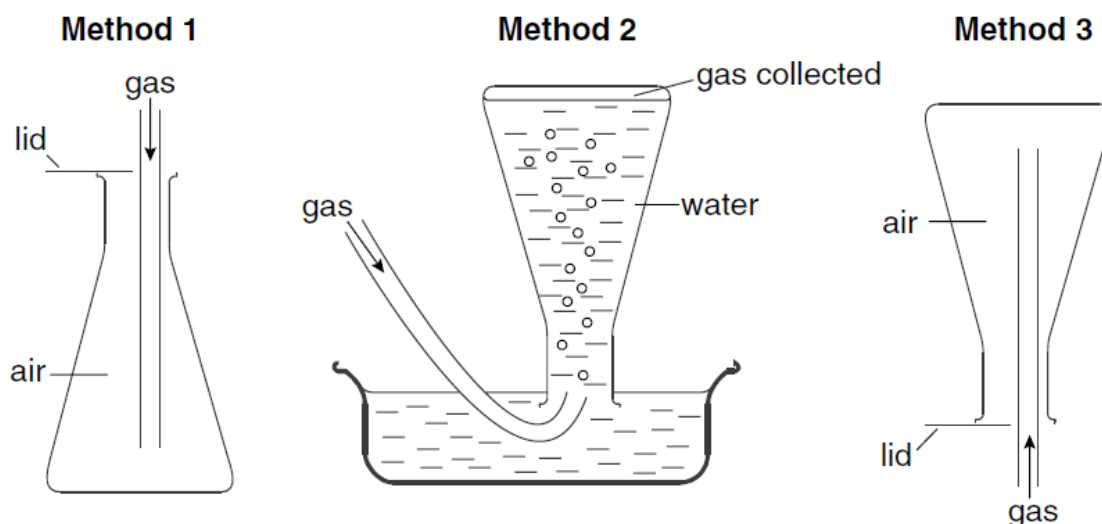
- (b) Peter has four types of string that he labels W, X, Y and Z. The diagram shows the maximum mass that each can support without breaking. Circle your answer.



In which diagram will all the strings remain unbroken? Circle your answer.



(c) The diagrams show three methods that are commonly used to collect gases.



Some colourless gases and their properties are shown.

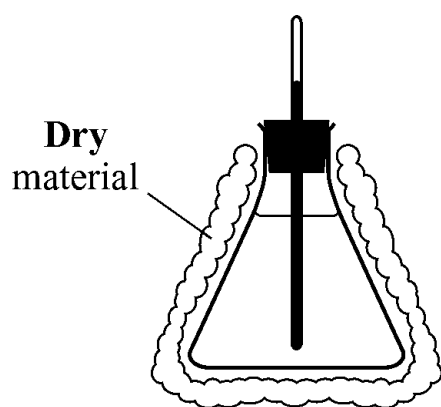
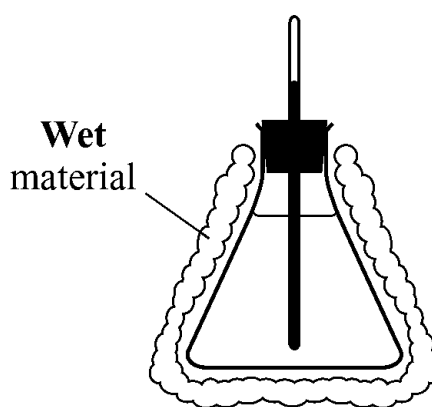
Gas	Soluble in water	Mass compared to equal mass of air	Smell
Ammonia	yes	Less	Strong
Oxygen	no	equal	none
Hydrogen	no	Less	none
Methane	no	Less	slight
Carbon dioxide	yes	more	none

What are the best methods for collecting some of these gases? Circle your answer.

	Carbon dioxide	Hydrogen	Oxygen	Ammonia
A	method 1	method 2	method 2	method 3
B	method 3	method 2	method 2	method 1
C	method 2	method 3	method 1	method 3
D	method 1	method 2	method 2	method 1

Question Two: Fair test experiment. [5 marks]

Hypothermia occurs if the body loses too much heat. Craig was worried about getting hypothermia if he got soaking wet during a field trip. He set up an experiment to test how much heat was lost through wet clothing and how much was lost through dry clothing, as shown in the diagram.

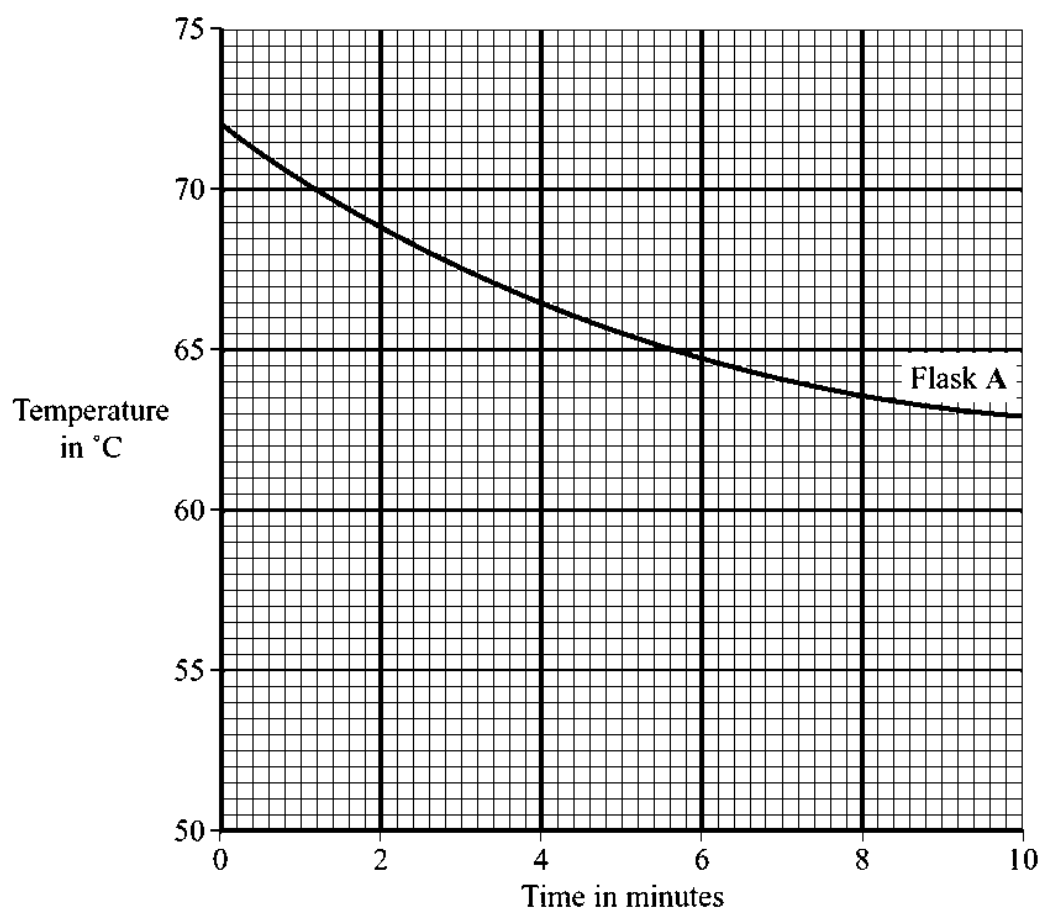
**Flask A****Flask B**

Time in minutes	Temperature of water in °C
	Flask B
0	72
2	68
4	65
6	62
8	59
10	57

He measured the temperature of the water in the conical flasks every 2 minutes for 10 minutes.

The results for Flask A have been plotted on the graph. The table shows his results for Flask B.

(a) Draw a line graph for Flask B on the same axes.



- (b) After 10 minutes, **how much cooler** was the water in Flask B than the water in Flask A? Show your working.

- (c) List two of the ways in which Craig ensured it was a fair test.

1.
2.

Question Three: Forensic Science. [3 marks]

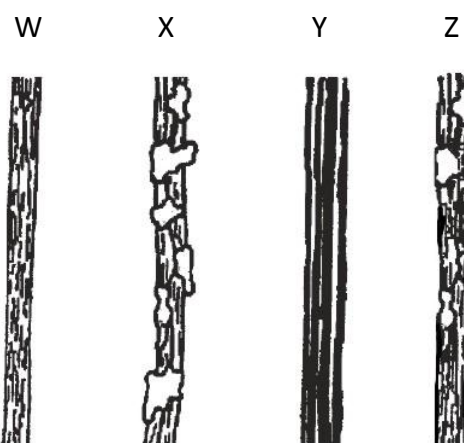
- (a) Some techniques used in forensic science investigations are listed below and labelled A to E.

- | | | | |
|---|-------------------------------------|---|------------|
| A | Electrophoresis | D | Microscopy |
| B | The measurement of refractive index | E | Flame test |
| C | Thin layer chromatography | | |

Which technique is most likely to be used in each of the examples of investigations described below? Write one of the letters, A, B, C, D, or E in the box next to the example to show the technique most likely to be used.

	Matching fragments of glass.
	Identifying types of pollen.
	Separating fragments of DNA

- (b) A forensic scientist found some fibres (W, X, Y & Z) on a suspect's shoes. He compared them with the carpet fibres found at the crime scene.





Carpet fibre found at the crime scene

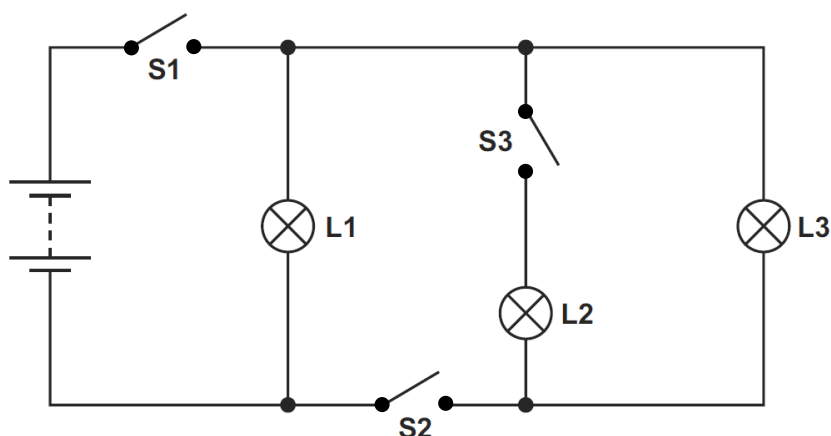
Does this prove that the suspect was at the crime scene? Yes / No.

Explain your answer.

Question Four: Electricity & Magnetism. [4 marks]

Aleisha set up the electric circuit shown below. It contained three lamps L1, L2 and L3.

It contained three switches S1, S2 and S3.



- (a) In the table below write the words 'on' or 'off' to show when each lamp is lit or not lit for each set of switch positions.

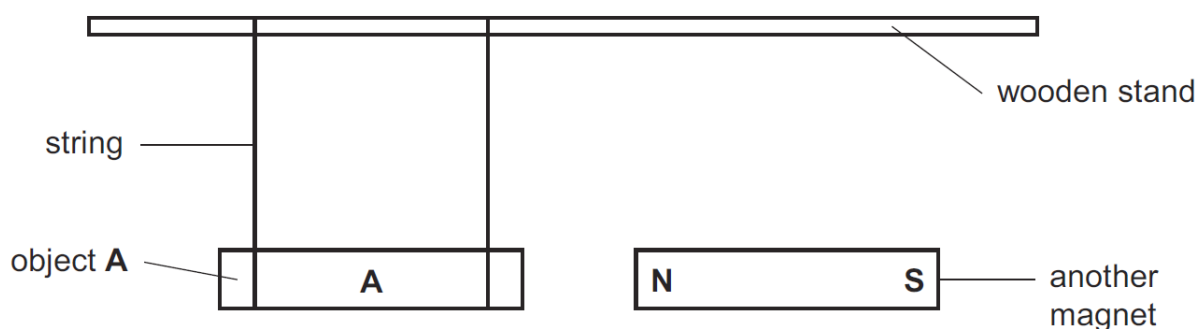
Switch position			Lamp 'on' or 'off'		
S1	S2	S3	L1	L2	L3
Closed	Closed	Open			
Closed	Open	Closed			

(b) A teacher has the following objects that are all the same size.

a magnet ● a soft iron block ● an aluminium block

He paints them all black so that Aleisha cannot see which is which, and labels them A, B and C.

He gives them to Aleisha for the experiment shown below.



She hangs object A from a wooden stand using two pieces of string.

- She holds a magnet so that its north pole is facing A and notes the effect.
- She reverses the magnet so that the south pole is facing A. He notes the effect.
- She repeats the experiment using objects B and C, each time noting the results.

Aleisha has written two of her results in the table opposite.

Complete the table to show the results you expect her to obtain.

In the last column, identify A, B and C. Remember that one is a magnet, one is soft iron and one is aluminium.

Object	North pole	South pole	Name of object
A	repelled		
B			
C		no effect	

(c) The teacher gives Aleisha two more magnets, D and E. One of these two magnets is stronger than the other one. Explain how, using the apparatus shown with a magnet hanging from the string, she can find out which of the two new magnets D and E is the stronger.

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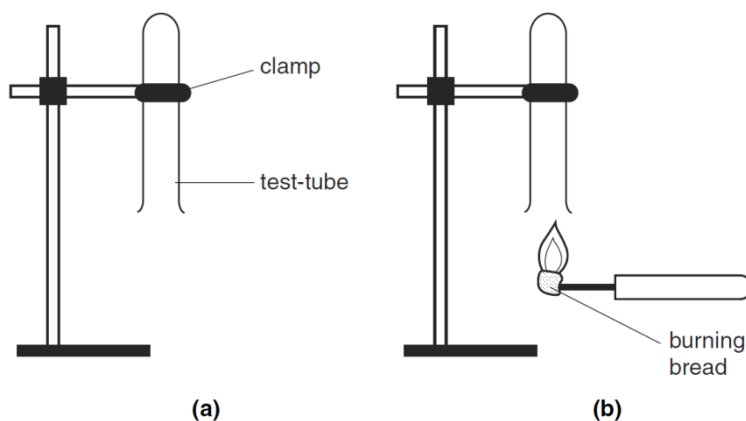
Question Five: Food. [4 marks]

Starch and sucrose are carbohydrates.

(a) Describe the chemical test, including the result, for sucrose (sugar).

Steven did an experiment to find out what is produced when bread is burned in air. In some ways the process is similar to respiration in the cells of the body. He used the apparatus shown here.

- He pushed a piece of bread onto a mounted needle.
- He set fire to it, then held it beneath the test-tube.
- He let it burn for fifteen seconds, then he put out the flame and placed a bung in the tube.
- He then did some tests on the tube and its contents.



(i) Complete the table below.

<i>Test</i>	<i>Observation</i>	<i>Conclusion</i>
He felt the sides of the tube	The sides felt warm	Energy is released
He looked at the sides of the tube	The sides looked misty	
He added limewater to the tube and shook it		Carbon dioxide was present

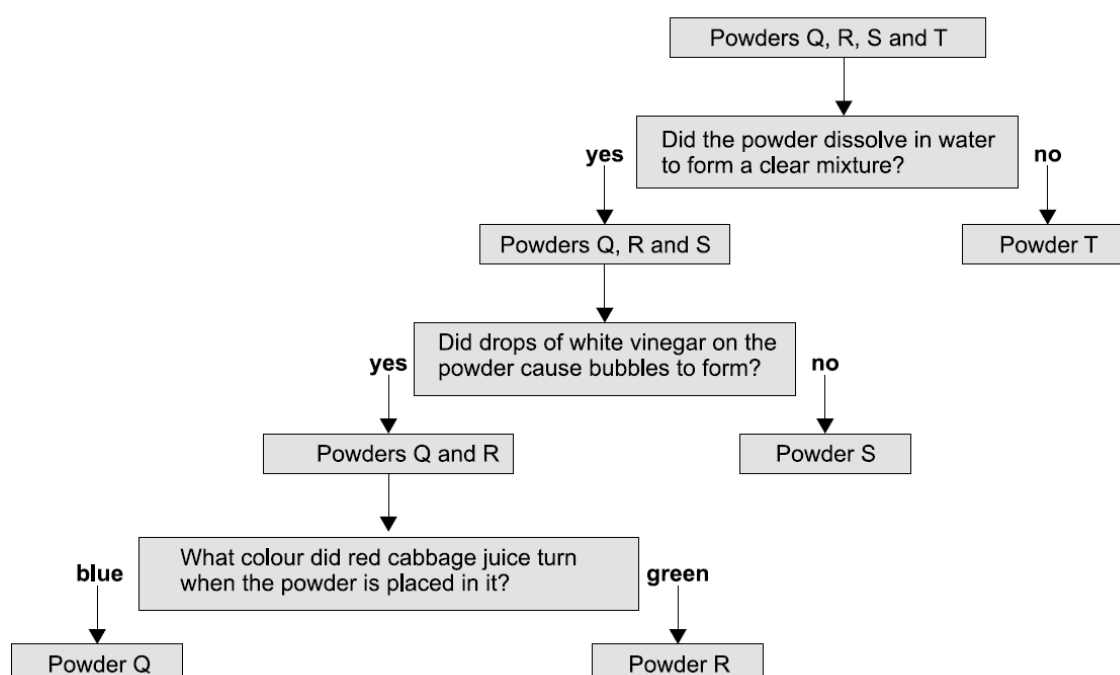
(ii) Describe one way in which respiration in our body cells is different from the burning of bread.

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(b) Kate and Kaylee tested four white powders. The table gives their results.

Powder	Test			
	Do the powder and water form a clear mixture?	What colour does red cabbage juice turn when the powder is placed in it?	Do drops of white vinegar on the powder cause bubbles to form?	Do drops of yellow iodine turn black when placed on the powder?
cornflour	no	blue	no	yes
baking soda	yes	blue	yes	no
washing soda	yes	green	yes	no
epsom salt	yes	blue	no	no

They constructed a flow chart to show how they distinguished between the four powders using some of the tests in the table.

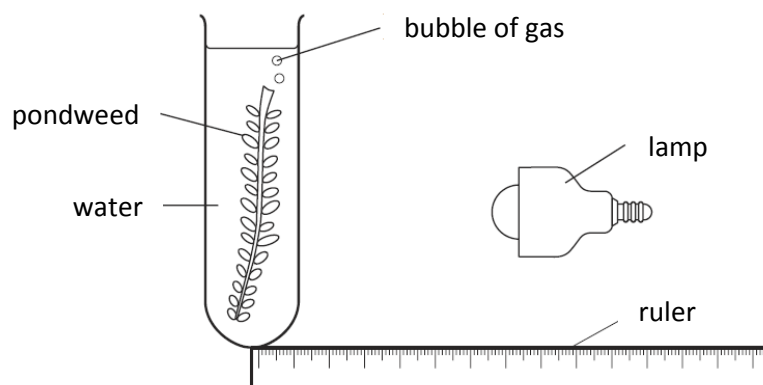


Which substance is powder Q?



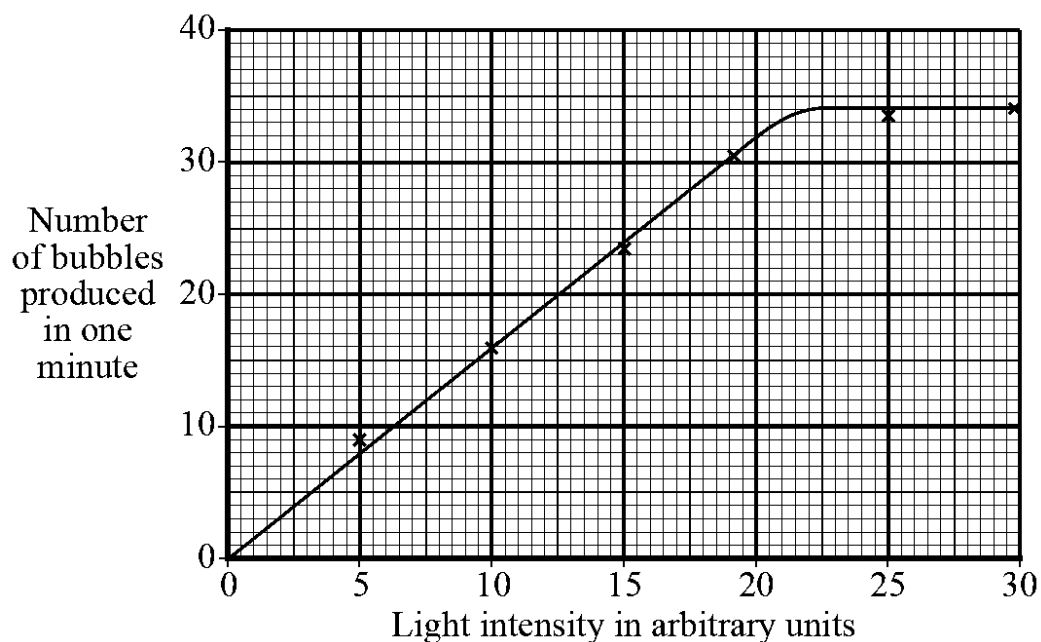
Question Six: Plants and photosynthesis. [2 marks]

James decided to investigate the effect of light intensity on the rate of photosynthesis. He used the apparatus shown in the diagram.



He measured the rate of photosynthesis by counting the number of gas bubbles given off each minute.

His results are shown on the graph.



- (a) This is what James wrote for his conclusion.

"Increasing the light intensity increases the rate of photosynthesis of the pondweed."

Why was his conclusion incomplete?

- (b) Suggest two ways in which the process of photosynthesis benefits humans.

1
2

Question Seven: Skydiving. [4 marks]

A skydiver jumps from an aircraft and soon is falling **at a constant speed** (known as “terminal velocity”).

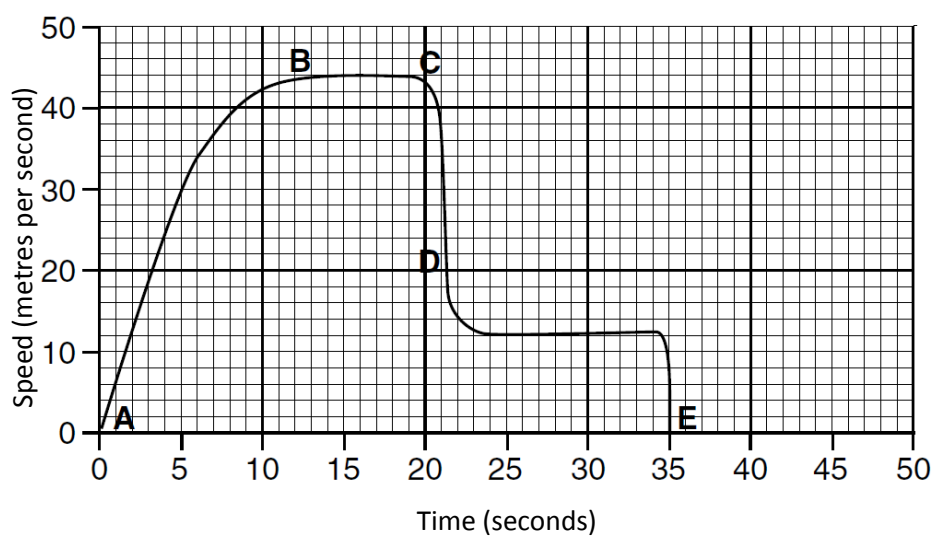
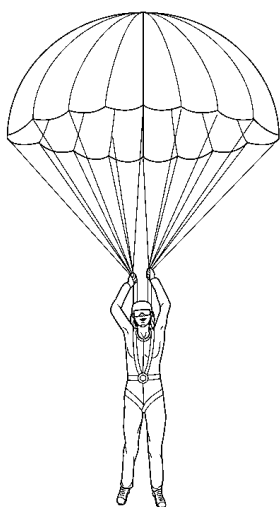
- (a) Draw arrows to show the **two** main forces acting on her. Label the arrows with the names of the forces, **weight** and **drag**.



- (b) Which of the forces you have labelled will be the larger **just after** she jumps? Explain your answer.

Weight / drag will be greater just after she jumps because....

- (c) The skydiver opens her parachute. The speed-time graph shows her descent.



- (i) At which point does she open her parachute?

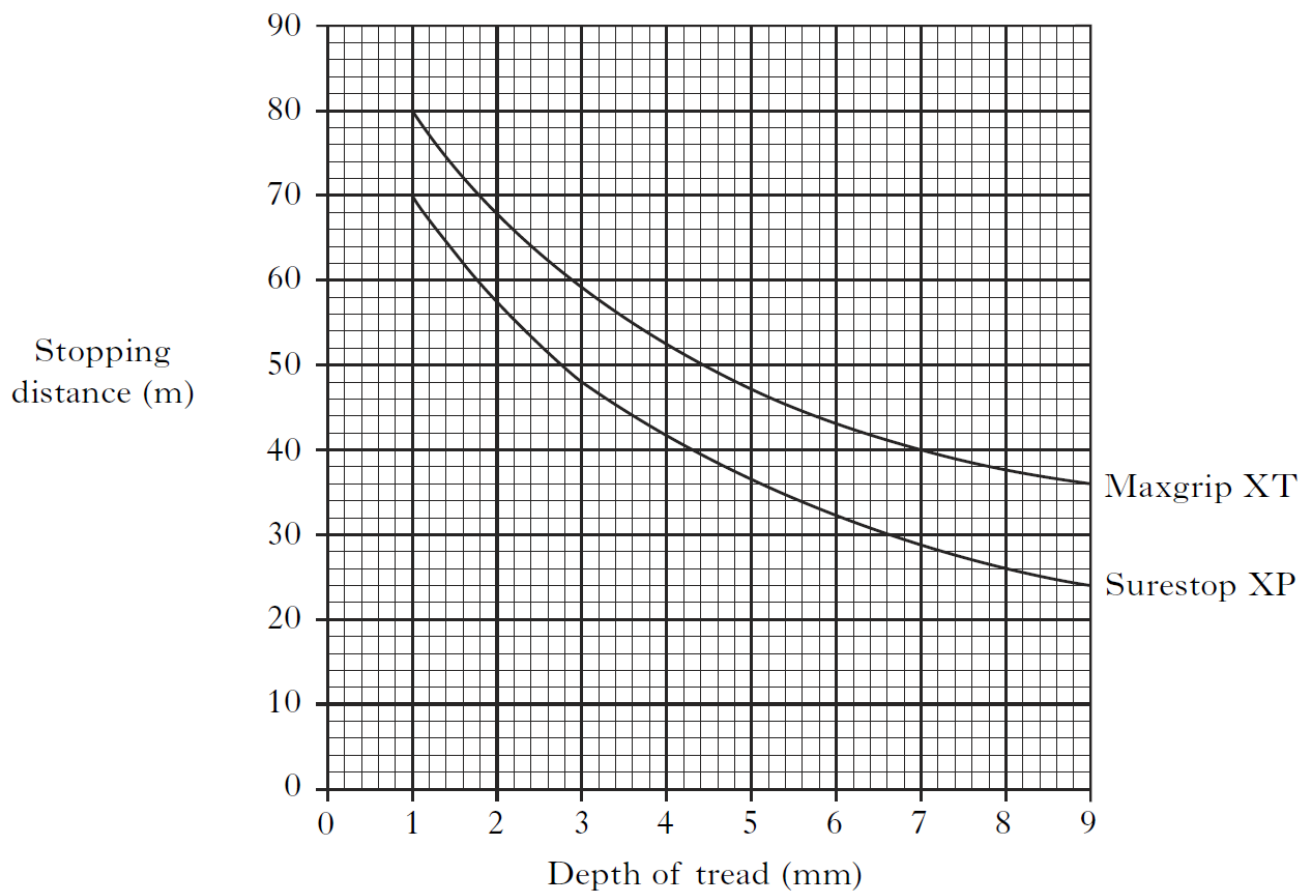
A B C D E (circle your answer)

- (ii) Explain why you chose this answer.

- (iii) How long after opening her parachute does she reach the ground? Show your working.

Question Eight: Interpreting graphs and tables. [5 marks]

A car manufacturer tested two types of tyre with different depths of tread to compare stopping distances on wet roads.



(a) Draw two conclusions from this graph.

1
2

The legal minimum tread for a tyre is 1.5 mm in New Zealand.

(b) What is the difference in stopping distance between a car with Maxgrip XT tyres and one with Surestop XP tyres when both have a tread of 1.5 mm? Show your working.

Tread allows the tyre to give better road grip by displacing water on the road as spray. The table shows the volume of water that each tyre can displace in one second.

Maxgrip XT	Depth of tread (mm)	2	3	4	5	6	7	8	9
	Volume of water displaced in one second (litres)	3.4	3.8	4.3	4.8	5.4	6.0	6.7	7.4
Surestop XP	Depth of tread (mm)	2	3	4	5	6	7	8	9
	Volume of water displaced in one second (litres)	4.6	5.3	5.9	6.4	7.0	7.7	8.4	9.2

(c) Use the information **in the graph and the table** to answer the following questions.

- (i) A car fitted with Surestop XP tyres has a stopping distance of 48 metres.
What volume of water is displaced by each tyre in one second? _____ litres.
- (ii) A car is fitted with Maxgrip XT tyres. Each tyre displaces 6.0 litres of water in one second.
What is the car's stopping distance? _____ m.



Question Nine: Rocks. [5 marks]

- (a) Helen weighed three pieces of rock and soaked them in water. The next day, she weighed them again. Her results are shown below.

rock	mass before soaking in water (g)	mass after soaking in water (g)
granite	26.3	26.3
marble	20.4	20.4
sandstone	25.5	27.6

Helen put the soaked sandstone into a freezer for 24 hours.



- (i) Water in the spaces in the sandstone froze and expanded. What would happen to the sandstone as the water froze and expanded?

- (ii) What result would you expect if the experiment was repeated with granite? Explain your answer.

- (b) Helen placed fresh pieces of granite, marble and sandstone in beakers of dilute sulfuric acid. Only the marble reacted with the acid. Use Helen's results to explain why granite is more suitable than marble for a statue in a city centre.

- (c) (i) Draw a line from the name of each rock below to the group of rocks it belongs to.
 (ii) Draw a line from each group of rocks below to the way the group of rocks was formed.

name of rock	group of rocks	way the group of rocks was formed
granite	sedimentary	the effect of high temperature and pressure on limestone
marble	igneous	formed when magma cools
sandstone	metamorphic	particles are deposited in layers

Question Ten: The Shaky Isles. [5 marks]

- (a) What is the difference between the focus and the epicentre of an earthquake?

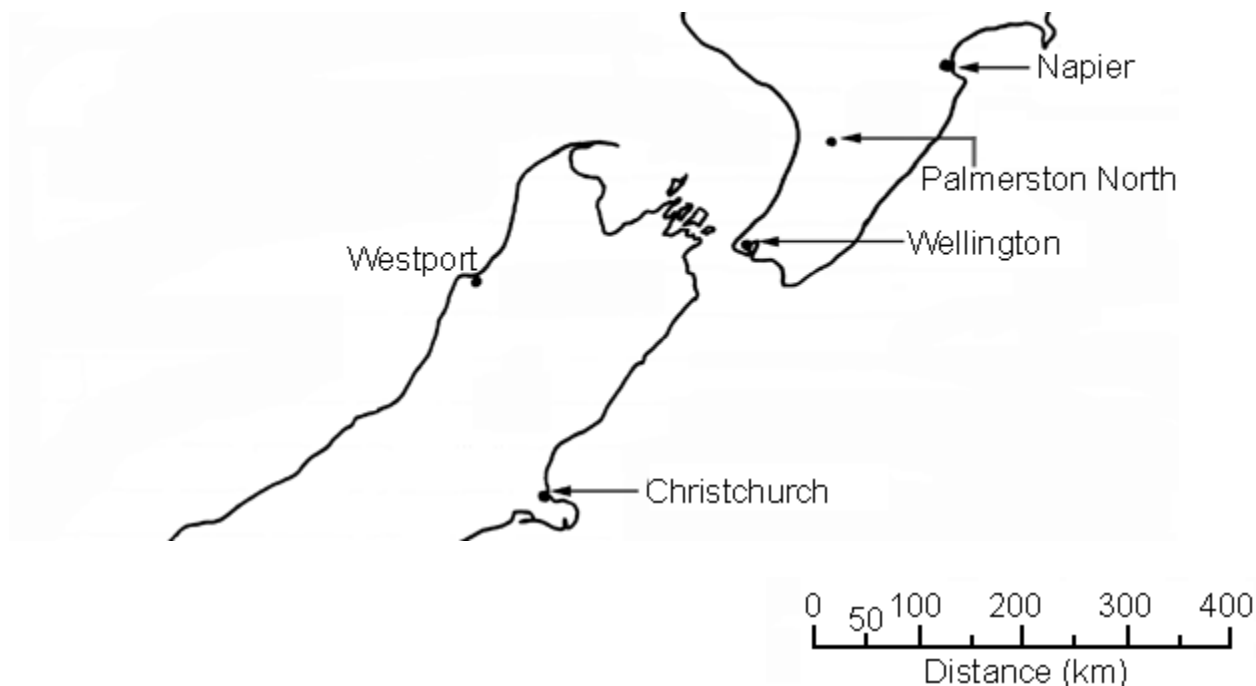
- (b) An earthquake struck central New Zealand at about 11:23 a.m. one morning. The time difference between the arrival of the P and S waves can be used to find the epicentre of this earthquake.

	Relationship between time difference and distance							
Time between P and S waves (seconds)	12	15	18	22	26	30	35	37
Distance (km)	100	120	150	175	200	270	325	350

- (i) Use **this information** to complete the 4 spaces in table below which shows data collected from seismographs in three different cities.

Location	Arrival time of waves		Time difference (s)	Distance (km)
	P wave (h:m:s)	S wave (h:m:s)		
Wellington	11:23:27	11:23:45		
Westport	11:23:30	11:23:52	22	
Napier	11:23:52			325

- (ii) Describe how you **could use the distances** you calculated, and the scale, to show where the epicentre of the earthquake was located.



- (iii) Three possible locations are shown on the map by the symbol ⊙. Circle the **one** closest to where you *estimate* that the earthquake occurred.

