

NAME:	SCIENCE TEACHER: (circle code)	<b>9BA</b>
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# SCIENCE

Year 9 Examination 2014

9BA – 90 marks

Answer all questions in the spaces provided on the paper.

Show all your working in calculations.

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

Check you have pages 1-26.

*For Teacher Use*

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Marks gained																
Marks available	2	3	2	4	4	3	2	3	6	2	4	2	3	3	3	4

Question	17	18	19	20	21	22	23	24	25	26	27	Total
Marks gained												
Marks available	4	4	2	2	3	4	5	3	3	4	6	90

**ANSWER ALL QUESTIONS IN THE SPACES PROVIDED**

**Question One: [2 marks]**

It is very important to be safe in the laboratory.



Write down any TWO things the students are doing wrong, why this is dangerous & what they should be doing instead.

1. What is wrong

Why this is dangerous

What they should they be doing instead

2. What is wrong

Why this is dangerous

What they should they be doing instead

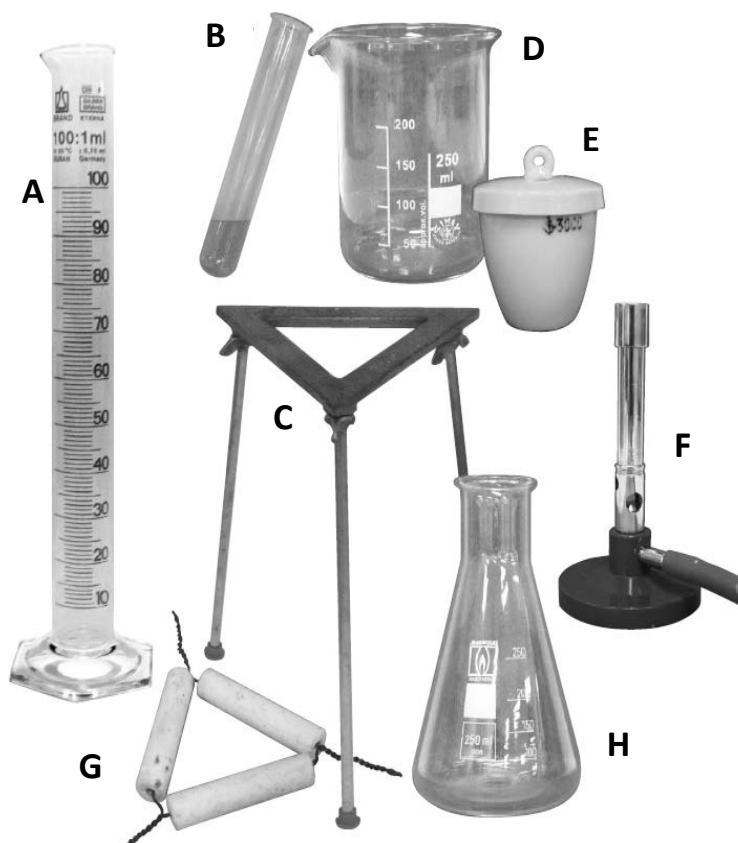
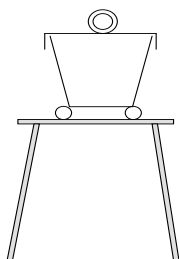
**Question Two: [3 marks]**

- (a) Name the pieces of apparatus **A**, **B** and **F**.

A	
B	
F	

- (b) Give the letters of the pieces of apparatus shown in the diagram below.

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- (c) Draw the scientific diagram (2D) of the apparatus for apparatus D and H.

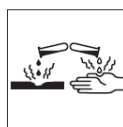
D	H

**Question Three: [2 marks]**

- (a) Four of the symbols used on containers are shown.



A



B



C



D

Some chemicals have symbols on their containers. What name is given to these symbols?  
Circle the correct answer.

**health**

***danger***

***hazard***

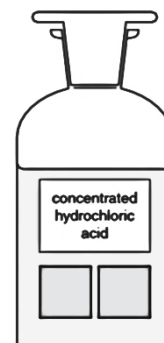
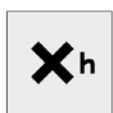
- (b) Sodium cyanide is poisonous.

Which symbol (A, B, C or D) should be placed on a bottle of sodium cyanide?

- (c) Which symbol (A, B, C or D) should be placed on a can of petrol?

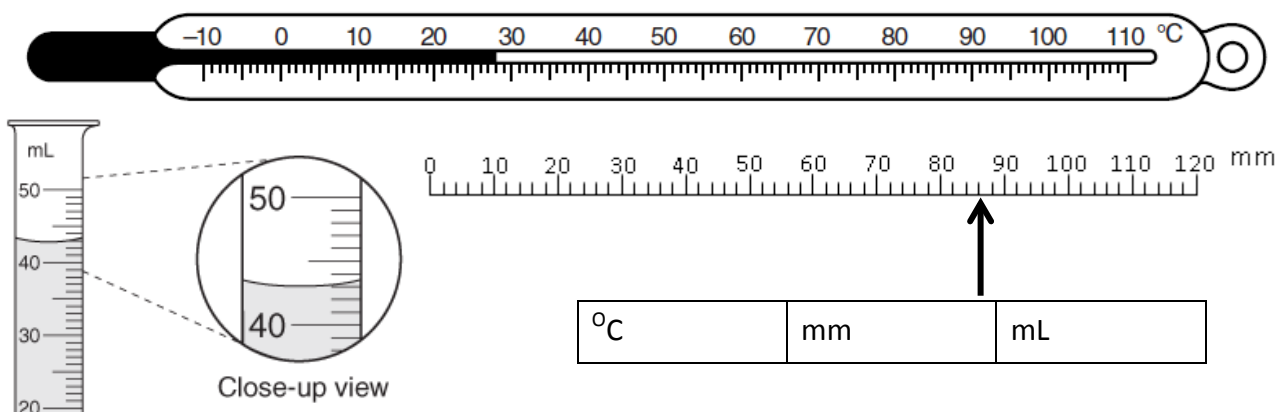
- (d) Concentrated hydrochloric acid is toxic and corrosive.

Circle the two symbols that should go on a bottle of the acid.

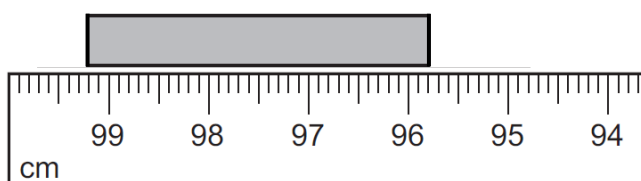


#### Question Four: [4 marks]

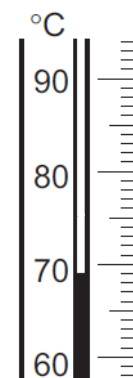
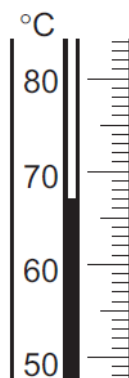
- (a) Read the scales on the apparatus below.



- (b) How long is the rod?



- (c) What is the **difference in temperature** between the two thermometers?

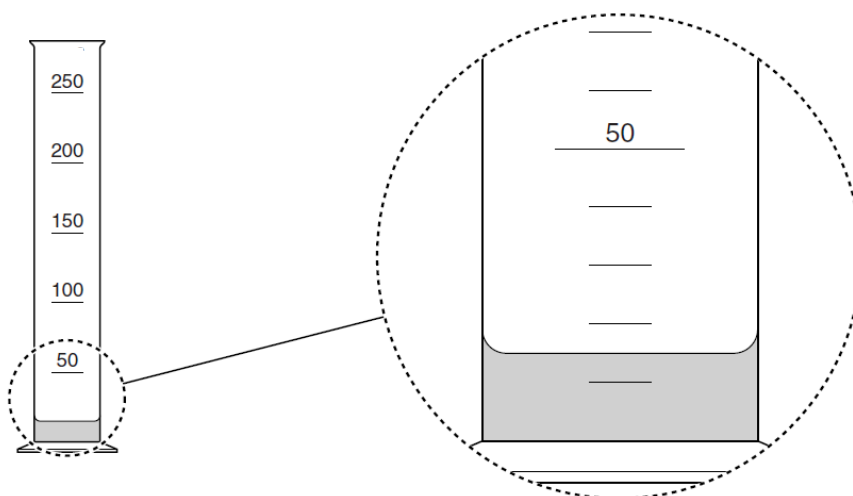
The time, to the nearest second, on this stopwatch is 17 s.

Turn the reading on the stopwatch below from minutes and seconds into seconds. (Show your working).




- (d) (i) Estimate the volume of the liquid in the measuring cylinder below.

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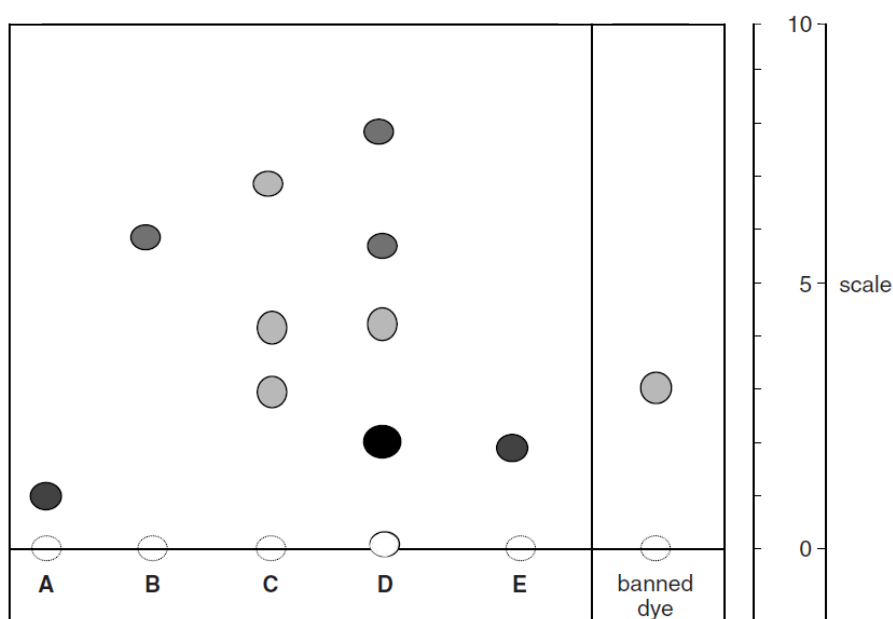


- (ii) On the enlarged part of the diagram, draw the liquid level when another 25 mL of liquid has been added to the measuring cylinder.

### Question Five: [4 marks]

Scientists are concerned that some fizzy drinks may contain a banned food dye.

They test five drinks, A, B, C, D and E. This is the result of their tests.



(a) What is this separation technique called?

(b) Which drink, A, B, C, D or E, may contain the banned food dye? Explain how you know.

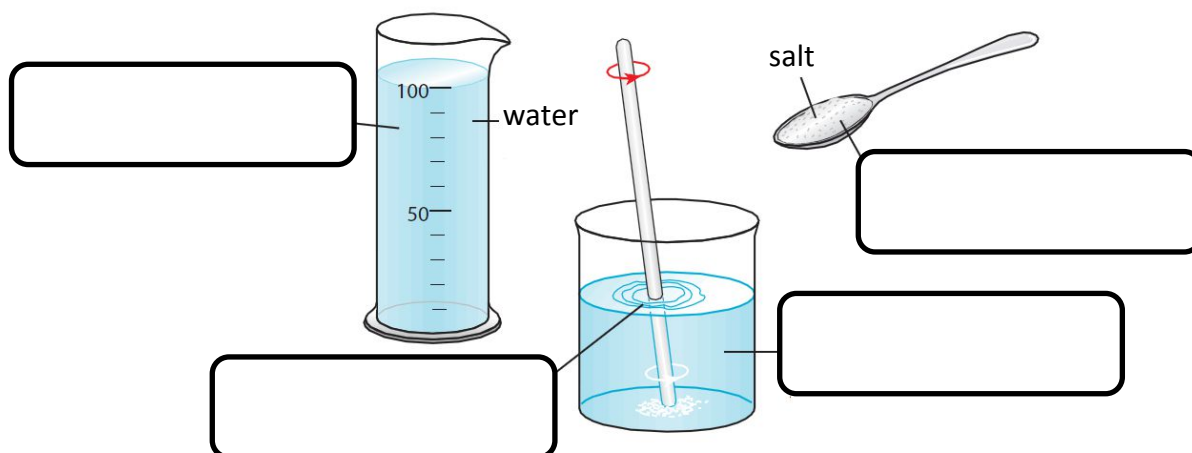

(c) Which drink has the largest number of food dyes in it?

(d) Drinks A and E both look the same colour. Explain how you know that they each contain different dyes. You should refer to the scale in your answer.


**Question Six: [3 marks]**

(a) Complete the diagram using the following words.

***dissolving    solute    solution    solvent***



(b) The following is a list of apparatus.

***balance    condenser    filter funnel    pipette    thermometer***

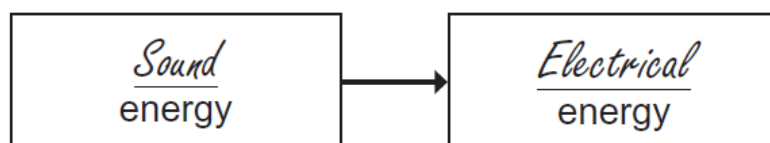
From the list, name one piece of apparatus which must be used when each of the following experiments is carried out.

(i) separating mud from muddy water

(ii) separating water from salty water

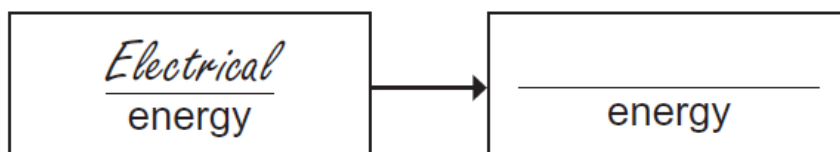
### Question Seven: [2 marks]

A microphone changes sound energy into electrical energy, as shown in the energy flow diagram below.

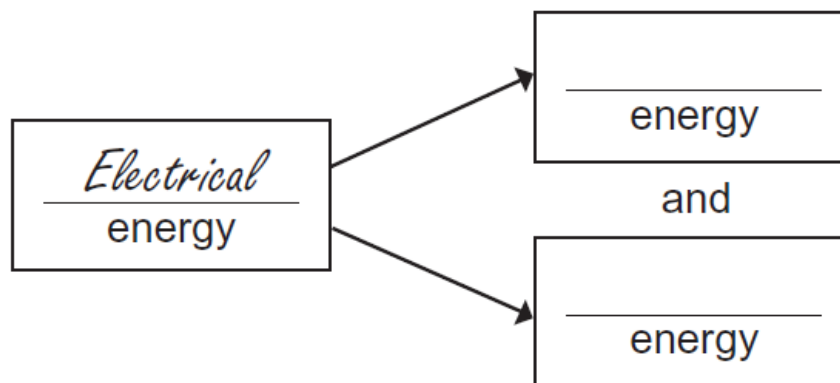


Fill in the spaces to show the energy changes the electric oven and TV are designed to bring about.

Electric oven



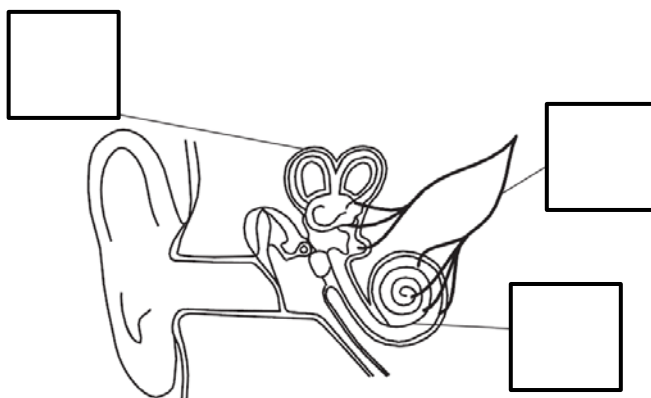
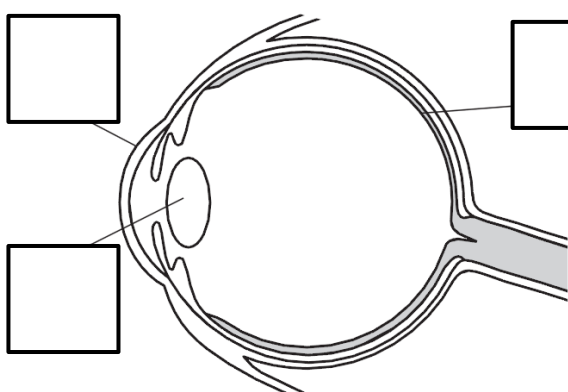
TV



### Question Eight: [3 marks]

The diagrams below represent an eye and an ear. Label the diagrams by entering the correct letter in each box.

A. auditory nerve	B. cochlea	C. cornea
D. lens	E. retina	F. semi-circular canals



**Question Nine: [6 marks]**

- (a) Which THREE following are light sources? Circle your answers.

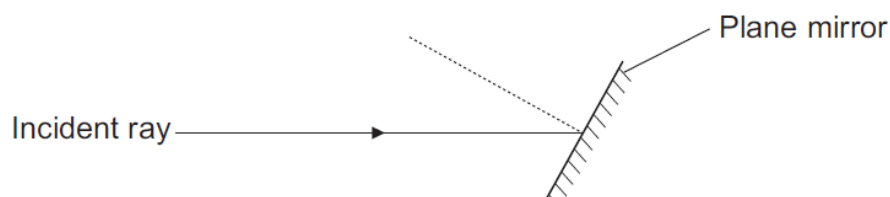
*cinema screen      Sun      glow worm      tv screen      Moon*

- (b) Place these objects in the correct columns.

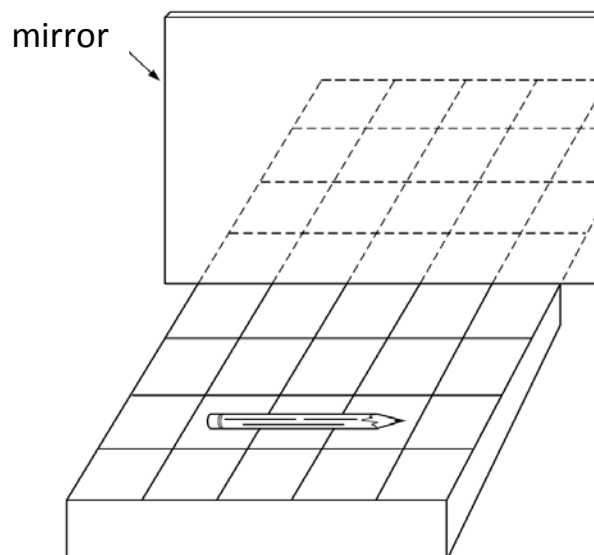
*glad wrap      mirror      water      wood      waxed paper*

Transparent	Translucent	Opaque

- (c) A plane mirror reflects a light ray. Carefully draw the reflected ray on the diagram.

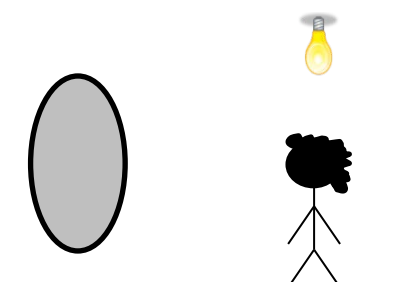


- (d) The picture shows a pencil that is lying on a shelf in front of a mirror. Draw a picture of the pencil as you would see it in the mirror. Use the patterns of lines on the shelf to help you.



- (e) Imagine you are looking at an image of yourself in a plane (flat) mirror. Some light falls on your hair and makes it shine.

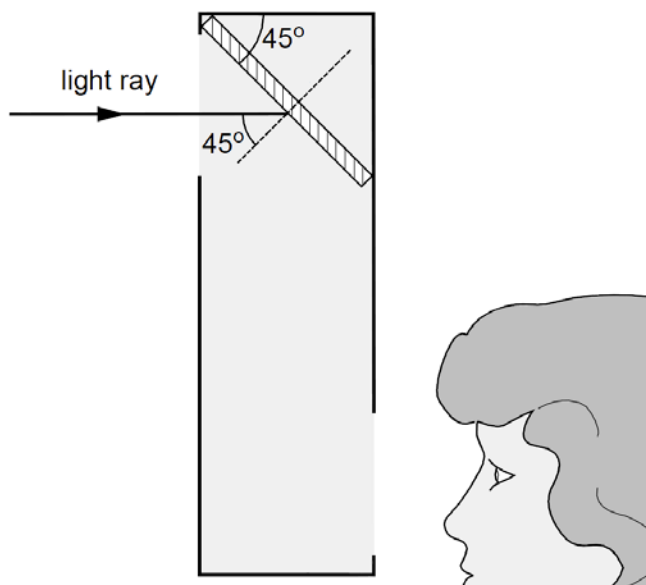
How does the light get from your hair into your eye? You may draw on the diagram to help explain your answer.



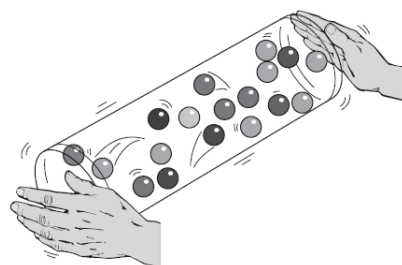
- (f) A person uses a periscope made from two plane mirrors to look over the heads of a crowd.

Complete the diagram below to show how the light ray enters the person's eye. Use a ruler.



### Question Ten: [2 marks]

A student shakes a tube containing small balls to model the movement of particles in a gas.



- (a) Why is this a good model for the movement of particles in a gas? Tick (✓) TWO boxes.

☐

The balls move slowly.

☐

The balls are different colours.

☐

The balls are far apart from each other.

☐

The balls move randomly.

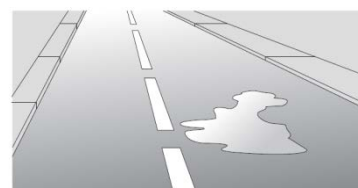
- (b) The table below lists melting points & boiling points of substances A, B, C and D.

Substance	Melting point ( $^{\circ}\text{C}$ )	Boiling point ( $^{\circ}\text{C}$ )
A	808	1465
B	114	444
C	-7	59

- (i) What is meant by the term melting point?

- (ii) What state is substance C in at  $70^{\circ}\text{C}$ ?

The picture shows a puddle of water in a road, after a rain shower. During the day, the puddle of water dries up and disappears.

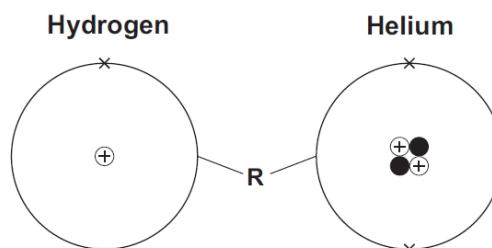


- (c) Describe one change in the weather which would cause the puddle of water to dry up faster.

**Question Eleven: [4 marks]**

- (a) The diagrams show an atom of hydrogen and an atom of helium.

Draw a ring around the correct answer to complete each sentence.



- (i) The centre of each atom is called the  
*molecule      nucleus      shell*
- (ii) The circle (labelled R) around the centre of each atom is called  
*a bond      an electrical charge      an energy level (shell)*

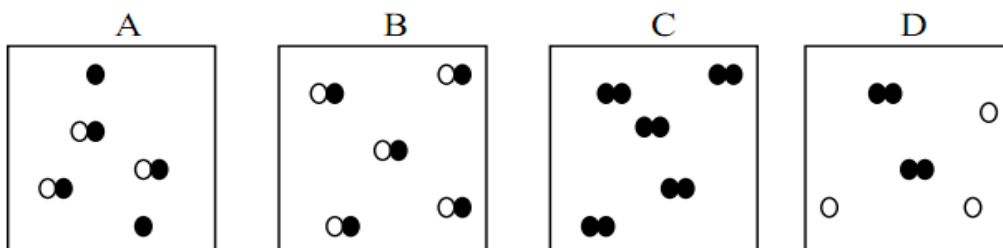
- (b) Draw one line from each question to its correct answer. One answer will not be needed.

Question	Answer
How many protons are there in the hydrogen atom?	1
How many electrons are there in the helium atom?	2
What is the mass number of the helium atom?	3
	4

- (c) Which of the substances below are elements and which are compounds?

<i>water H<sub>2</sub>O</i>	<i>salt NaCl</i>	<i>mercury Hg</i>	<i>helium He</i>	<i>hydrogen H<sub>2</sub></i>
Elements			Compounds	

- (d) The atoms of different elements are represented by the symbols ● and ○.



- (i) Which diagram represents a mixture of two elements? \_\_\_\_\_
- (ii) Which diagram represents one compound only? \_\_\_\_\_
- (iii) Which diagram represents one element only? \_\_\_\_\_

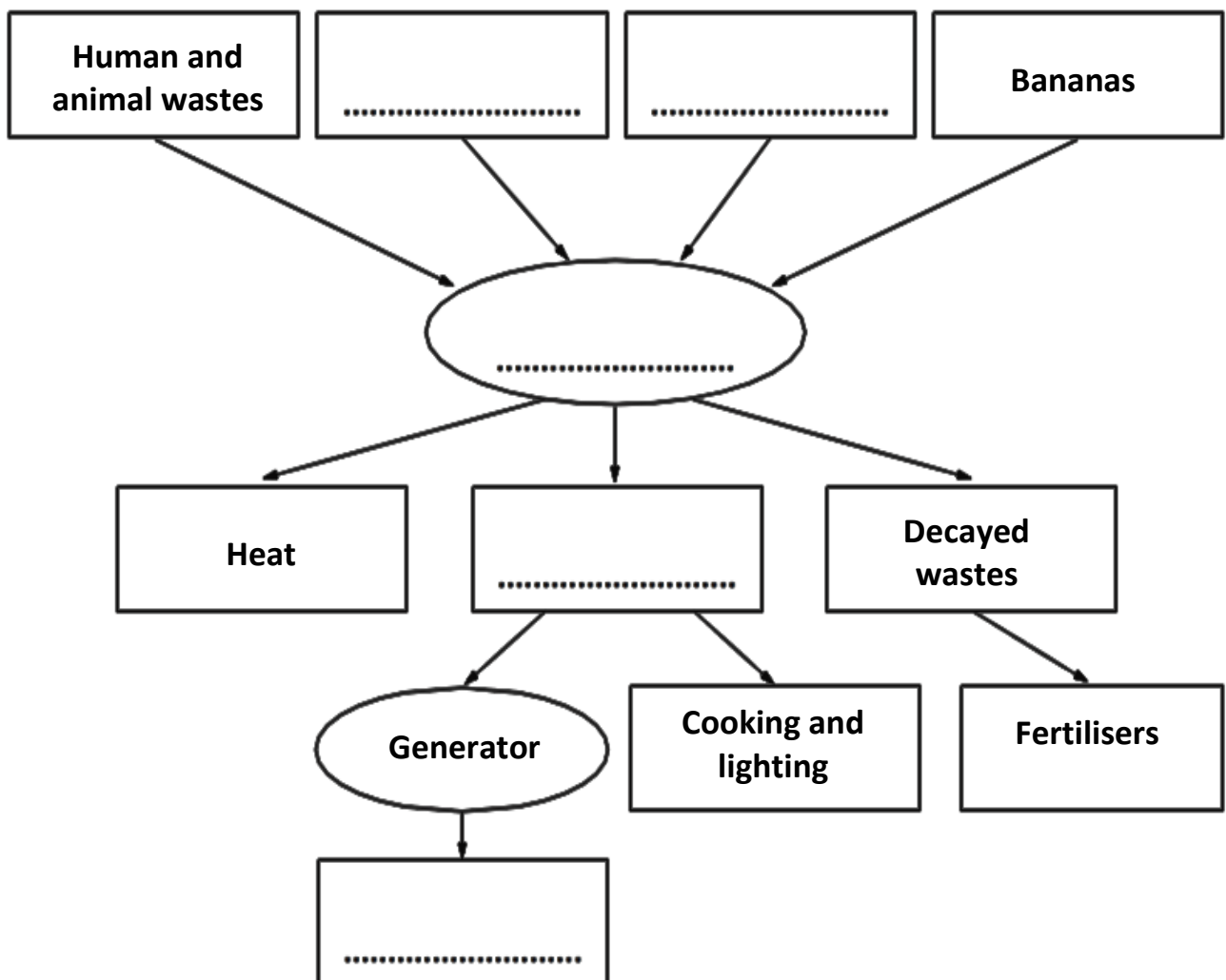
**Question Twelve: [2 marks]**

The people of Xinbu, a village in China, are now generating electricity and producing their own fertilisers using biogas digesters. A biogas digester is a place where plant and animal wastes decay to produce heat and methane gas.

The wastes used include human and animal wastes, sugar, grass and bananas. The methane gas produced is used for cooking, lighting and generating electricity. The decayed wastes are then recycled as fertilisers for their crops.

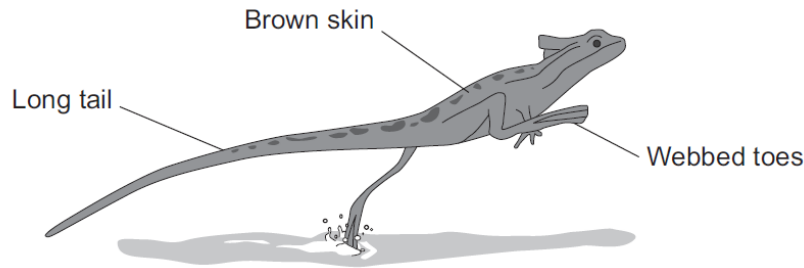


Use the information above to complete the flowchart.



### Question Thirteen: [3 marks]

The picture shows a basilisk lizard. Some of the adaptations of the lizard are labelled.



Basilisk lizards are often found resting on branches of trees that grow next to water. Basilisk lizards can run across the surface of the water.

- (a) Draw one line from each adaptation of the lizard to the advantage of the adaptation. (One advantage will NOT be needed).

Toes on the back feet are webbed

Long tail

Brown skin

For camouflage on branches of trees

Helps the lizard to balance when running

Warning colours to deter predators

Increases surface area in contact with water

- (b) Suggest one advantage to the basilisk lizard of being able to run across the surface of the water.

- (c) Animals, such as lizards, compete with each other. Circle **two factors** animals compete for.

**oxygen**

**food**

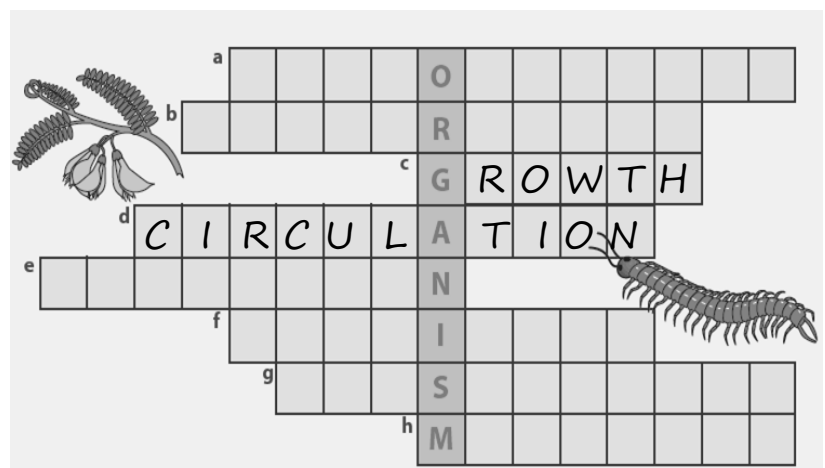
**territory**

**light**

### Question Fourteen: [3 marks]

Complete this puzzle about the characteristics of living things using the clues. Two have been done for you.

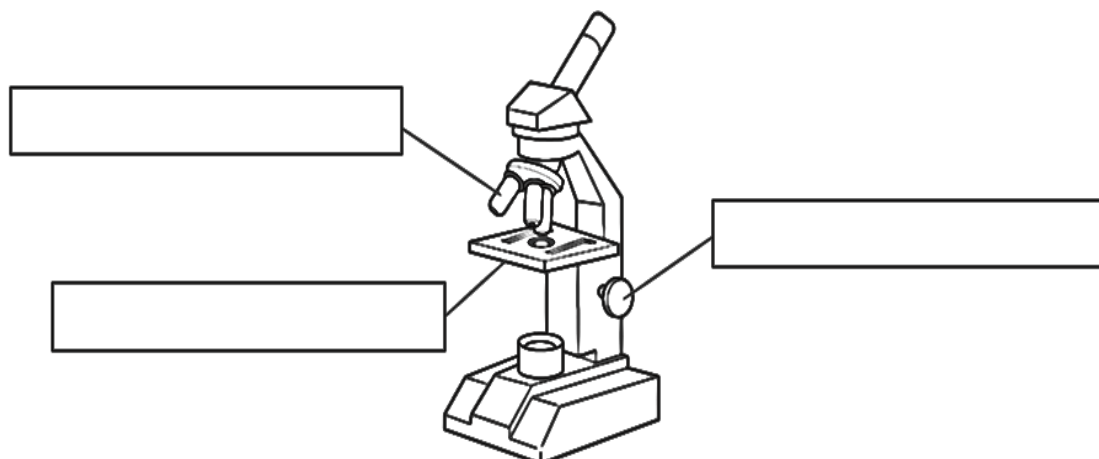
- a producing offspring
- b releasing energy from food
- c enlarging in size or changing life stages
- d moving materials around body
- e disposing of waste chemicals
- f producing or consuming food
- g detecting changes in the environment and responding
- h moving part or the whole of the body



**Question Fifteen: [3 marks]**

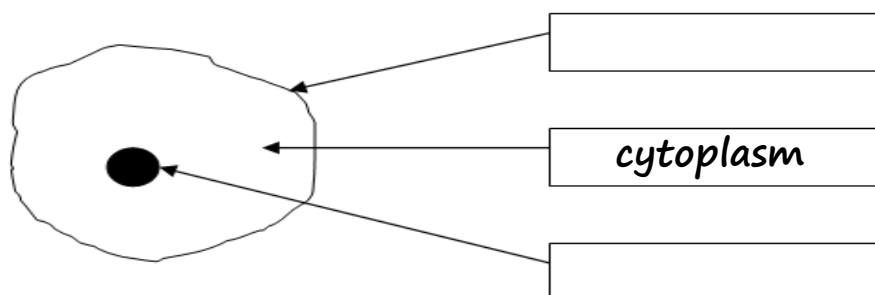
- (a) Complete the labels on this diagram of a microscope. Choose from this list.

*eyepiece lens lamp focus knob nosepiece objective lens stage*



- (b) The microscope in the drawing is used with a  $\times 10$  eyepiece and a  $\times 40$  objective lens. Calculate the magnifying power of the microscope.

- (c) Label this diagram of a human cheek cell.



- (d) A pupil prepared a microscope slide of onion cells using water. Diagram A shows how the cells looked when first seen with the microscope. Diagram B shows their appearance after the addition of another liquid.



Diagram A



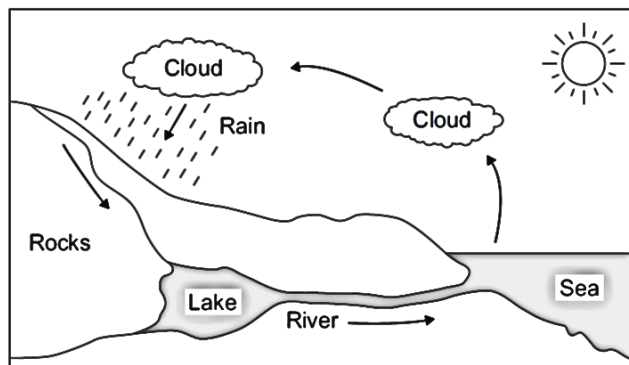
Diagram B

What name is given to a liquid used to make cell structures easier to see?

**Question Sixteen: [4 marks]**

Most drinking water used in the NZ is taken from lakes and rivers.

The water cycle shows how water gets into lakes and rivers.



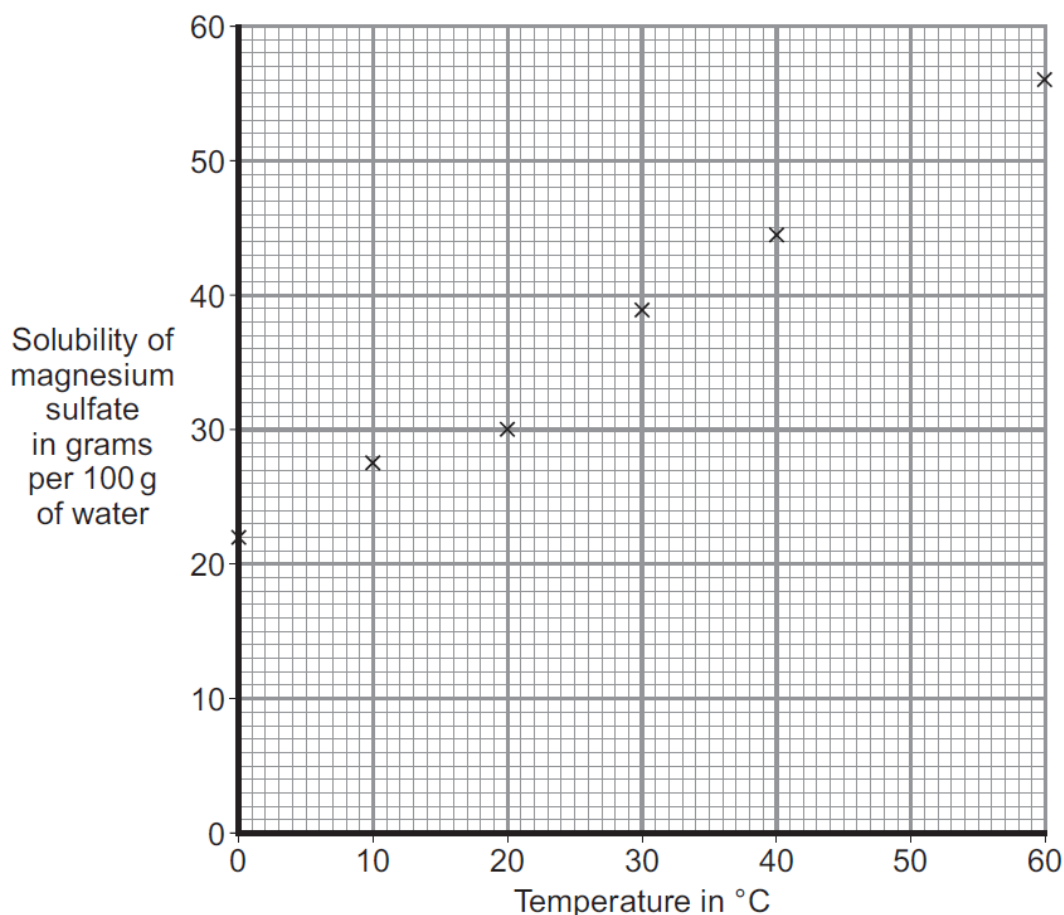
(a) Complete the paragraph using the words below.

*condensed    dissolved    evaporated    filtered    sterilised*

- (i) During the water cycle, water is \_\_\_\_\_ from the sea to form water vapour.
- (ii) Some substances in the rocks are \_\_\_\_\_ by rainwater.
- (iii) Drinking water taken from rivers and lakes is \_\_\_\_\_ to remove solids and \_\_\_\_\_ with chlorine.

(b) The water in the lake contains some dissolved magnesium sulfate. A student did an investigation to find the maximum mass of magnesium sulfate that dissolves in 100 g of water at different temperatures.

The graphs show the results of the investigation.



- (i) Complete the graph by drawing a line of best fit.
- (ii) Use the graph to find the maximum mass of magnesium sulfate that dissolves in 100 g of water at 50 °C.

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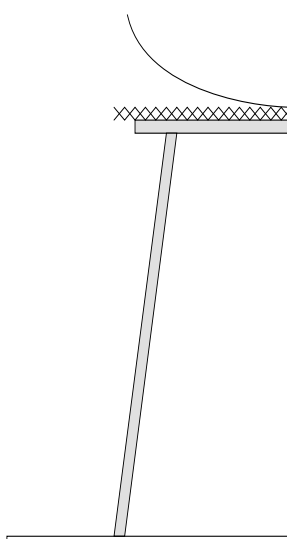
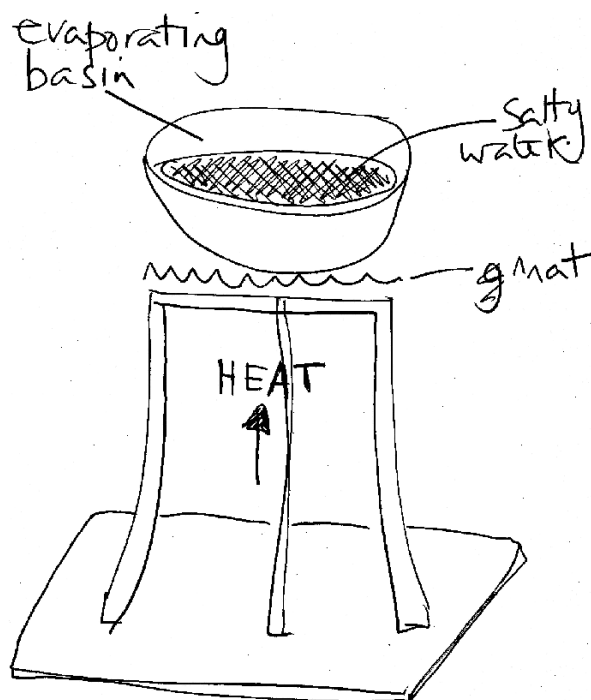
- (iii) Describe the trend (pattern) shown by the graph.


### Question Seventeen: [4 marks]

A student evaporated some salty water. They drew a diagram of the apparatus but they made a number of mistakes.

Complete the diagram correctly, as a 2D diagram.

Label it.



**Question Eighteen: [4 marks]**

Absorption	11	Radiation – gamma	19
Aerial	3	– infrared	4
Burglar alarm	6	– ultraviolet	8
Computer– desktop	15	Radio waves	9
– laptop	18	Reflection	5
Cooking	13	Remotecontrol	3
Heat loss – conduction	2	Security light	7
– convection	2	Sunbeds	9
Light	1	Television	10
Medical images	21	Transmitter	14
Microwaves	12	Wavelength	1
Mobile phone	12	Wireless network	23
Optical fibre	17	X-rays	20

- (a) What page was this picture probably found on?



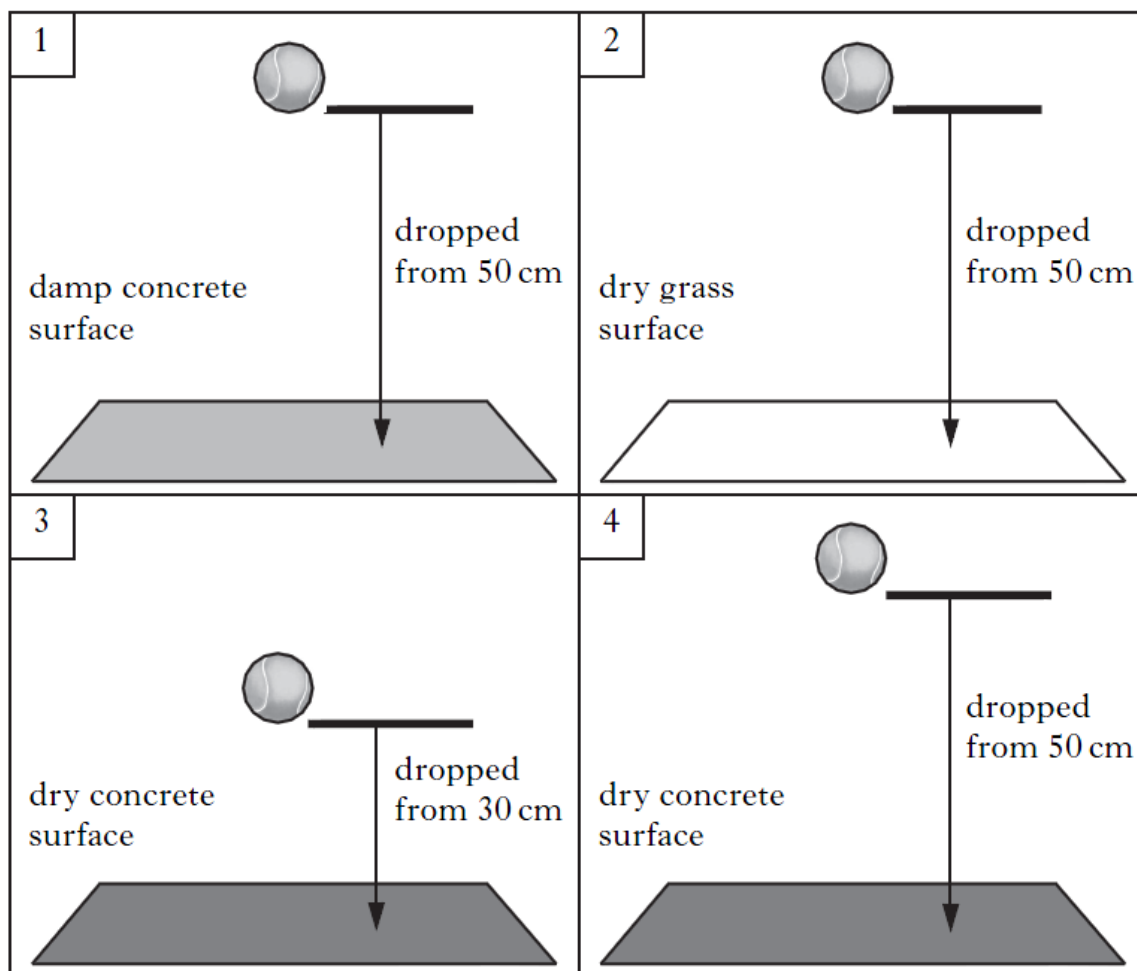
- (b) Which **two pages** should you look up to find out about using microwaves for cooking?


- (c) Aroha looked up pages **18** and **23**. What was she trying to find out about?




**Question Nineteen: [2 marks]**

Marek investigated how high tennis balls bounce. For each experiment, he measured how high the tennis ball bounced after it hit the surface.



- (a) Marek wanted to find out if the **dampness of the surface** affected how high the **tennis ball** bounced.

Which two boxes show the experiments he should compare for a fair test?

Box \_\_\_\_\_ and Box \_\_\_\_\_

- (b) Marek compared the experiments in boxes 3 and 4.

What was he trying to find out?

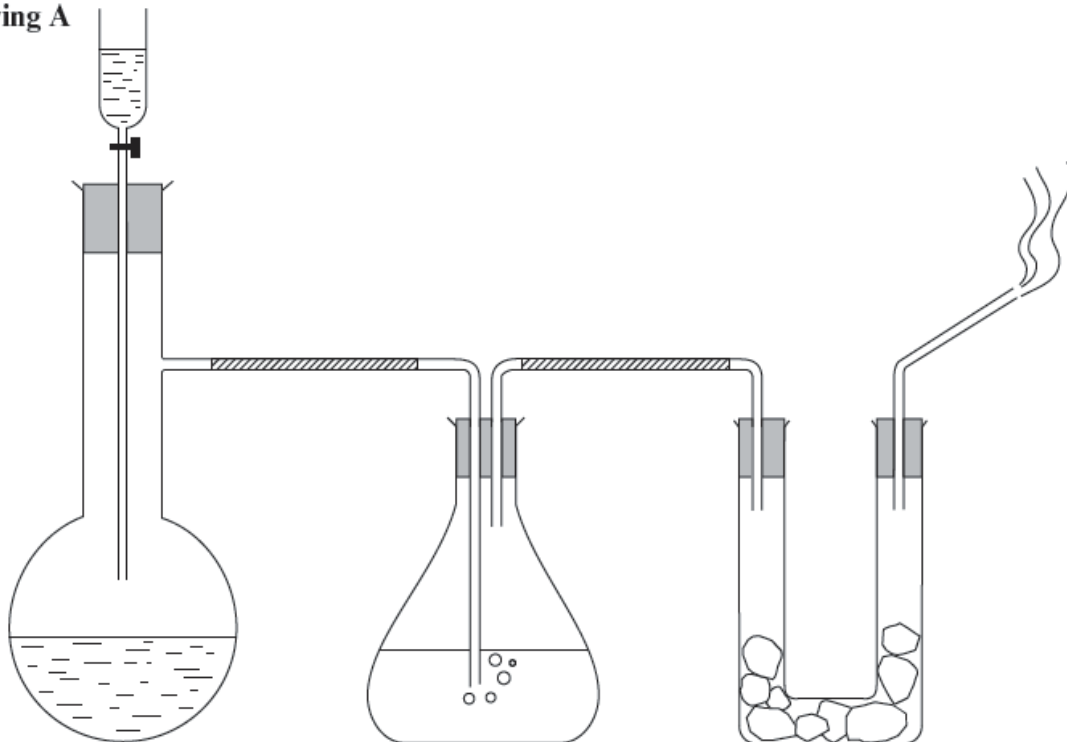

**Question Twenty: [2 marks]**

Look carefully at the two drawings of apparatus set up for an experiment.

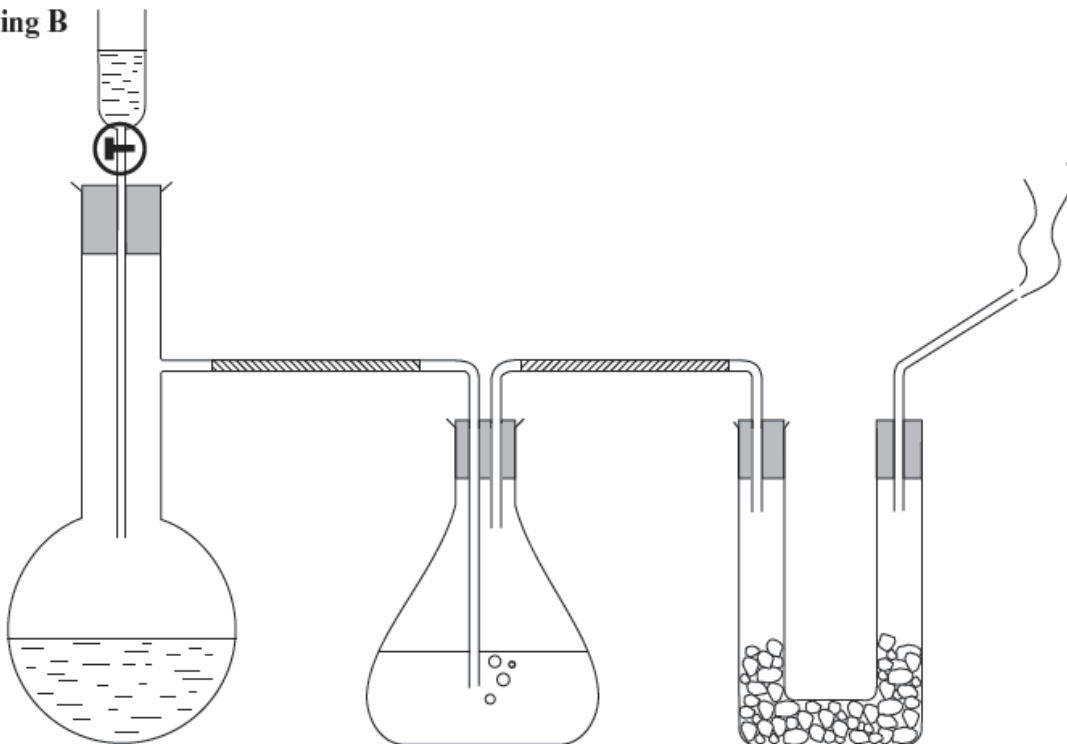
There are some differences between the drawings A and B. One of these has been found for you.

Draw a neat circle around **five** more differences on drawing B.

**Drawing A**



**Drawing B**



**Question Twenty One: [3 marks]**

Materials have many important uses.

(a) Match each material, using lines, to one of its uses. One has been done for you.

<u>Material</u>	<u>Use</u>
polythene	drinks can
glass	coffee mug
aluminium	plastic bag
ceramics	window pane
	bridge

(b) Bottles can be made from glass or plastic. Give an advantage of using plastic to make bottles.


(c) Which material, (A, B, C or D) would be a liquid at 50°C?

	melting point °C	boiling point °C
<b>A</b>	−100	80
<b>B</b>	−73	−10
<b>C</b>	−60	40
<b>D</b>	95	280

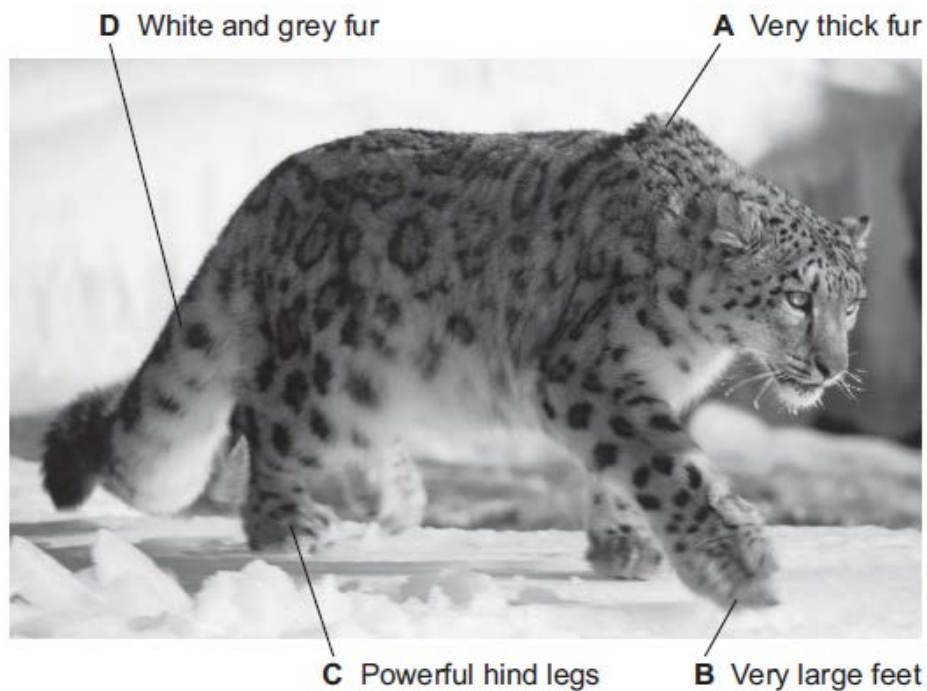
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**Question Twenty Two: [4 marks]**

The snow leopard lives in rocky areas in mountains.

The winters there are very cold and the ground is covered in snow.

The snow leopard feeds on animals such as deer.



(a) Match labels, A, B, C and D, with the adaptations below.

- \_\_\_\_\_ camouflages the leopard against the snow and rocks
- \_\_\_\_\_ stops the leopard from sinking into snow
- \_\_\_\_\_ protects the leopard against very cold air temperatures
- \_\_\_\_\_ helps the leopard to move quickly in the mountains

(b) A year 9 student made a poster of a food web (see below)

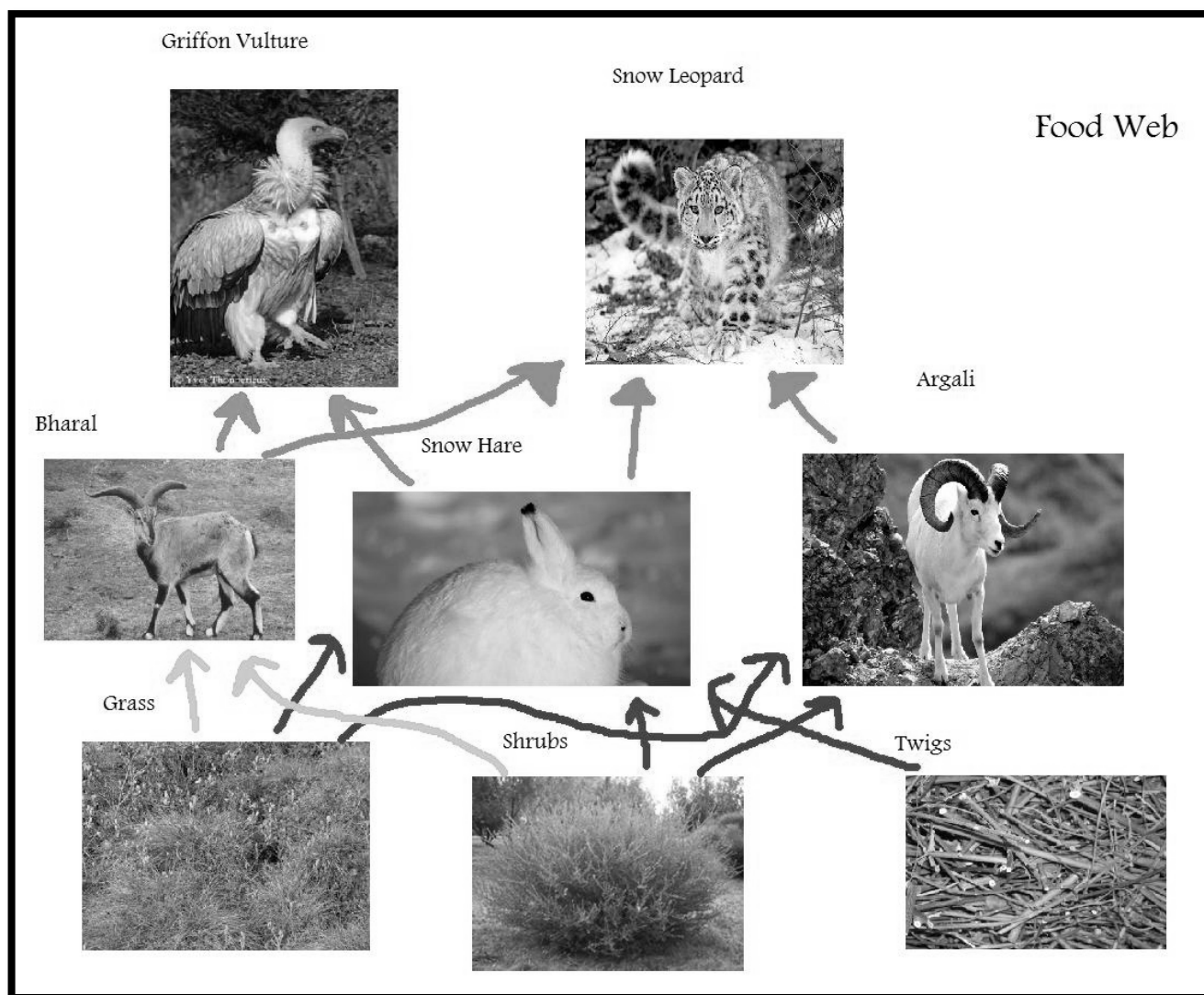
(i) Why is grass known as a producer?


(ii) What do Argali eat?

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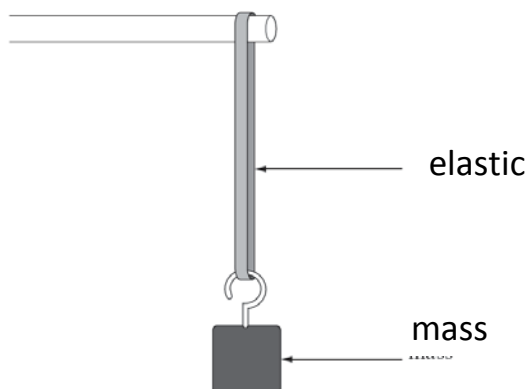
(iii) Which is a food chain from this web? (Circle your answer).

- A Shrubs → Argali → Griffon Vulture
- B Snow Leopard → Snow Hare → Grass
- C Grass → Bharal → Snow leopard
- D Twigs → Snow Hare → Argali



### Question Twenty Three: [5 marks]

The class did an experiment to see if cold elastic bands stretched more than warm elastic bands. They placed elastic bands in beakers of hot, warm and cold water. They left them there until needed.



They put the bands, one at a time, on the apparatus below.

They added a 100 g mass to each and measured how much the bands stretched.

- (a) What **two** things must they keep the same to make this a fair test?

1.
2.

- (b) Why must they leave the elastic band in the water until needed for the experiment?


The results of the experiment are shown below.

Type of water	Amount stretched (cm)
cold	12.0
warm	15.2
hot	18.9

- (c) What was the effect of heat on the stretch of the elastic bands?


- (d) Suggest **one** way of making this experiment more reliable.

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**Question Twenty Four: [3 marks]**

The table below gives information about some substances found in the laboratory.

Substance	Melting point °C	Boiling point °C	Conductor of electricity (when melted)
Copper	1084	2570	good
Lead chloride	501	950	good
Copper chloride			
Lead	327	1740	good
Sand	1610	2230	poor

(a) Copper chloride is a good conductor of electricity, melts at 620°C and boils at 990°C. Add this information to the table.

(b) Which substance has the highest boiling point?

(c) Name one substance which is a poor conductor of electricity.

**Question Twenty Five: [3 marks]**

The level of sound is measured in decibels (dB). The table below shows the level of some common sounds.

Sound	Normal breathing	Rustle from a newspaper	People talking	A busy road	Thunder	Live band (music)
Sound level (dB)	10	30	50	80	110	115

(a) Loud sounds above 85 dB can damage our ears.

Which **two** sounds in the table above could damage our ears?

1	2
---	---

(b) Using the information in the table, suggest the sound level for:

A school disco	A school exam room
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**Question Twenty Six: [4 marks]**

Information:

Chemical	Added to water	Gently heated
sand	does not dissolve	does not burn
salt	dissolves	does not burn

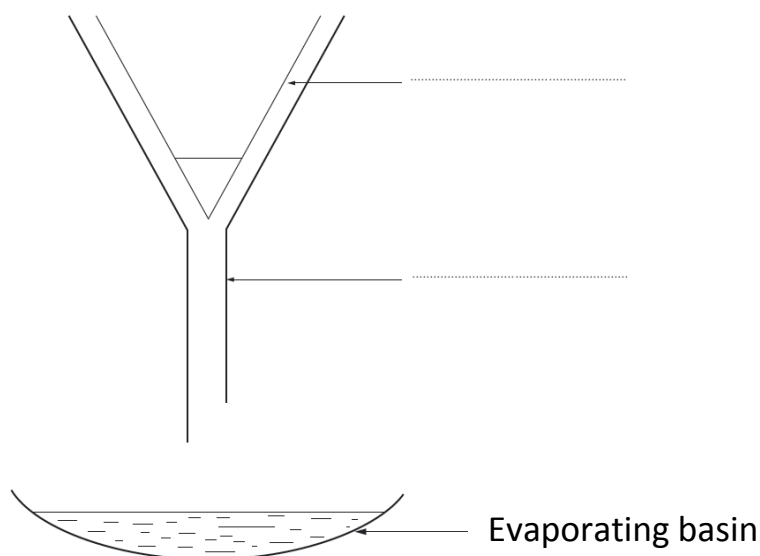
Jayne needs to separate some sand and salt which have become mixed together.

To do this Jayne adds the mixture to some cold water in a beaker and stirs.

(a) What will happen when she does this?


(b) Jayne pours the mixture through the apparatus shown below.

Label the apparatus used in this experiment.



(c) What will happen to the sand when the mixture is poured in this apparatus?


(d) How can she remove any water left in the evaporating basin?



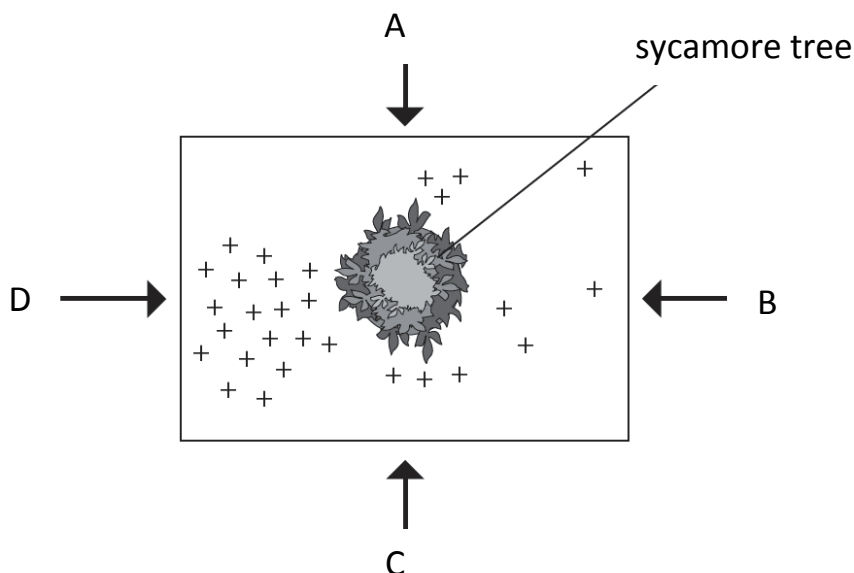
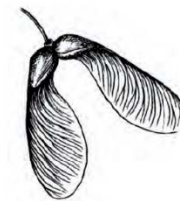

### Question Twenty Seven: [6 marks]

The seeds of some plants [like sycamore] have wings that help them fly like a helicopter. This helps them fly further from the tree where they were from.

Pupils collected seeds that had fallen from the tree. They marked where they found the seed on the diagram below.

The + shows where a seed was found.

The arrows show *possible* directions that the wind was blowing.

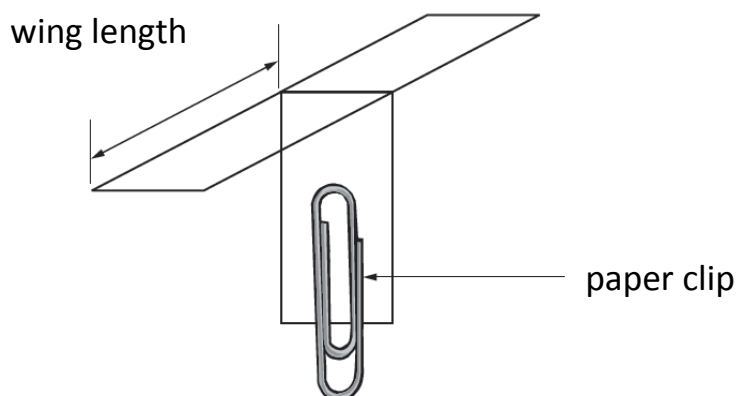


(a) In which direction do you think that the wind usually blows from?

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(b) Why did you choose this direction?


The class made simple models of the seed to check if the length of the wings had any effect.



The class let each model fall from a height of 2 metres in a classroom.

The time taken for each type of seed to fall is shown below.

Length of wing (cm)	Time taken to fall (s)
2	2
4	4
6	6
8	9

- (c) Why did they let each model fall from 2 metres? Give TWO reasons.

1.
2.

- (d) How long would it take a model with 5 cm wings to fall?

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- (e) What is the effect of having longer wings?


- (f) What else could make a difference to the time taken for the model seed to fall? Give THREE factors.

1.
2.
3.

**CHECK YOUR ANSWERS!**