

Name	Form class	Teacher code
------	------------	--------------

# SCIENCE

# 10BA

## Year 10 Examination 2015

### 10BA – 120 Marks

Answer all questions in the spaces provided on the paper.

Show all your working in calculations.

Give units for all answers (e.g. km or °C) unless they have already been provided.

Check you have pages 1 – 30.

Question	m/c	1	2	3	4	5	6	7	8	9	10	11	Total
Marks gained													
Marks available	30	5	5	5	5	5	4	3	4	3	5	6	80

Question	12	13	14	15	16	17	18	19	Total
Marks gained									
Marks available	5	6	5	5	5	6	4	4	40

**120**

**There are no questions printed on this page**

MULTIPLE CHOICE

<b>Thinking with evidence in Science - Multiple Choice Questions</b>													
<ul style="list-style-type: none"> <li>Use a <b>blue or black pen</b></li> <li>For each answer <b>completely fill in the circle</b> as shown.</li> <li>Do <b>not</b> extend beyond the circles.</li> <li>If you want to change your answer <b>you must</b> cross out your original answer as shown.</li> <li>If you change your mind about an answer you have crossed out and now want to choose it, draw a ring around the cross as shown.</li> </ul>	<table border="1" style="margin: auto; border-collapse: collapse;"> <tbody> <tr> <td style="padding: 2px 10px;">A ○</td> <td style="padding: 2px 10px;">B ●</td> <td style="padding: 2px 10px;">C ○</td> <td style="padding: 2px 10px;">D ○</td> </tr> <tr> <td style="padding: 2px 10px;">A ○</td> <td style="padding: 2px 10px;">B <del>●</del></td> <td style="padding: 2px 10px;">C ○</td> <td style="padding: 2px 10px;">D ●</td> </tr> <tr> <td style="padding: 2px 10px;">A ○</td> <td style="padding: 2px 10px;">B <del>●</del> (○)</td> <td style="padding: 2px 10px;">C ○</td> <td style="padding: 2px 10px;">D ○</td> </tr> </tbody> </table>	A ○	B ●	C ○	D ○	A ○	B <del>●</del>	C ○	D ●	A ○	B <del>●</del> (○)	C ○	D ○
A ○	B ●	C ○	D ○										
A ○	B <del>●</del>	C ○	D ●										
A ○	B <del>●</del> (○)	C ○	D ○										

- 1     A ○    B ○    C ○    D ○
- 2     A ○    B ○    C ○    D ○
- 3     A ○    B ○    C ○    D ○
- 4     A ○    B ○    C ○    D ○
- 5     A ○    B ○    C ○    D ○

- 16    A ○    B ○    C ○    D ○
- 17    A ○    B ○    C ○    D ○
- 18    A ○    B ○    C ○    D ○
- 19    A ○    B ○    C ○    D ○
- 20    A ○    B ○    C ○    D ○

- 6     A ○    B ○    C ○    D ○
- 7     A ○    B ○    C ○    D ○
- 8     A ○    B ○    C ○    D ○
- 9     A ○    B ○    C ○    D ○
- 10    A ○    B ○    C ○    D ○

- 21    A ○    B ○    C ○    D ○
- 22    A ○    B ○    C ○    D ○
- 23    A ○    B ○    C ○    D ○
- 24    A ○    B ○    C ○    D ○
- 25    A ○    B ○    C ○    D ○

- 11    A ○    B ○    C ○    D ○
- 12    A ○    B ○    C ○    D ○
- 13    A ○    B ○    C ○    D ○
- 14    A ○    B ○    C ○    D ○
- 15    A ○    B ○    C ○    D ○

- 26    A ○    B ○    C ○    D ○
- 27    A ○    B ○    C ○    D ○
- 28    A ○    B ○    C ○    D ○
- 29    A ○    B ○    C ○    D ○
- 30    A ○    B ○    C ○    D ○

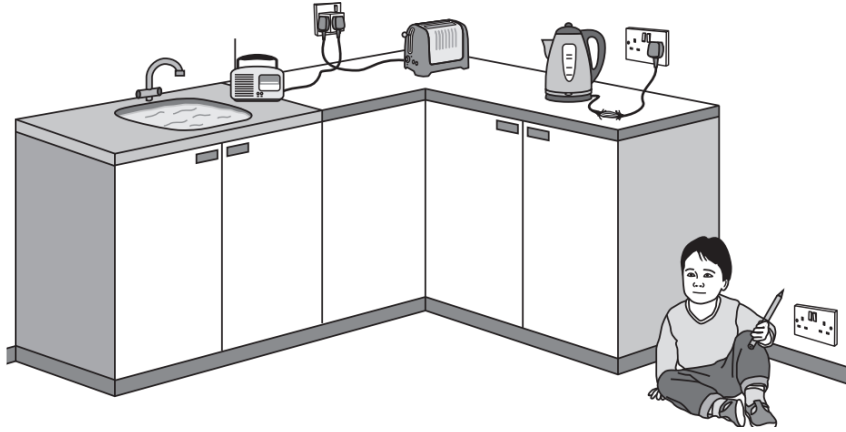
**Do NOT answer questions 31-40 from the booklet.**

Answer ALL the questions in the spaces provided.

**Question One: [5 marks]**

Electricity needs to be used safely. It can cause an electrical shock. Look at the picture of the kitchen.

- (a) (i) Circle three electrical hazards you can see in the picture.



- (ii) Explain what might happen in one of the 3 hazards you have circled.

---

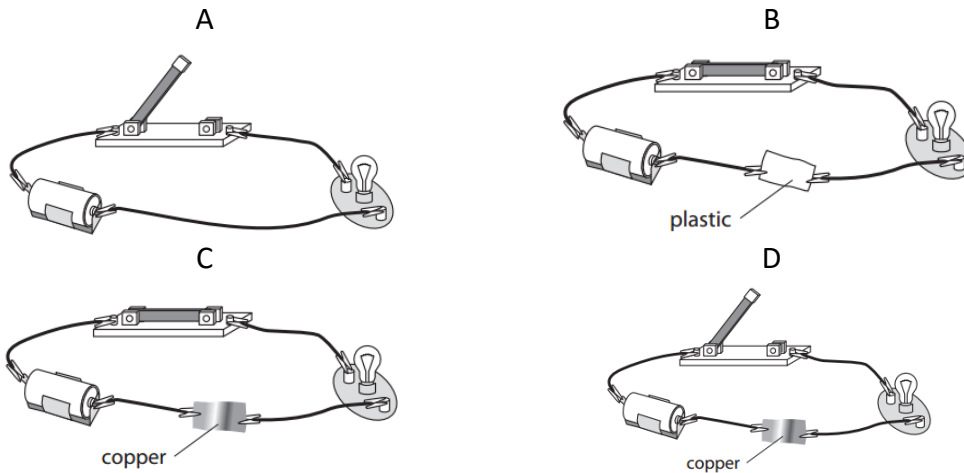


---

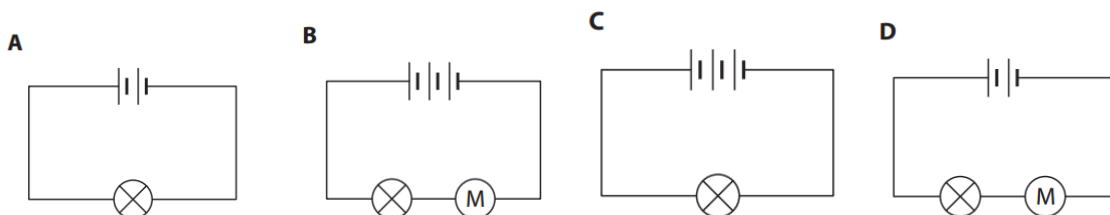


---

- (b) Students investigate how to light up a bulb. In which circuit will the bulb light? (Circle your answer.)



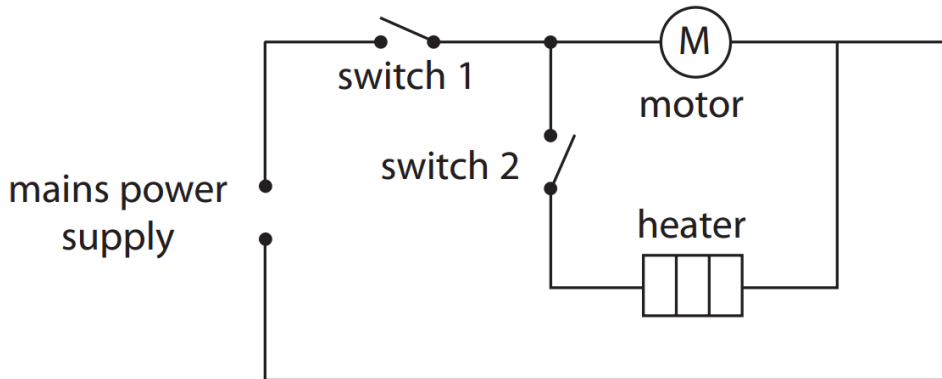
- (c) All the bulbs in the circuits below will light up. "M" is a motor. Which circuit will have the brightest bulb? (Circle your answer.)



Amy has a hairdryer.

She drew a diagram of the circuit inside the hairdryer.

The motors turn the fan and the heater warms the air.



(d) Explain which of the switches must be closed for the hairdryer to just blow cold air.

---

---

---

---

---

---

(e) Explain which of the switches must be closed for the heater to work.

---

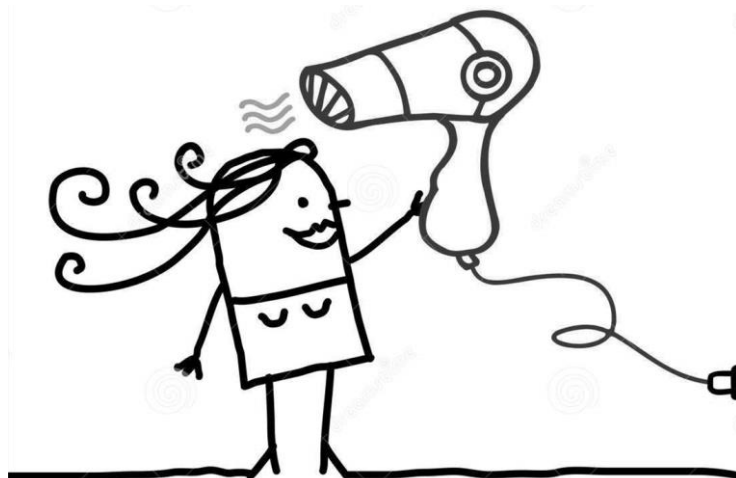
---

---

---

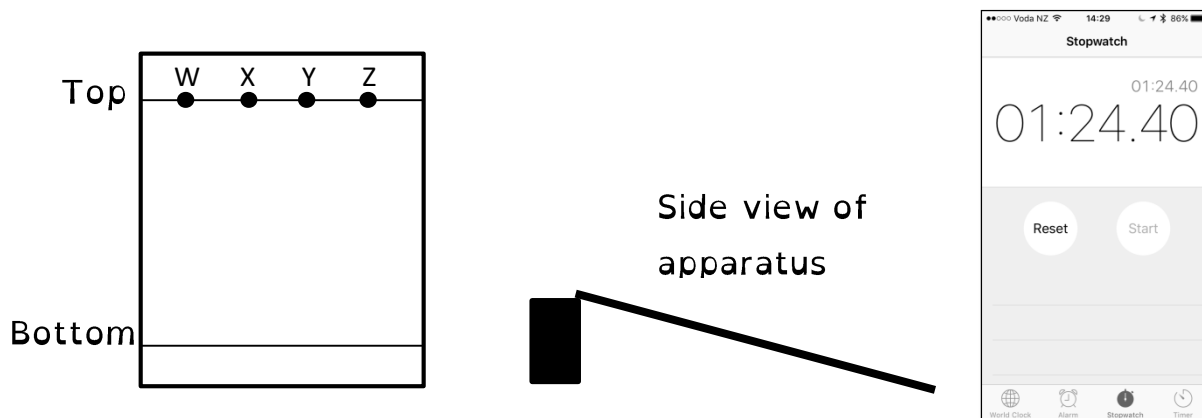
---

---



**Question Two: [5 marks]**

Viscosity is how easily a liquid flows. **The more viscous an oil is, the slower it will flow.** A student compared the viscosity of four different oils, W, X, Y and Z, at different temperatures. He put a drop of oil on the top line and timed how long it took to reach the bottom line.



Oil W was heated to 20°C. The time taken for oil W to flow from the top to the bottom line was recorded using his iPhone.

The student repeated the procedure for oil W at temperatures of 30°C, 40°C and 50°C. The student then used oils X, Y and Z in the same way.

Oil	Time taken (s)			
	At 20°C	At 30°C	At 40°C	At 50°C
W		74	79	54
X	55	50	45	40
Y	36	33	30	27
Z	115	105	95	85

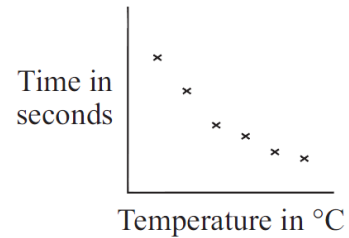
- (a) Convert the time shown on the iPhone into seconds and write the value *in the table*. (Ignore the split seconds).
- (b) When testing oil W at the four temperatures shown, the dependent variable is (Circle your answer.)
- the choice of oil.
  - the time the oil takes to travel between top and bottom line.
  - the oil temperature
  - the distance between the top and the bottom line.
- (c) A measurement that appears to be anomalous (is an outlier) is for (Circle your answer.)
- oil Y at 40 °C.
  - oil X at 30 °C.
  - oil W at 40 °C.
  - oil Z at 30 °C.
- (d) Which oil is most viscous? Explain how you know.

---

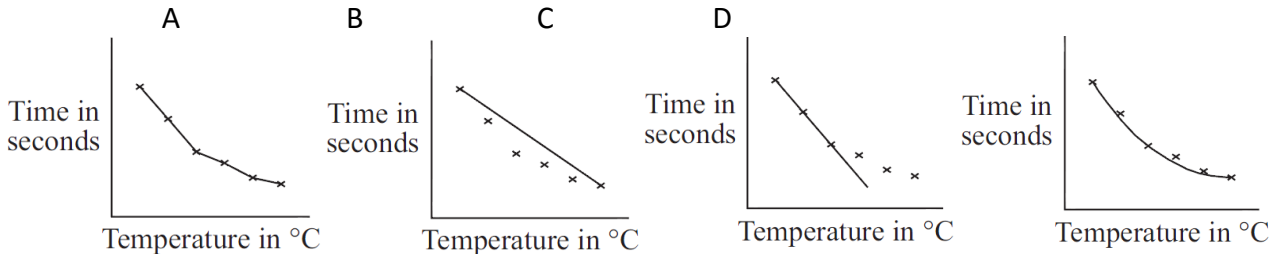


---

Another group of students tested oil W over six temperatures. Their results, plotted on a temperature–time graph, looked like this.

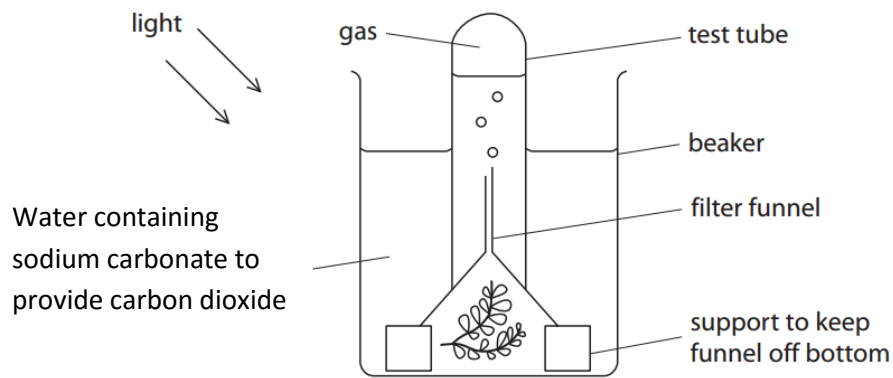


(e) Which one of the following shows the most appropriate (best) line for the results? (Circle your answer.)



**Question Three: [5 marks]**

Mikaya investigated the effect of red, green and blue light on how fast pond weed makes oxygen gas.



She shone different coloured lights on the pond weed. She counted the number of bubbles released per minute.

Trial	Number of bubbles release per minute		
	Blue light	Green light	Red light
1	12	1	10
2	10	1	11
3	2	1	9
Average	11	1	10

(a) What is the independent variable in this investigation?

\_\_\_\_\_

(b) Give TWO other variables (things) that Mikaya should keep the same in order to make this a fair experiment.

1.

\_\_\_\_\_

2.

\_\_\_\_\_

- (c) Apart from doing three trials for each light, give one other reason why the data in the table is reliable.

---



---



---

- (d) Write a conclusion for this investigation.

---

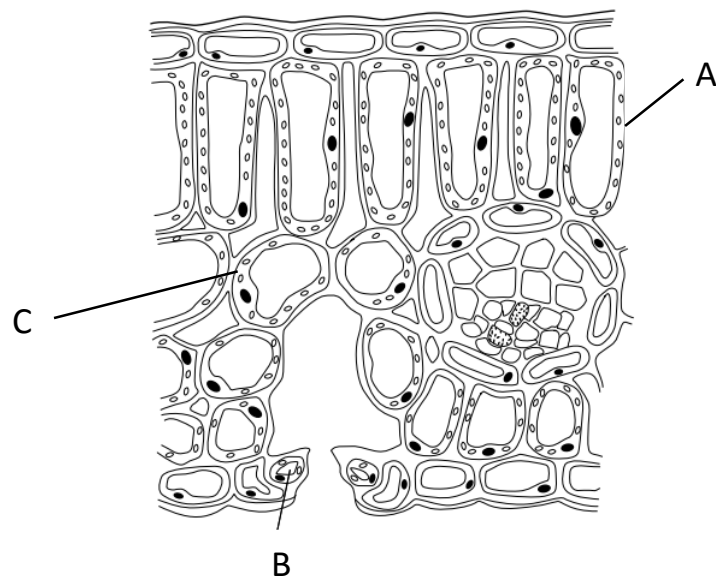


---



---

- (e) The diagram shows a cross section through a leaf. The cell that will make most glucose (sugar) is: (Circle your answer.)



**Question Four: [5 marks]**

Some flowering plants transfer pollen by using insects. Others use wind.

- (a) How can you tell that this plant is wind-pollinated?

---



---



---

- (b) Insects do not visit wind-pollinated flowers very often. Why not?

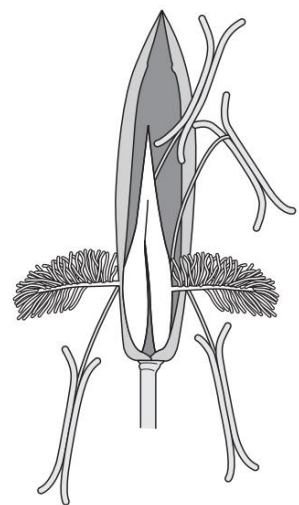
---



---



---





Some people have hay fever, an allergy to pollen made by flowering plants.

(c) Why is hay fever usually caused by wind-pollinated plants rather than insect pollinated plants?

---

---

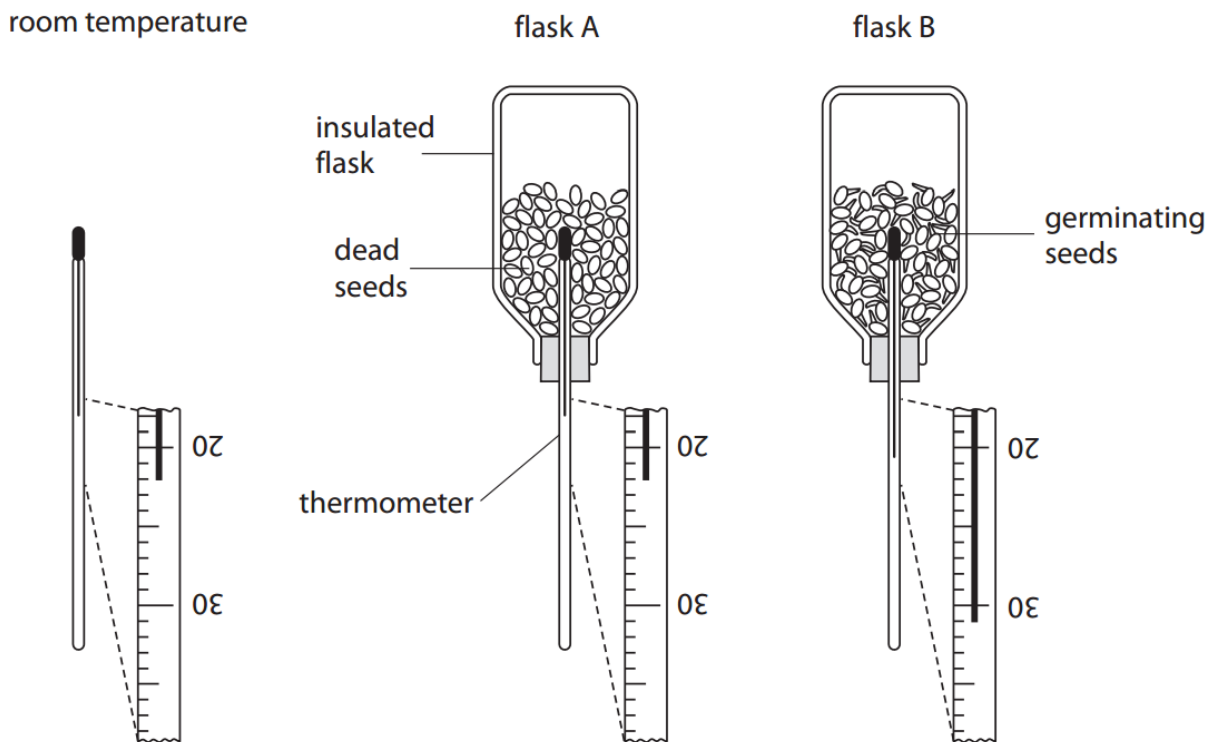
Flora investigated whether seeds release energy when they begin to grow (germinate). She set up two insulated flasks of seeds. She placed them in a room at a constant temperature for two days.

- A contains dead seeds.
- B contains germinating seeds.

(d) How much has the temperature in flask B increased by over the two days? Show your working.

---

---



(e) What conclusion could Flora draw from this experiment?

---

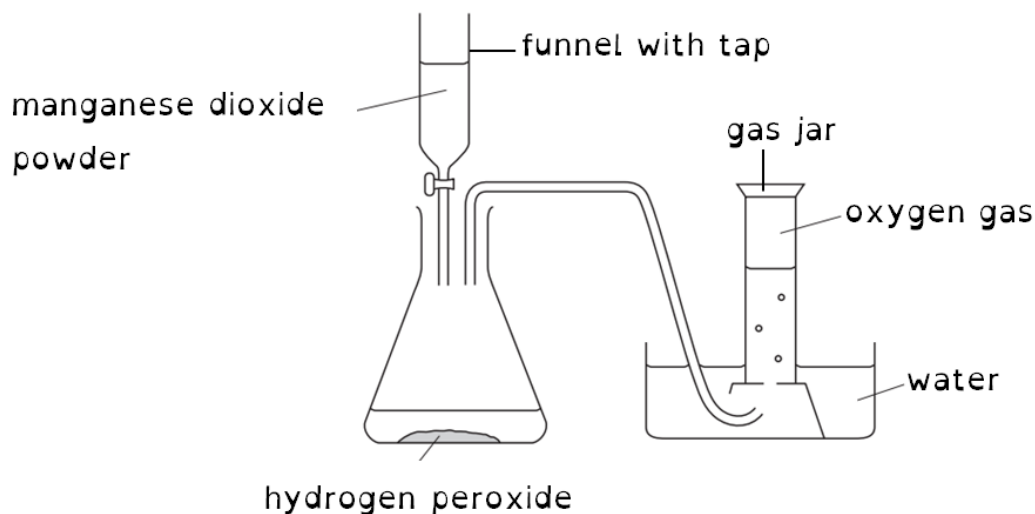
---

---



**Question Five: [5 marks]**

Kate draws this diagram to show how she will make oxygen gas.



She forgets to draw a piece of apparatus (laboratory equipment) and makes a mistake in the labelling.

(a) What is the mistake in the labelling of the diagram?

---



---

(b) What is the missing piece of apparatus?

---

(c) Explain why this piece of apparatus is necessary.

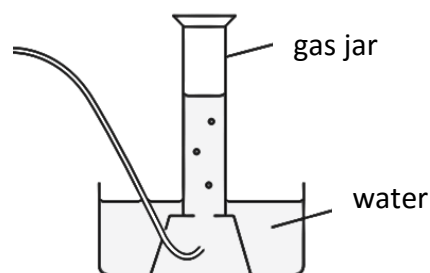
---



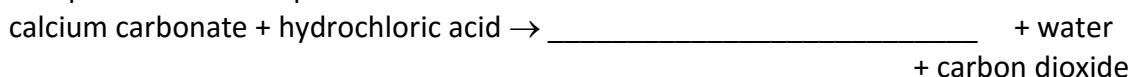
---

This same apparatus can be used to collect carbon dioxide.

This is done by mixing calcium carbonate and dilute hydrochloric acid.



(d) Complete the word equation.



(e) Explain how limewater can be used to test for carbon dioxide gas; what you would do and what you would see happening?

---



---

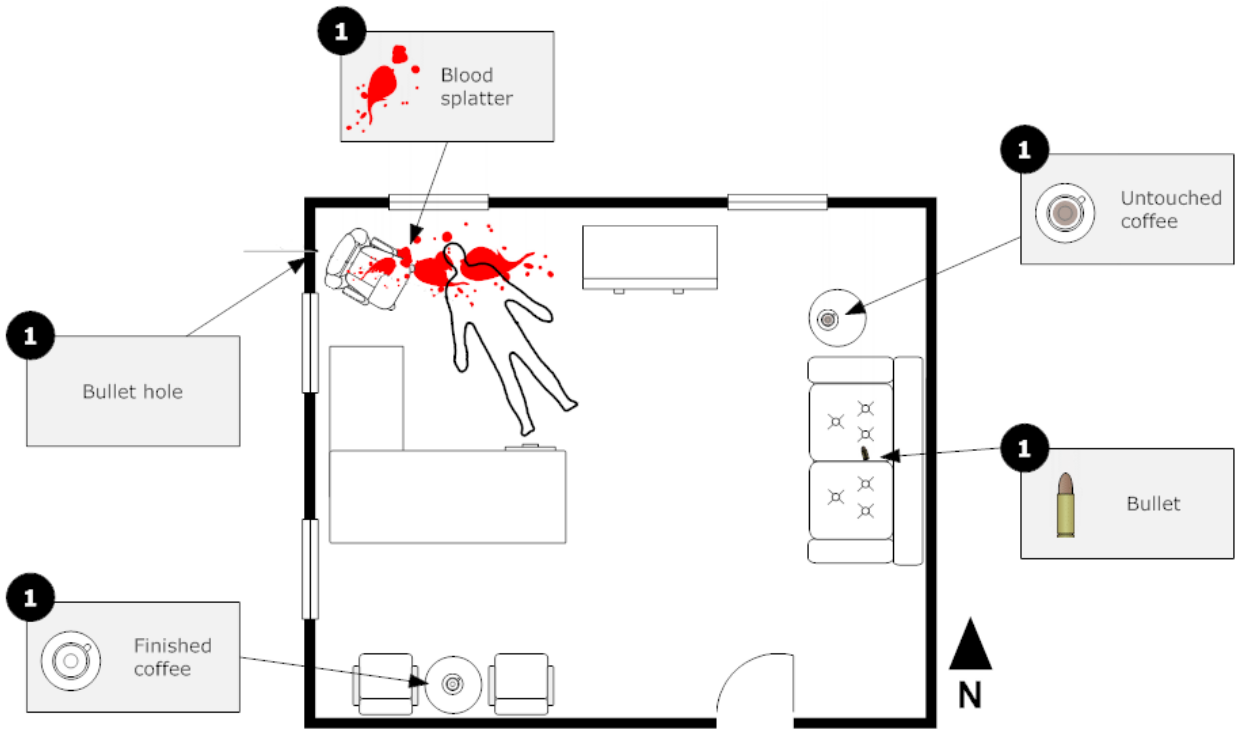


---



**Question Six: [4 marks]**

Forensic scientists look for evidence at the crime scene.



- (a) Put an X on the crime scene map to show where you think the murderer was when he shot the victim.
- (b) Describe how the forensic scientist would find (reveal) and collect (lift) or make a permanent record of the fingerprints at the crime scene.

---

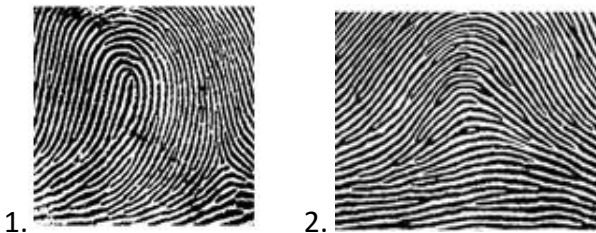


---



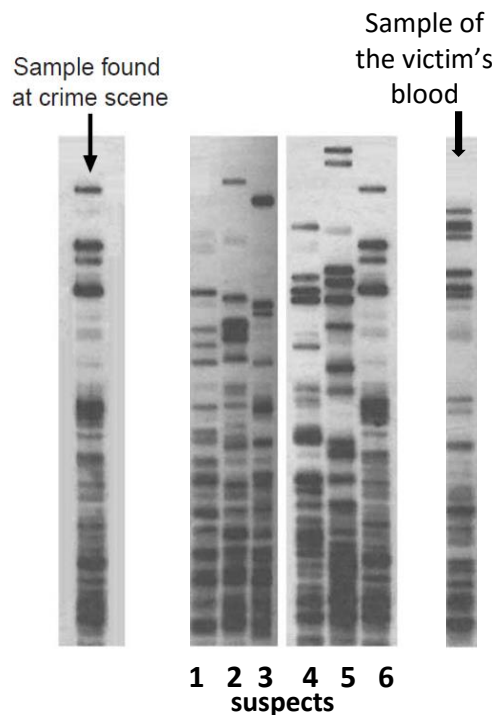
---

- (c) Identify these two fingerprint types.



1. \_\_\_\_\_

2. \_\_\_\_\_



Some DNA was recovered from the crime scene.

- (d) Which suspect has DNA that matches the DNA sample found at the crime scene?

---

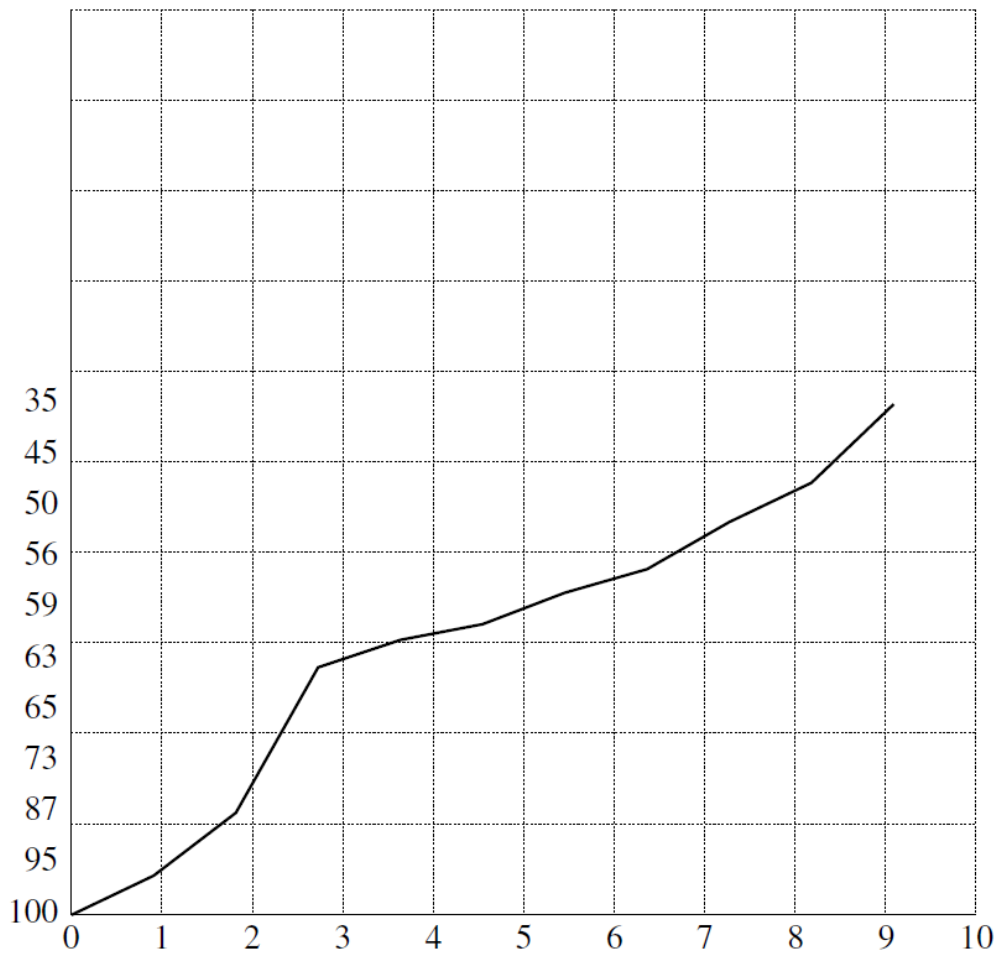
**Question Seven: [3 marks]**

Dion and Raumati did an experiment to observe boiled water as it cooled. Their results are shown in the table.

Time (minutes)	0	1	2	3	4	5	6	7	8	9	10
Temperature (°C)	100	95	87	73	65	63	59	56	50	45	35

Dion's graph is shown below.

List five corrections you would make to Dion's graph.



1.

---

2.

---

3.

---

4.

---

5.

---



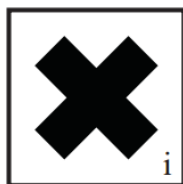
**Question Eight: [4 marks]**

The diagrams show the reactions of some metals with cold water and dilute hydrochloric acid.

- (a) Which symbol would you find on a bottle of hydrochloric acid? (Circle your answer.)



A



B



C



D

Answer the questions, using only the metals that appear in the diagrams.

Metals in cold water

Metals in dilute hydrochloric acid

bubbles of gas

calcium copper iron magnesium zinc

Ca Cu Fe Mg Zn

The diagrams show the reactions of five metals (calcium, copper, iron, magnesium, zinc) with cold water and dilute hydrochloric acid. In the cold water test, calcium and magnesium show significant bubbling, while iron shows a few bubbles. Copper and zinc show no reaction. In the dilute hydrochloric acid test, calcium, iron, magnesium, and zinc all show significant bubbling, while copper shows no reaction.

- (b) Write the names of two metals that react with cold water.
1. \_\_\_\_\_
2. \_\_\_\_\_
- (c) Write the name of one metal that reacts with dilute hydrochloric acid but not with cold water.
- \_\_\_\_\_
- (d) Arrange the five metals in order of reactivity. Use their chemical symbols.

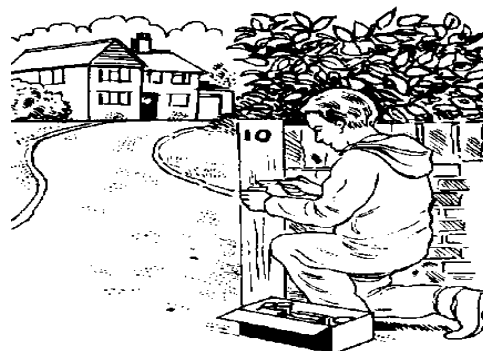
most reactive \_\_\_\_\_ least reactive

**Question Nine: [3 marks]**

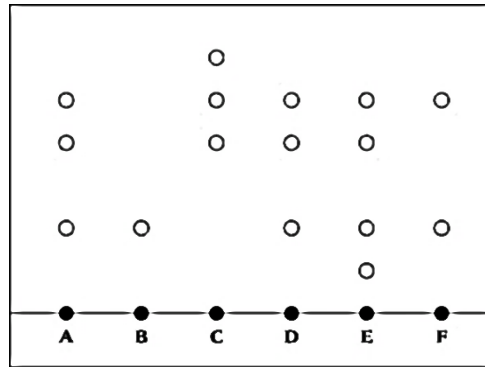
Police were called to 10 Purnell Place because there had been a burglary.

There were bits of red paint on the gatepost.

The police think that the robbers' van scraped the gatepost when they were making their getaway.



The scientists used chromatography to find out the make of the getaway vehicle.



A = Paint from gate post, B-F = Paint samples

- (a) The scientists could not use water as a solvent when they carried out their tests. Why not?

---



---

- (b) Which manufacturer uses the same paint as the paint from the gatepost? How can you tell?

---



---

The chromatography test does not *prove* that the getaway vehicle was made by the manufacturer in your answer to question (c).

Some Courier vans are red, so the marks could have been made when a parcel was delivered.

- (c) How could you show that the paint did not come from a Courier van?

---



---

**Question Ten: [5 marks]**





Liam wanted to take some objects out of the glass tank without getting his hands wet. He used a strong magnet to slide them out of the glass tank. They were (from left to right): glass marble, eraser, copper coin, drawing pin, iron nail, and gold ring.



- (a) Complete the table with the likely observations.

Objects removed from glass tank	Objects that remained in the glass tank

Anna had four magnets. She brought them, one by one, into a box of paperclips. She counted the number of paperclips each magnet attracted.

				
Magnet	A	B	C	D
Number of paperclips attracted	5	7	3	11

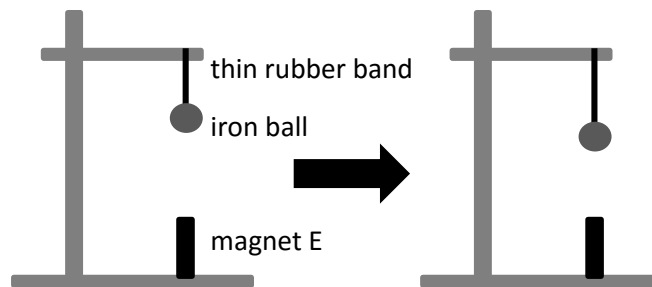
- (b) She concluded “smaller magnets are stronger than larger magnets.” Is her conclusion correct? Explain your answer.

---



---

Allister set up an experiment to compare the strength of 4 bar magnets E, F, G and H. When he placed magnet E under the iron ball, the ball moved downwards.



He repeated the experiment for the other 3 magnets.

- (c) What could he measure to compare the strength of 4 bar magnets?

---



---



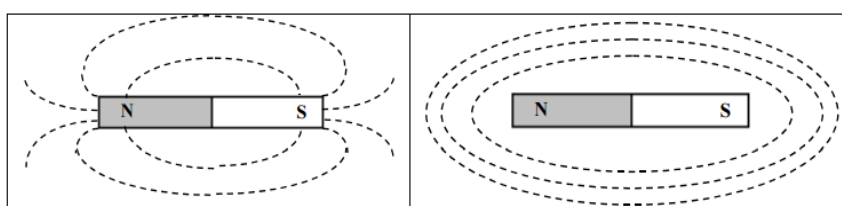
---

- (d) Tom wanted to show the pattern of the magnetic field around a bar magnet.

- (i) Name a substance or a piece of equipment Tom could use to show the pattern of the magnetic field around a magnet.

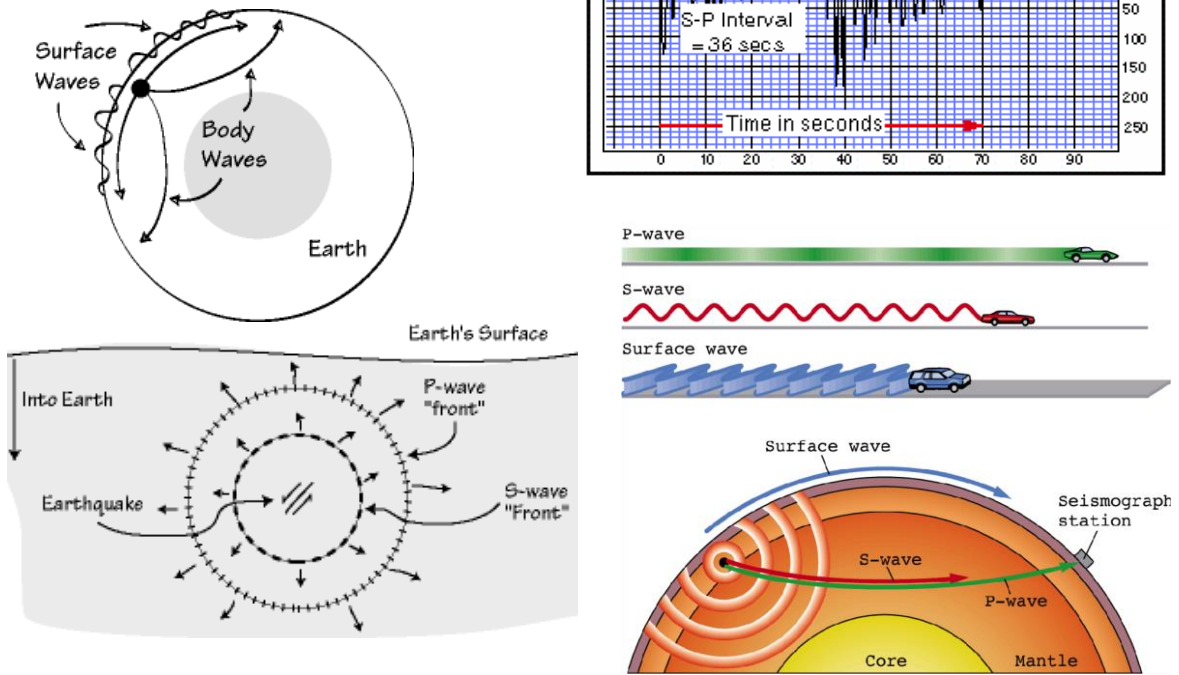
---

- (ii) Write the letter P below the pattern you would expect to get if you did this experiment.



**Question Eleven [6 marks]**

A student collected 4 images from the internet as part of a poster she was preparing for homework.



(a) Give a similarity between P and S waves.

---



---

(b) Give a difference between P and S waves.

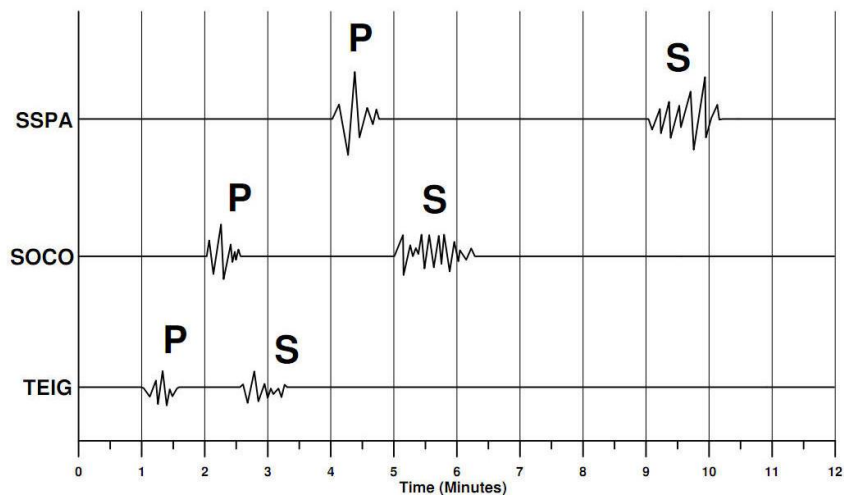
---



---

This shows the arrival of P and S waves at 3 different monitoring stations.

The time difference between arrival of P and S waves for the SSPA monitoring station is 5 minutes.

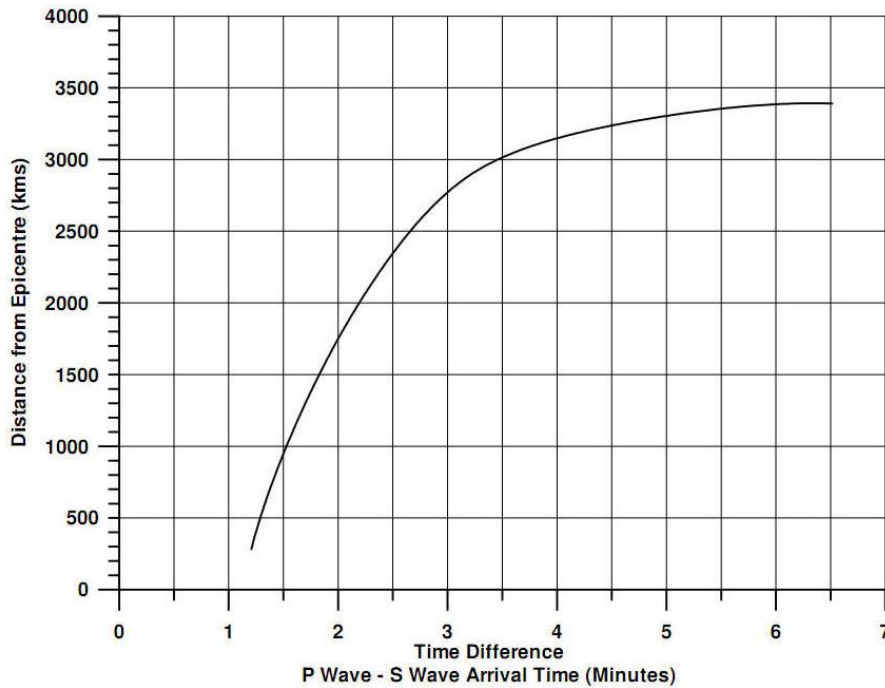


(c) Work out the time difference between P and S waves for the SOCO monitoring station.

---



The graph below can be used to estimate the distance of a monitoring stations from the epicentre. SSPA is 3300 km from the epicentre.

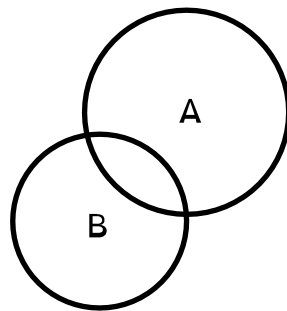


- (d) Use the time difference between arrival of P and S waves to estimate the distance of the SOCO monitoring stations from the epicentre.

SOCO \_\_\_\_\_ km

- (e) To work out the location of an earthquake the distance of the earthquake must be found from at least **three** seismic recording stations.

Why are two stations, stations A and B, not enough?




---



---



---



---

- (f) (i) How is the magnitude of an earthquake estimated? Refer to the example below in your explanation.

---



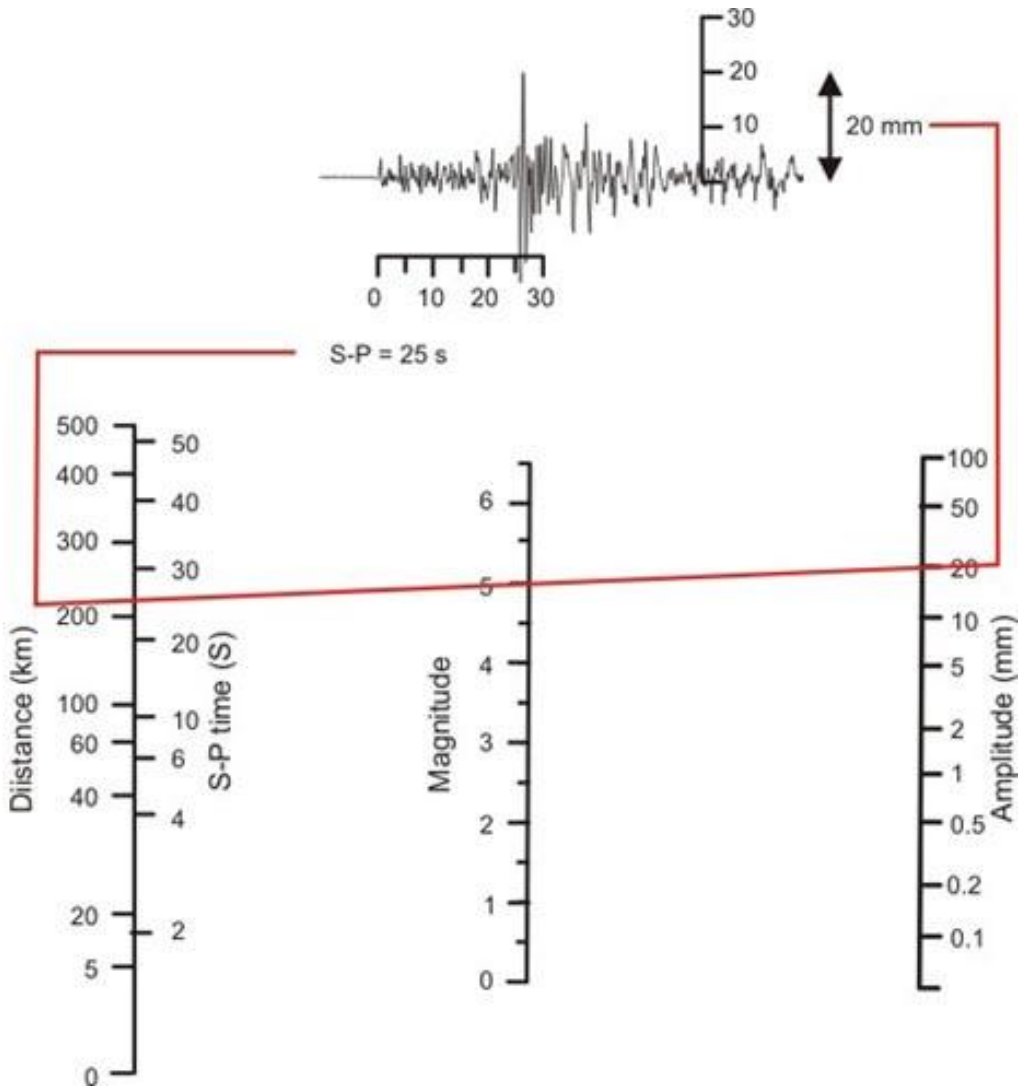
---



---



---



- (ii) If the S-P time is 40 s and the amplitude is 0.5 mm, estimate the magnitude of the earthquake. Show your working on the diagram above .

---

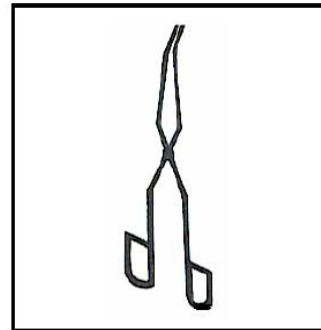
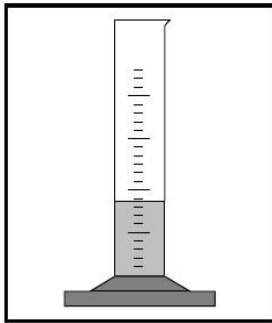


---



**Question Twelve: [5 marks]**

(a) Give one **use** for each of the following pieces of equipment.



Measuring cylinder

---

---

---

---

Tripod

---

---

---

---

Metal tongs

---

---

---

---

(b) Match the correct **unit of measurement** from the list with each of the uses below.

**cm<sup>2</sup>   L   mm   km**

**Volume** of milk in a bottle \_\_\_\_\_

**Distance** from Wanganui to Wellington \_\_\_\_\_

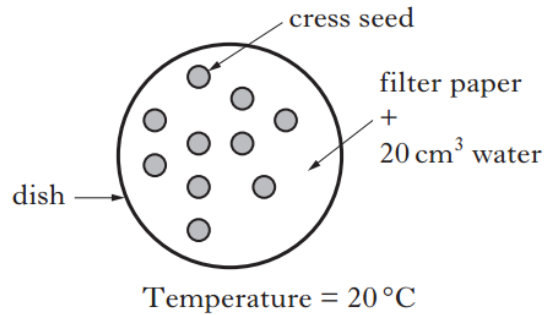
**Diameter** of a coin \_\_\_\_\_

**Area** of a leaf \_\_\_\_\_





A student investigated if water was needed for cress seeds to germinate (start to grow).



(e) Which of the following dishes would be a suitable control for this experiment? (Circle your answer.)

<p><b>A</b></p> <p>Labels: cress seed, filter paper + 0 cm<sup>3</sup> water, dish, Temperature = 20°C</p>	<p><b>B</b></p> <p>Labels: cress seed, filter paper + 0 cm<sup>3</sup> water, dish, Temperature = 30°C</p>
--	--

**Question Fourteen: [5 marks]**

The diagram shows a freely hanging magnet.

(a) What would you expect to notice if a north pole of another magnet was brought close to the north pole of the hanging magnet?

---



---



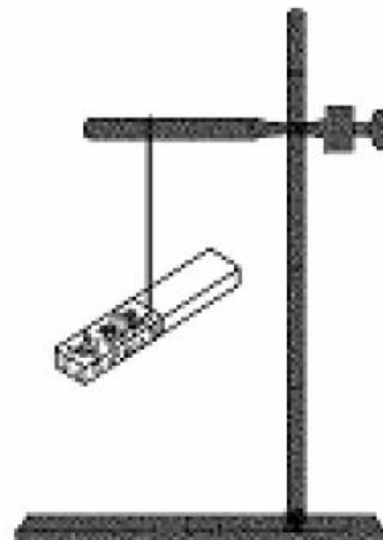
---

(b) What would you expect to notice if a south pole of another magnet was brought close to the north pole of the hanging magnet?

---

(c) Give one everyday use of a magnet.

---



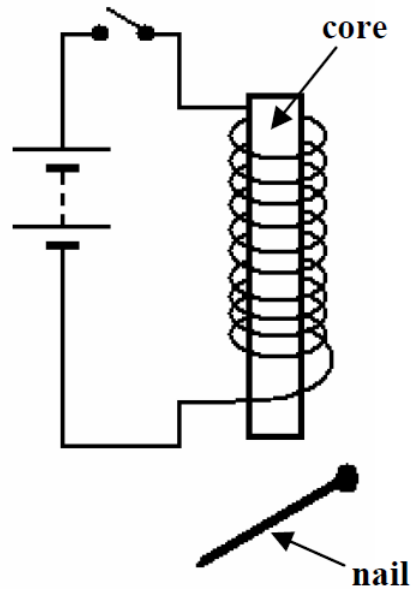
The diagram shows the parts of a simple electromagnet.

(d) Is an electromagnet a temporary or permanent magnet?

\_\_\_\_\_

(e) What happens to the nail when the switch is closed?

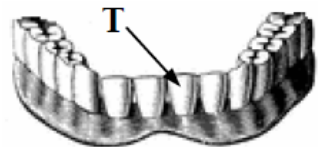
\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



**Question Fifteen: [5 marks]**

(a) A tooth is labelled T in the diagram.

- (i) Write the letter T beside the *type* of tooth labelled T.
- (ii) Tick the **function (job)** of the type of tooth labelled T.

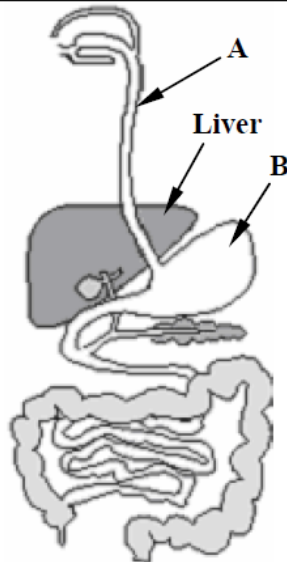


	<b>Canine</b>
	<b>Incisor</b>
	<b>Chewing</b>
	<b>Biting</b>

(b) The diagram shows the human digestive system.

In the table

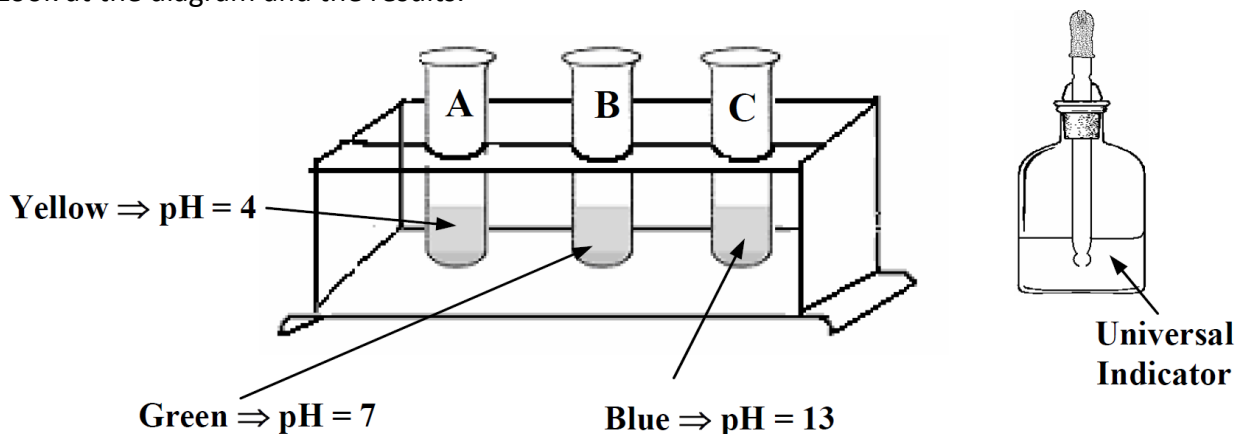
- (i) Write the letter A beside the **name** of the part labelled A.
- (ii) Write the letter B beside the **name** of the part labelled B.
- (iii) Tick the **function (job)** of the part labelled B.

	<b>Intestine</b>	
	<b>Stomach</b>	
	<b>Oesophagus</b>	
	<b>Digestion</b>	
	<b>Egestion</b>	
	<b>Excretion</b>	



**Question Sixteen: [5 marks]**

The diagram shows an experiment to investigate the pH of three different liquids A, B and C. A few drops of universal indicator were added to each liquid in a test tube. Look at the diagram and the results.



- (a) Which test tube, A, B or C, contained distilled water? \_\_\_\_\_
- (b) (i) Which test tube, A, B or C, contained an acid? \_\_\_\_\_  
 (ii) Give a reason for your answer.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- (c) Describe how you could make an indicator solution from some red cabbage and the normal gear you would find in the lab.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

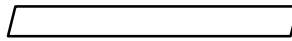
\_\_\_\_\_

\_\_\_\_\_



**Question Seventeen: [6 marks]**

(a) A plastic ruler is charged by rubbing it with a cloth: (Tick one.)



- It can repel small pieces of paper
- It can attract small pieces of paper
- It does nothing when brought near small pieces of paper

(b) A computer monitor is usually covered in dust because: (Tick one.)

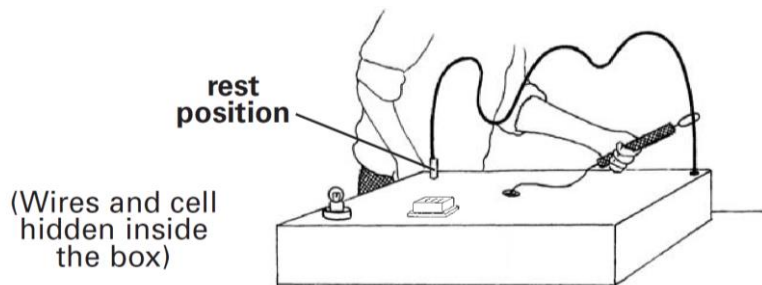
- The room needs cleaning
- The dust is attracted by magnets in the monitor
- The dust is attracted by static charges on the monitor



Janna has made a 'steady hand' game. She has to move a metal ring along a piece of thick metal fence wire until it reaches the rest position.

When she is moving it, the metal ring must not touch the wire.

If it touches the wire, a bulb will light and a buzzer will make a noise.



The metal ring and the thick wire both let electricity through.

(c) What is the **scientific name** for materials that let electricity through?

\_\_\_\_\_

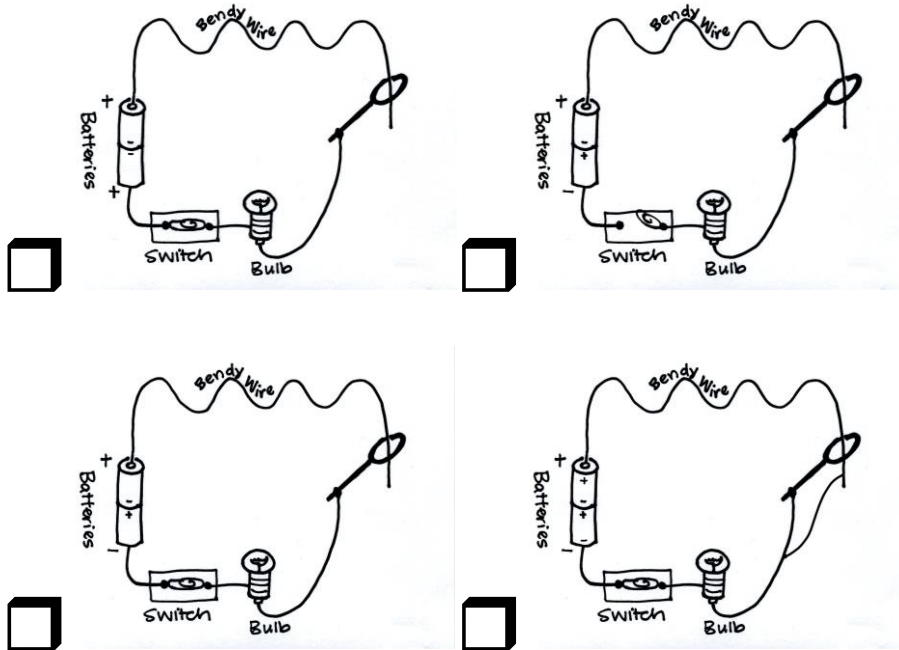
Janna made the rest position by covering the wire with an insulating material. When she puts the metal ring down on the rest position, the bulb and buzzer cannot work.

(d) Which materials could Janna use to insulate the wire for the rest position? Circle the **three** correct answers.

- |             |             |                |
|-------------|-------------|----------------|
| sticky tape | copper wire | plasticine     |
| newspaper   | steel wool  | aluminium foil |

The bulb and buzzer will only work in Janna's game when the metal ring touches the wire.

(e) Tick ONE box to show which is the correct circuit for her game.



Kieran plays the game. He thinks the buzzer should be louder.

(f) How can Janna change her circuit so that the same buzzer makes a louder sound?

---

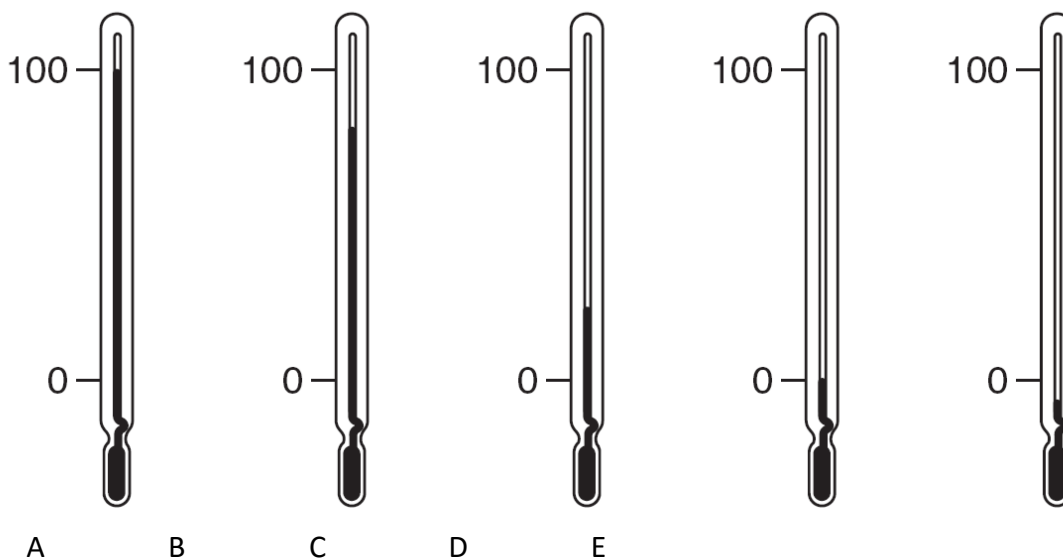
---

---



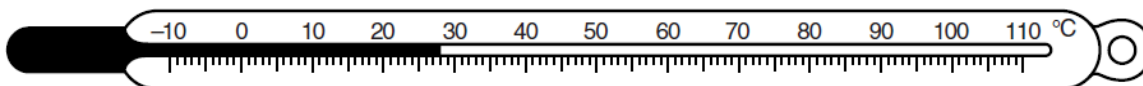
**Question Eighteen: [4 marks]**

The diagram shows four thermometers. Each shows a different temperature.



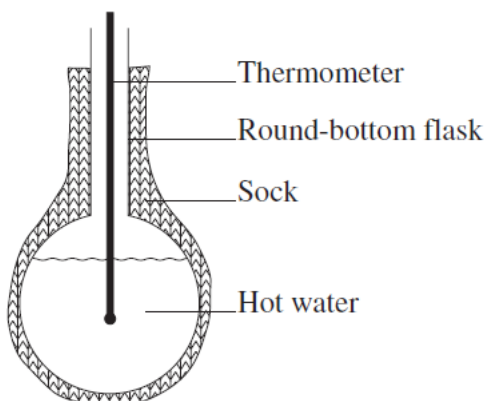
- (a) Answer these questions. Choose A, B, C, D or E.
- (i) This thermometer is in pure boiling water. \_\_\_\_\_
  - (ii) This thermometer is below the freezing point of water. \_\_\_\_\_
  - (iii) This thermometer is at normal room temperature. \_\_\_\_\_

- (b) Colour in the scale on the thermometer so that it shows a temperature of 82°C.



A student designed an experiment to find out which of three types of sock material was the best insulator (best at preventing heat loss).

- He covered a round-bottom flask containing hot water with a sock and recorded the temperature of the water after 10 minutes.
- He then repeated the experiment using socks made of the other materials.



He wrote down one thing he needed to keep the same to make this a fair test.

I will make sure the room temperature is the same for each experiment.  
If the room was colder for one experiment then the hot water would cool down faster in that experiment.

(c) Write down TWO more things he should keep the same, and give reasons for your answers.

1.

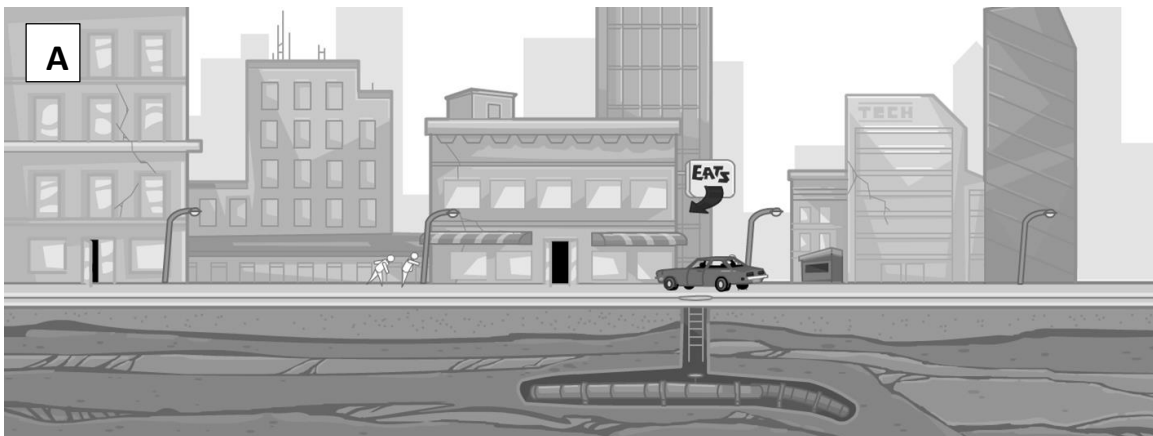
Reason:

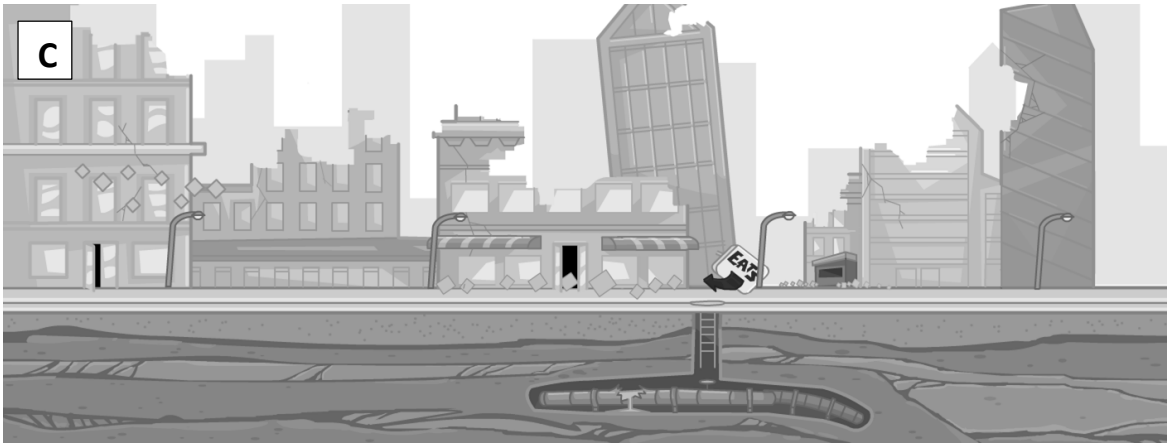
2.

Reason

**Question Nineteen: [4 marks]**

Match pictures A – D with the Modified Mercalli Intensity Scale.





Intensity	Effect	Picture
I	People do not feel any earth movement	
II	People might notice movement if they are at rest and/or on the upper floors of tall buildings	
III	Most people indoors feel movement, people moving outdoors might not and hanging objects swing back and forth	
IV	Dishes, windows and doors rattle. A few people outside may feel movement and parked cars rock.	
V	Sleeping people are woken up and doors may open and close.	
VI	People may have trouble walking, objects fall and furniture moves, plaster in walls might crack but damage is considered slight.	
VII	People have difficulty standing, cars shake and damage is considerable in poorly built buildings.	
VIII	Drivers have trouble steering. Tall structures such as towers and chimneys might twist and fa, Well-built buildings suffer slight damage	
IX	Well-built buildings suffer considerable damage and some underground pipes are broken.	
X	Most buildings and their foundations are destroyed. Some bridges are destroyed and dams are seriously damaged.	
XI	Buildings collapse and bridges are destroyed and underground pipelines are destroyed	



## CHECK YOUR ANSWERS

Only do this if you have answered all the exam questions.

V S V V P F F R M L Y Y C T F T T T  
 U W J F K V B A E P E J S Z R R E N  
 X H Y O I O T B Y T E K N T M V W J  
 P S B M O C R D T E E B P C A Y V J  
 B W U N M Y I E G H Y M A P N N T U  
 Z H M R E L P C G A A I O F T T D I  
 X F P U A I O W R L U R N M X U W Y  
 L U K A P N D V C U A Z Z O R B N K  
 H N A A I D F I L T E R E K A E B L  
 F N P C S E F L I A O Y Z B S B H B  
 M E A S U R I N G P G O I N O A V T  
 R L N G O G G L E S D N U T Z S L U  
 P K J W A Q R D X C C B V C S I S F  
 V G K L C K I B P B Z J A C L N O U  
 W C X G D G N B Z J R N B X A S D C

BASIN  
 BUNSEN  
 CYLINDER  
 FLASK  
 GOGGLES  
 PAPER  
 STAND  
 TUBE

BEAKER  
 CLAMP  
 EVAPORATING  
 FUNNEL  
 MAT  
 PIPETTE  
 THERMOMETER

BOSS  
 CONICAL  
 FILTER  
 GAUZE  
 MEASURING  
 SPATULA  
 TRIPOD

