

NAME:	SCIENCE TEACHER: (circle code)	9BC
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SCIENCE

Year 9 Examination 2014

9BC – 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 1-24.

For Teacher Use Only

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	1-16	17	18	19	20	21	22	Total
Marks gained								
Marks available	50	5	5	6	8	8	8	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

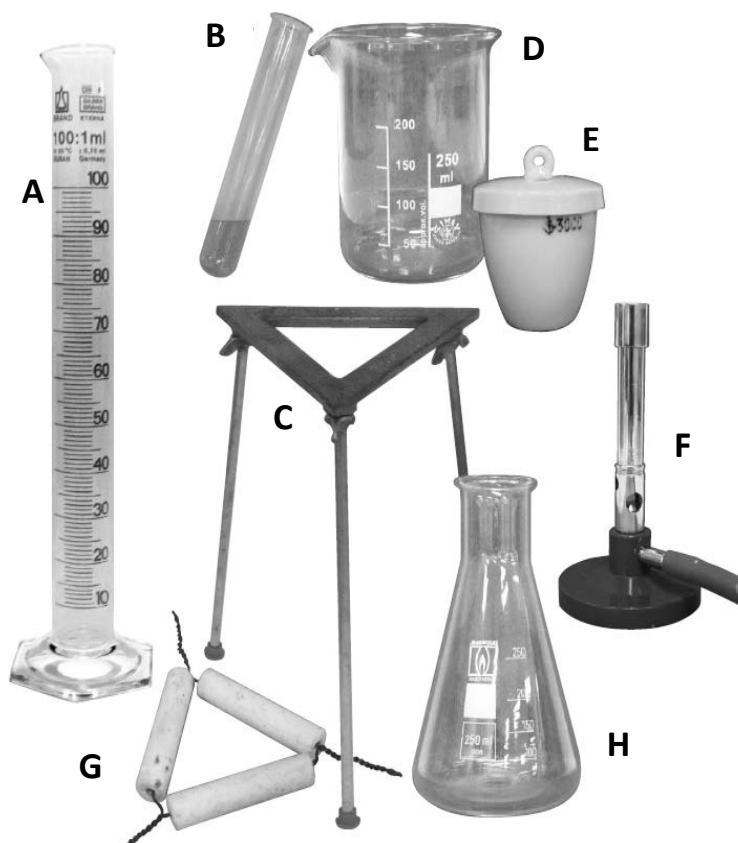
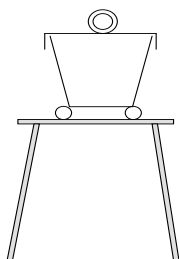
Question Two: [3 marks]

- (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.

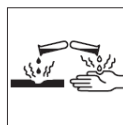
D	H

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

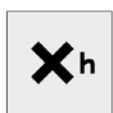
(b) Sodium cyanide is poisonous.

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?

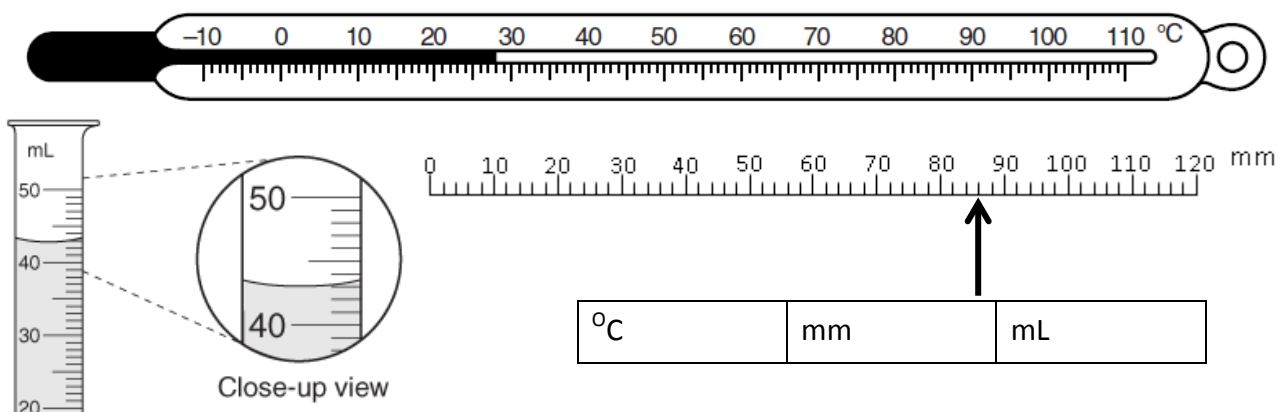
(d) Concentrated hydrochloric acid is toxic and corrosive.

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

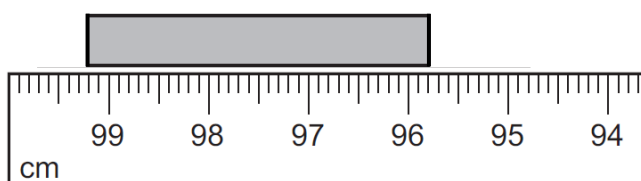


Question Four: [4 marks]

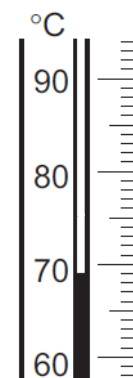
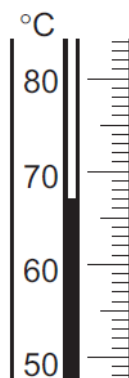
(a) Read the scales on the apparatus below.



(b) How long is the rod?



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



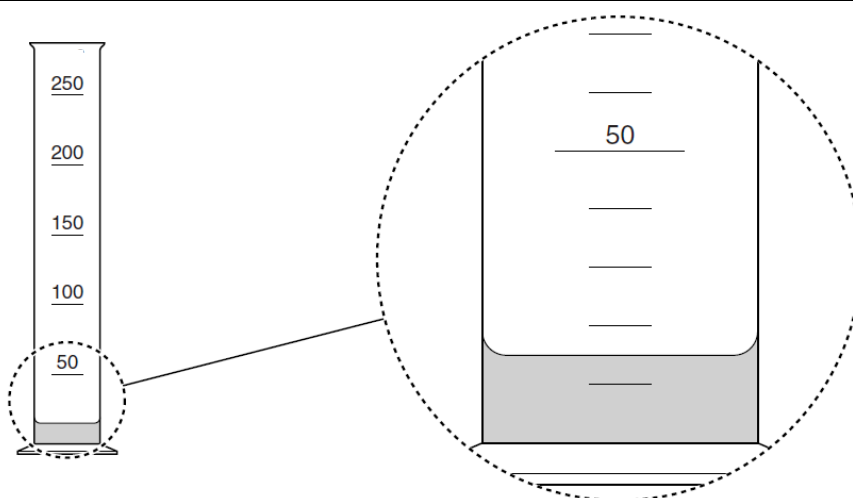
The time, to the nearest second, on this stopwatch is 17 s.

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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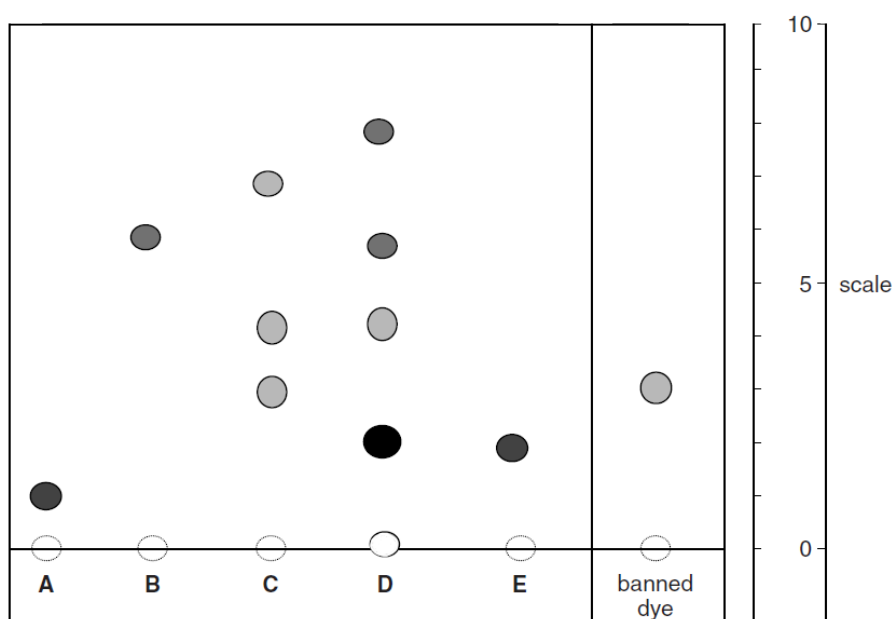


- (ii) On the enlarged part of the diagram, draw the liquid level when another 25 mL of liquid has been added to the measuring cylinder.

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.

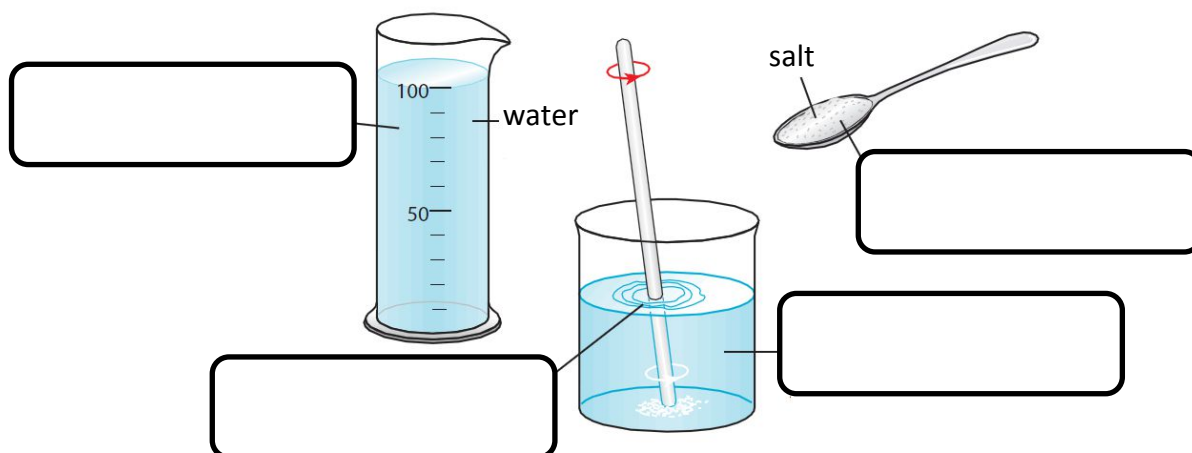
(c) Which drink has the largest number of food dyes in it?

(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

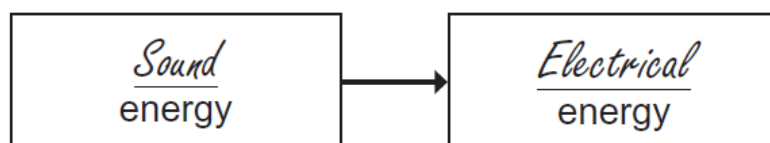
From the list, name one piece of apparatus which must be used when each of the following experiments is carried out.

(i) separating mud from muddy water

(ii) separating water from salty water

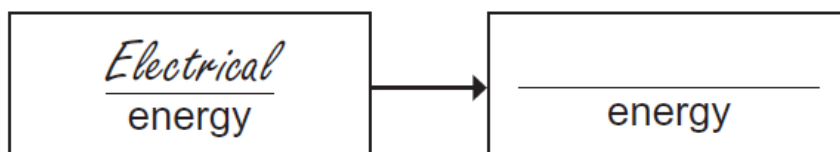
Question Seven: [2 marks]

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

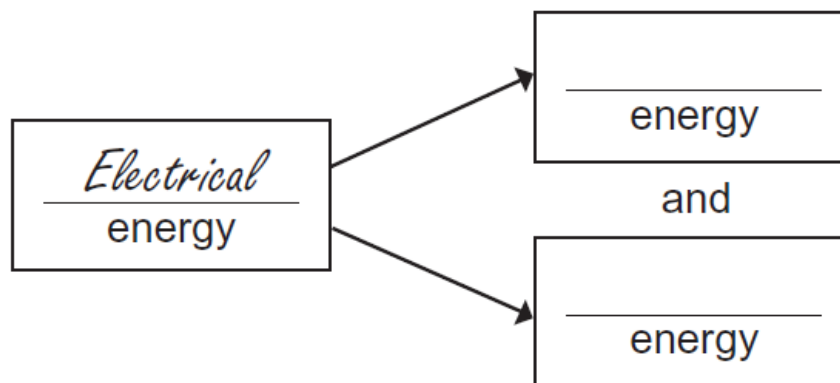


Fill in the spaces to show the energy changes the electric oven and TV are designed to bring about.

Electric oven



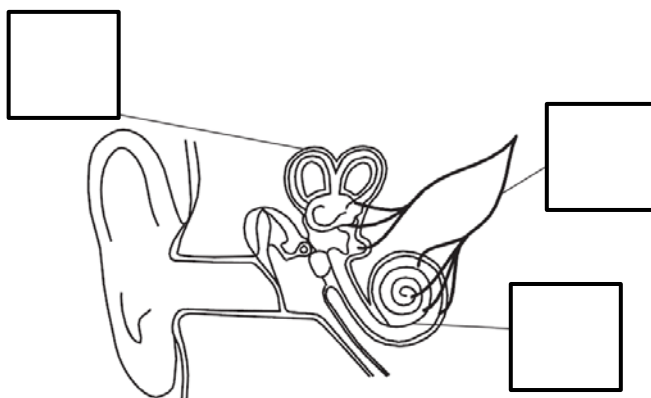
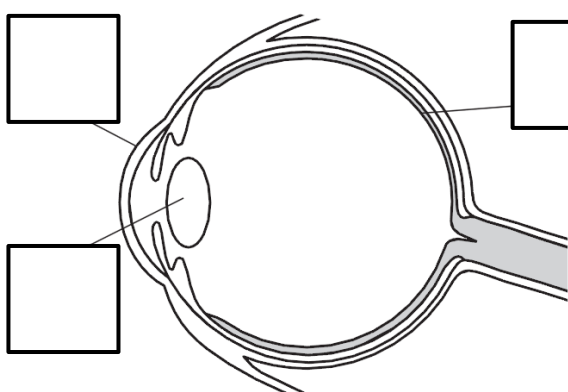
TV



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.

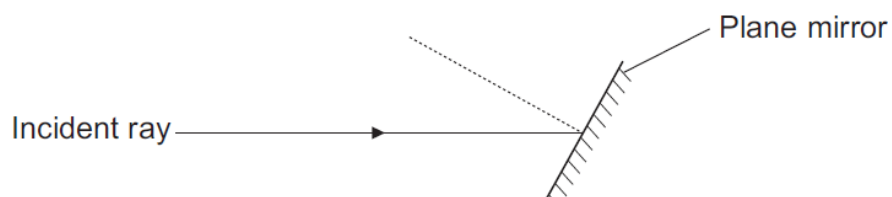
cinema screen Sun glow worm tv screen Moon

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

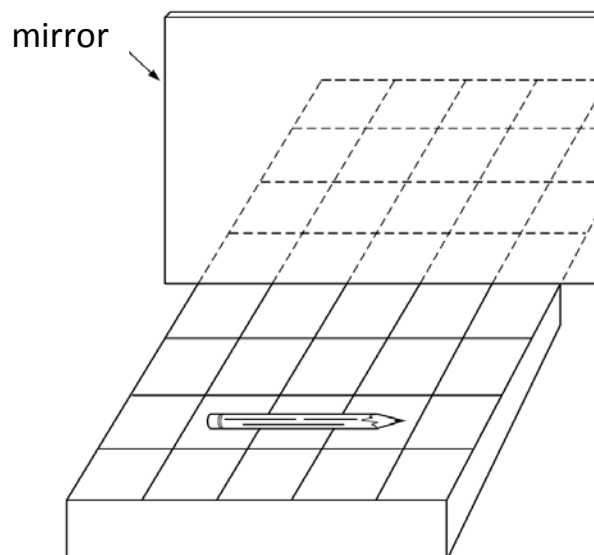
glad wrap mirror water wood waxed paper

Transparent	Translucent	Opaque

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

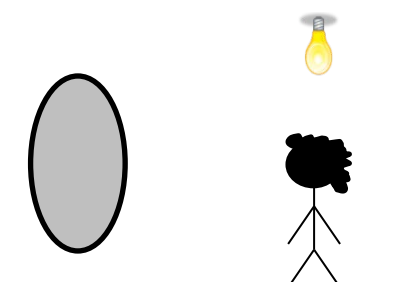


- (d) The picture shows a pencil that is lying on a shelf in front of a mirror. Draw a picture of the pencil as you would see it in the mirror. Use the patterns of lines on the shelf to help you.



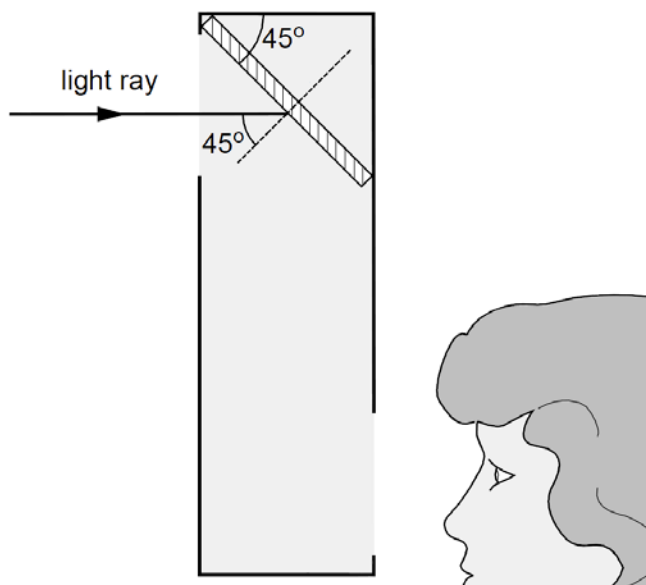
- (e) Imagine you are looking at an image of yourself in a plane (flat) mirror. Some light falls on your hair and makes it shine.

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



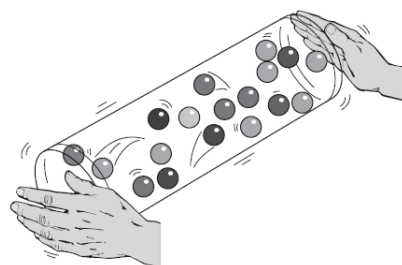
- (f) A person uses a periscope made from two plane mirrors to look over the heads of a crowd.

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.

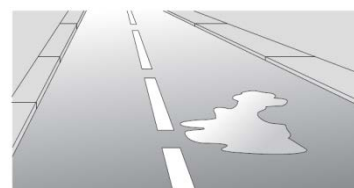
- (b) The table below lists melting points & boiling points of substances A, B, C and D.

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°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.

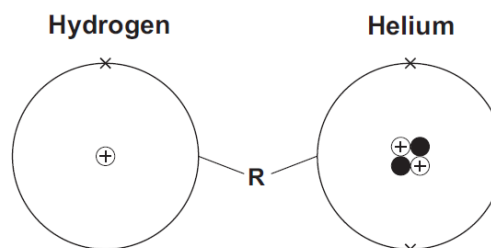


- (c) Describe one change in the weather which would cause the puddle of water to dry up faster.

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.

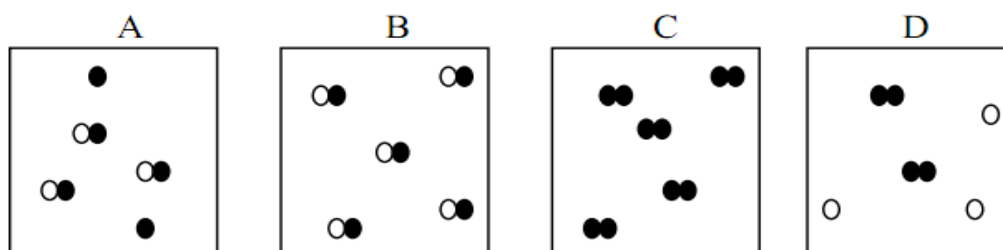
Question	Answer
How many protons are there in the hydrogen atom?	1
How many electrons are there in the helium atom?	2
What is the mass number of the helium atom?	3
	4

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

water H₂O salt NaCl mercury Hg helium He hydrogen H₂

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? _____

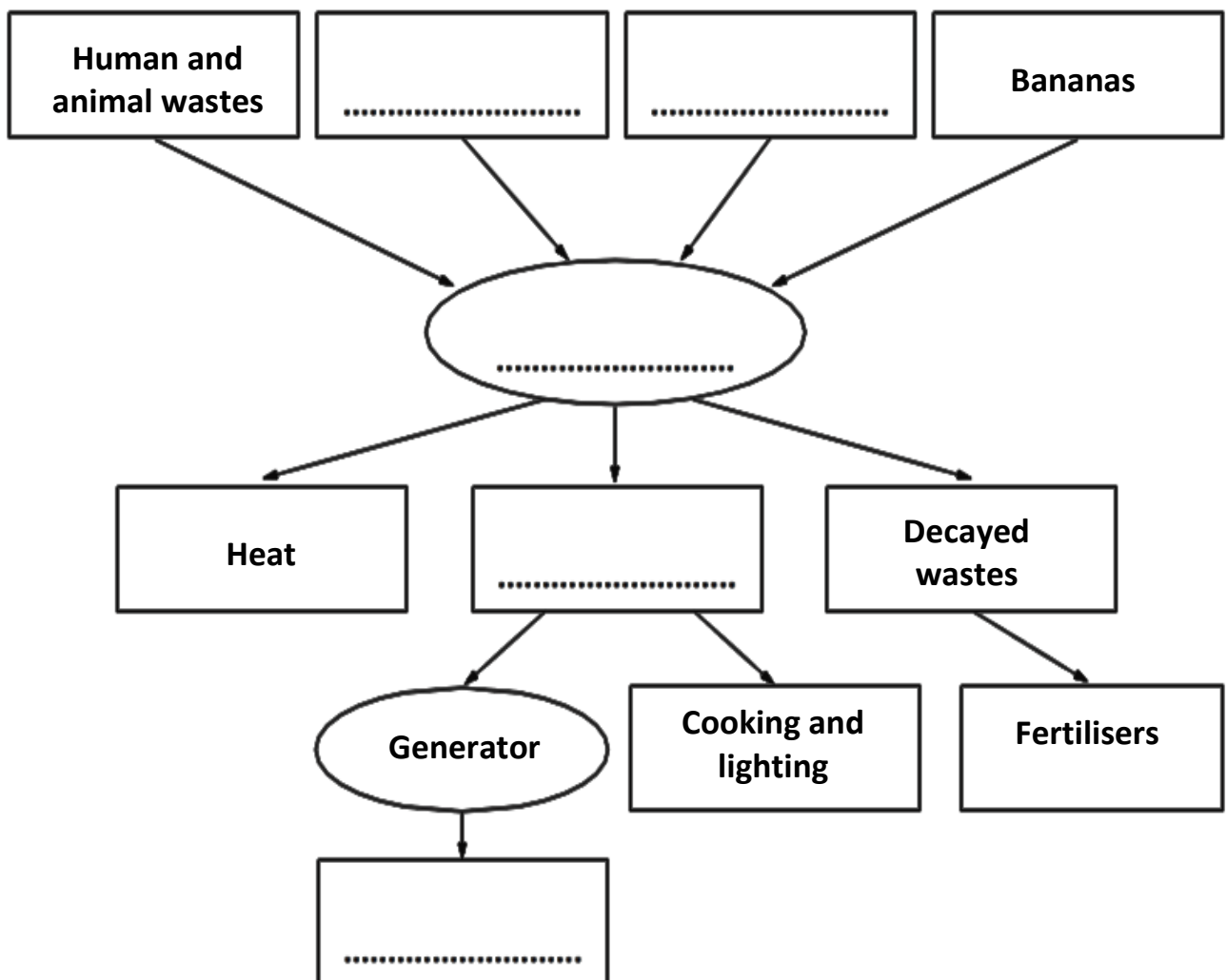
Question Twelve: [2 marks]

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.

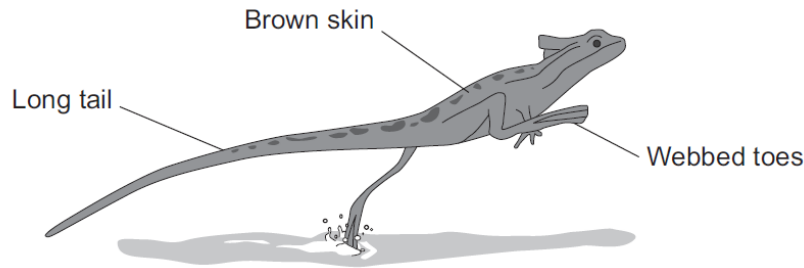


Use the information above to complete the flowchart.



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

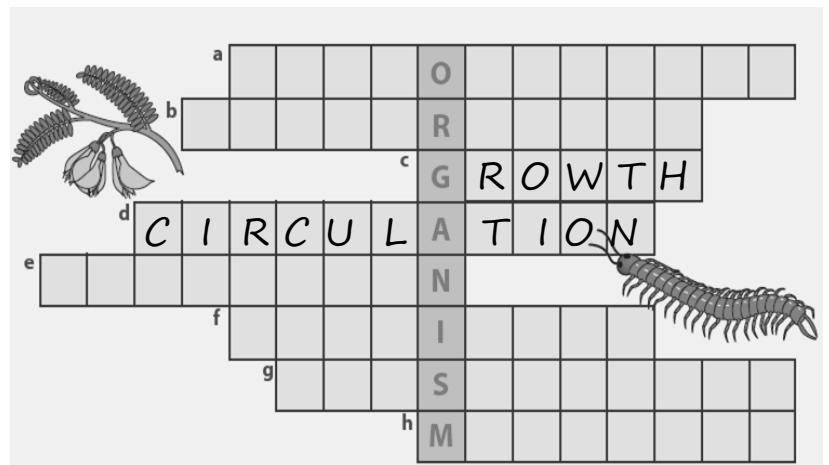
territory

light

Question Fourteen: [3 marks]

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

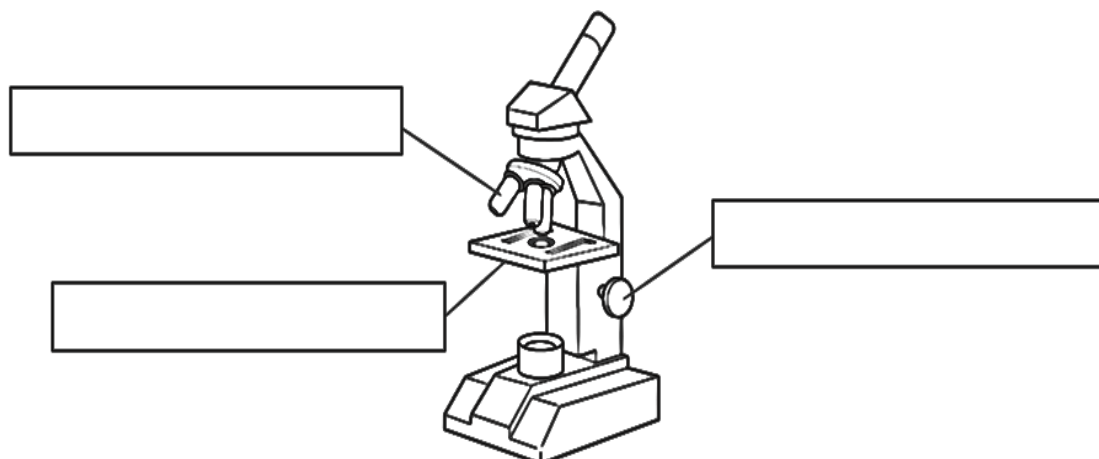
- a producing offspring
- b releasing energy from food
- c enlarging in size or changing life stages
- d moving materials around body
- e disposing of waste chemicals
- f producing or consuming food
- g detecting changes in the environment and responding
- h moving part or the whole of the body



Question Fifteen: [3 marks]

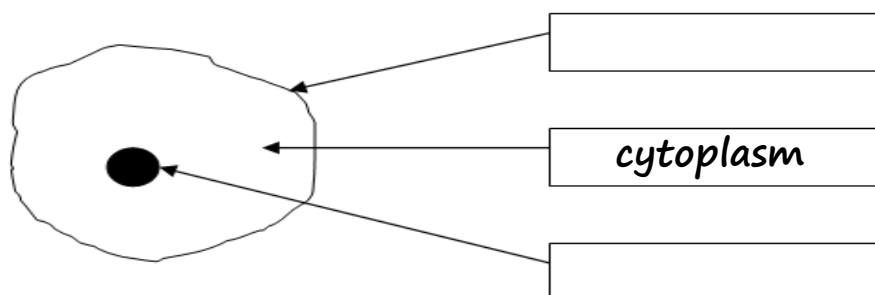
- (a) Complete the labels on this diagram of a microscope. Choose from this list.

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



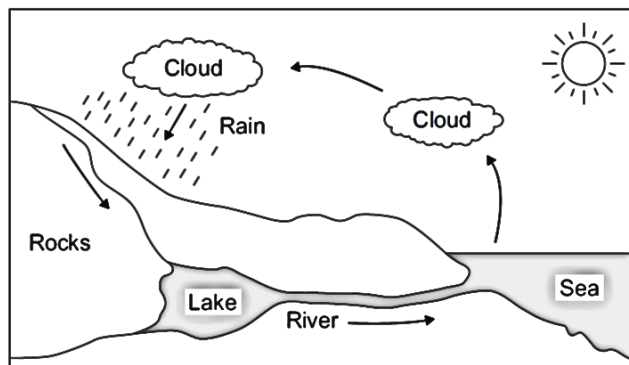
Diagram B

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.



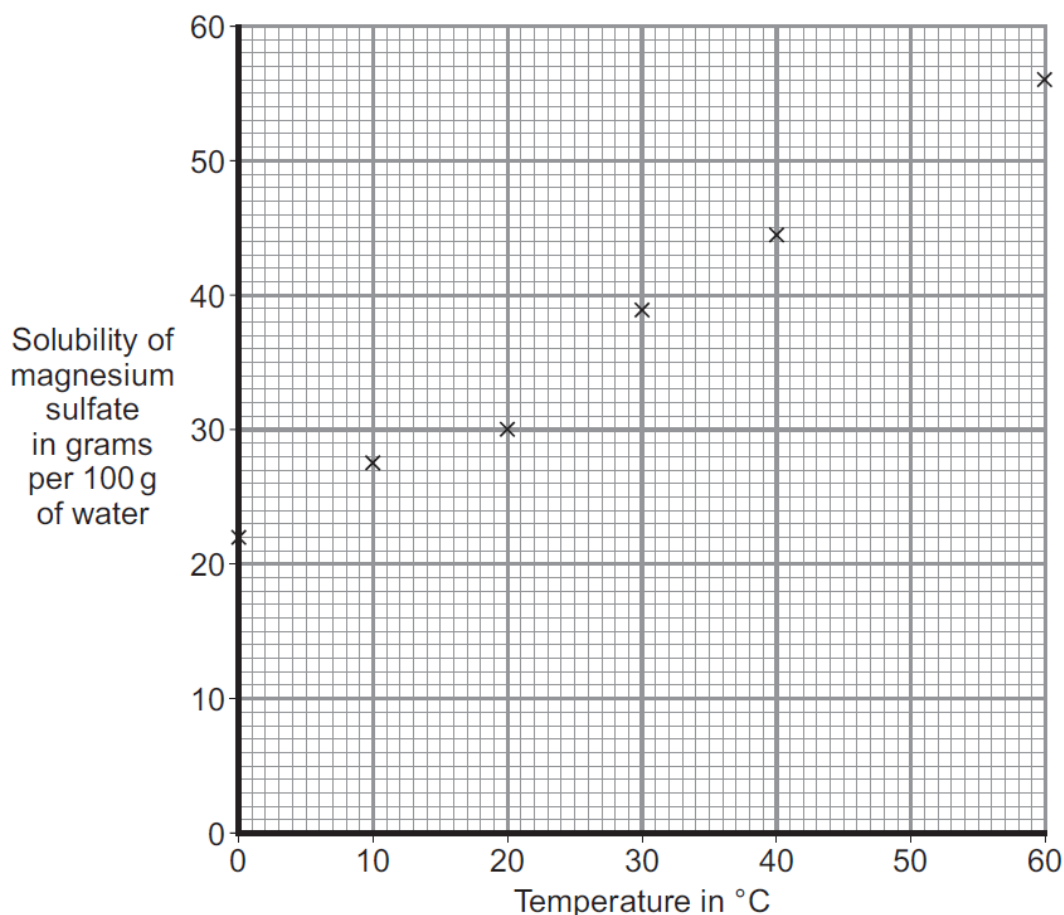
(a) Complete the paragraph using the words below.

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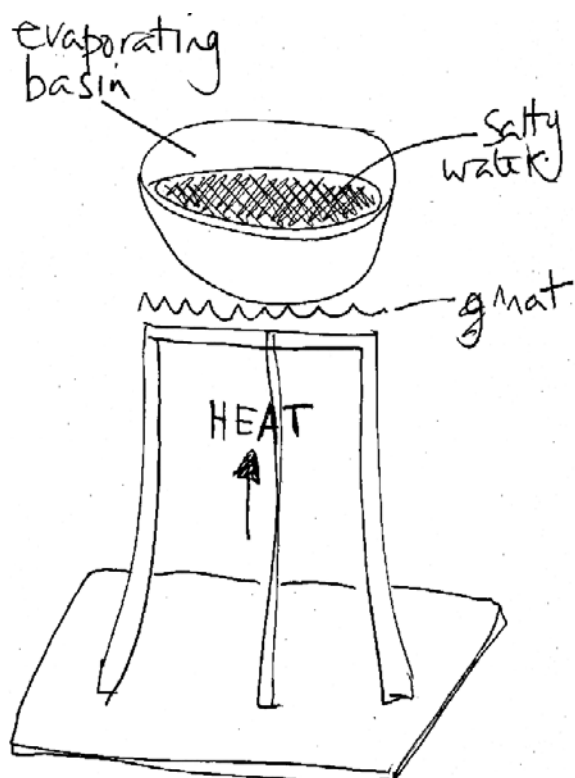
- (iii) Describe the trend (pattern) shown by the graph.

Question Seventeen: [5 marks]

A student evaporated some salty water.

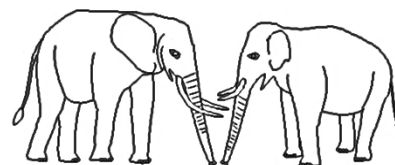
They drew a diagram of the apparatus but they made a number of mistakes.

Redraw the diagram correctly as a 2D diagram.



Question Eighteen: [5 marks]

Read the following passage about elephants and answer the questions using information from it.



The **African elephant** is the largest living land animal, with males reaching a height of 4.5 metres and a weight of up to 7 tonnes. Their ears are large and fan shaped. Tusks are present in both males and females.

Asian elephants have smaller ears which are straighter along the bottom. These elephants weigh up to 5 tonnes and grow to a height of 4.0 metres. Tusks are found on only a few male Asian elephants and none of the females.

Elephants can live for up to 70 years. They generally form small family groups of mothers and young. Males leave the herd at puberty (when they become able to reproduce). Female elephants are capable of giving birth every four to six years. Calves are born 22 months after fertilisation and are on average 1 metre tall. They are weaned from their mothers' milk between the ages of two and four years. After this time their diet consists of tree branches, fruits and grass.

Elephants were hunted for their tusks which are made of ivory. Ivory can be carved into objects of value. Trading in ivory is now illegal but elephants continue to be killed by poachers for their tusks. About 16 000 domesticated elephants are kept as work animals for such activities as clearing logs, transporting heavy loads & carrying tourists. Elephants can work in areas where machinery cannot go.

However, areas of natural forest have decreased considerably due to human activity. This has resulted in less logging work which is the main occupation of domestic elephants.

(a) Describe three differences between African and Asian elephants.

1.
2.
3.

(b) Why are the adults in an elephant family group **all** females?

(c) Why are elephants sometimes killed by poachers?

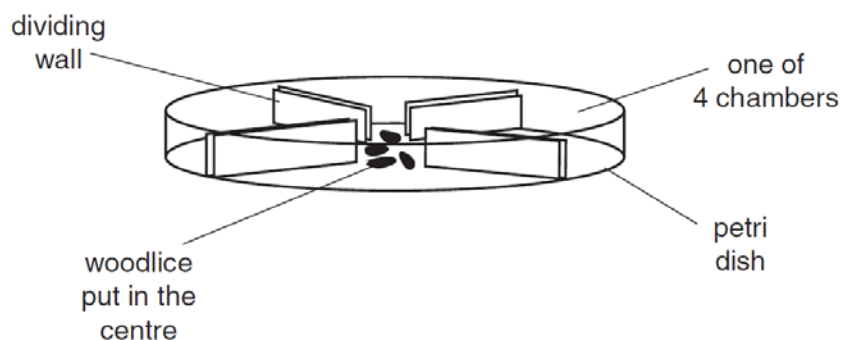
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(d) Elephant poaching is less of a problem in Asia than in Africa. Suggest a reason for this.

(e) Suggest a reason why the number of domesticated elephants may be decreasing.

Question Nineteen: [6 marks]

A student did an experiment using a choice chamber to find out what conditions woodlice like to live in.



(a) Sentences A, B, C and D show the stages in the experiment. They are not in the correct order.

- A The number of woodlice in each section was recorded.
- B 20 woodlice were collected from the school grounds.
- C The choice chamber was left for 10 minutes.
- D The woodlice were put into the choice chamber.

Put the sentences A, B, C and D in the correct order in the boxes below.

→→→

(b) Complete the results table.

Chamber	Chamber conditions	Number of woodlice
A	light and dry	1
B	dark and dry	5
C	light and moist	4
D	dark and moist	

(c) What is the percentage of woodlice found in chamber D?

(d) Why does moving to a moist place help woodlice to survive?

(e) Suggest why the students decided to take readings after the woodlice had been in the choice chambers for 10 minutes.

(f) Explain how doing repeat experiments would improve the reliability of the data.

Question Twenty: [8 marks]

- (a) The table shows some properties of materials that may be used in sports equipment. For each material, complete the table by putting a tick (✓) in the column that shows which property matches the material for that use.

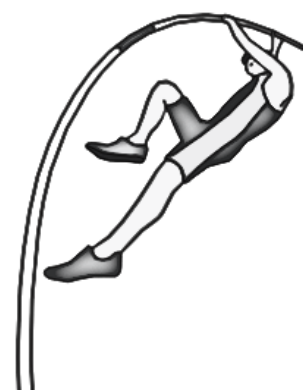
Put only one tick in each row.

Material (use)	Property		
	Flexible	Low density	High melting point
Aluminium (bicycle frame)			
Ceramic (oven baking dish)			
Polymer (nylon tennis racquet strings)			

- (b) One of the events in the Olympics is the pole vault.

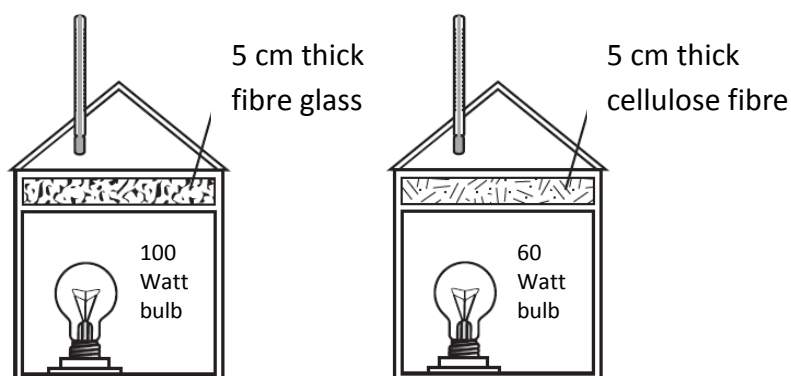
A vaulting pole needs to be easy to carry, take the weight of the athlete and be able to alter its shape. The original poles were made from wood, bamboo or aluminium but none was very successful. They were then made of glass fibre and more recently of a carbon fibre based material.

Suggest three properties that a material should have for use as a vaulting pole.



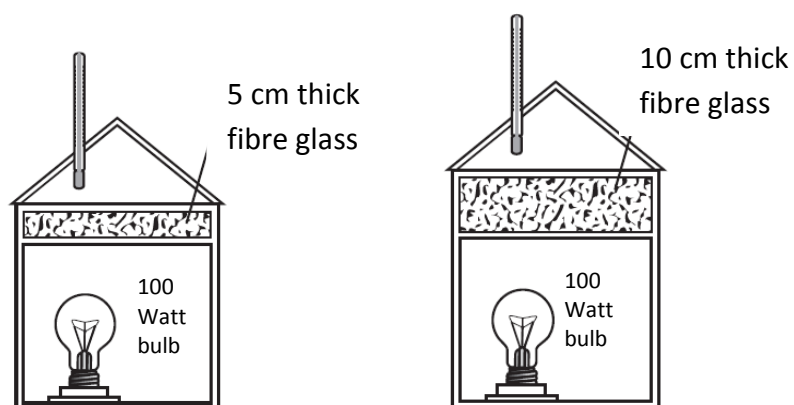
1
2
3

- (c) Some student wanted to find out if fibre glass or cellulose fibre is the better material for insulating a loft. The light bulb produces heat energy. The loft temperature is measured using a thermometer.



- (i) Why is this NOT a fair test?

The students then carried out a second experiment.



(ii) What was the experiment designed to find out?

(iii) What was the independent variable (the one thing that was altered)?

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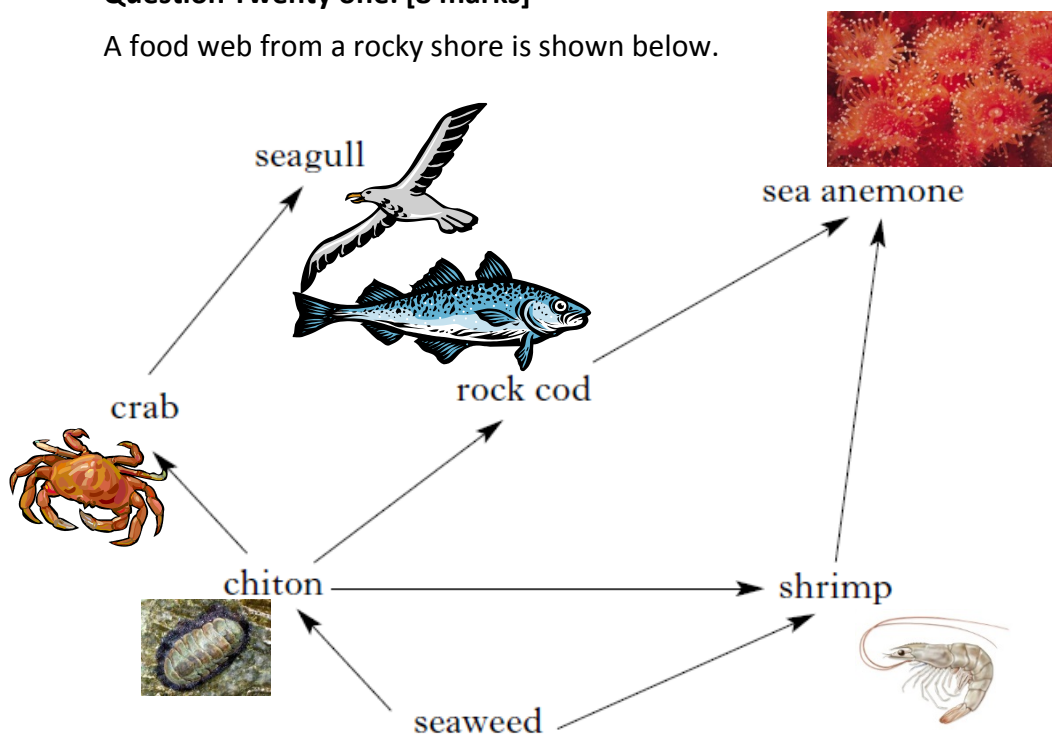
(iv) What was the dependent variable (the thing that was measured to collect some data)?

(v) What were three controlled variables (things that were kept the same)?

1.
2.
3.

Question Twenty one: [8 marks]

A food web from a rocky shore is shown below.



- (a) What do the arrows represent?

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- (b) Complete the following sentences by circling the correct answer.

- (i) The sea anemone is a { producer consumer } because it eats other organisms.
 (ii) The crab is the { predator prey } of the seagull.
 (iii) The energy from the sun is used by the { seaweed chiton } to make food.

Plant plankton are eaten by shrimps and mussels. Seagulls eat mussels.

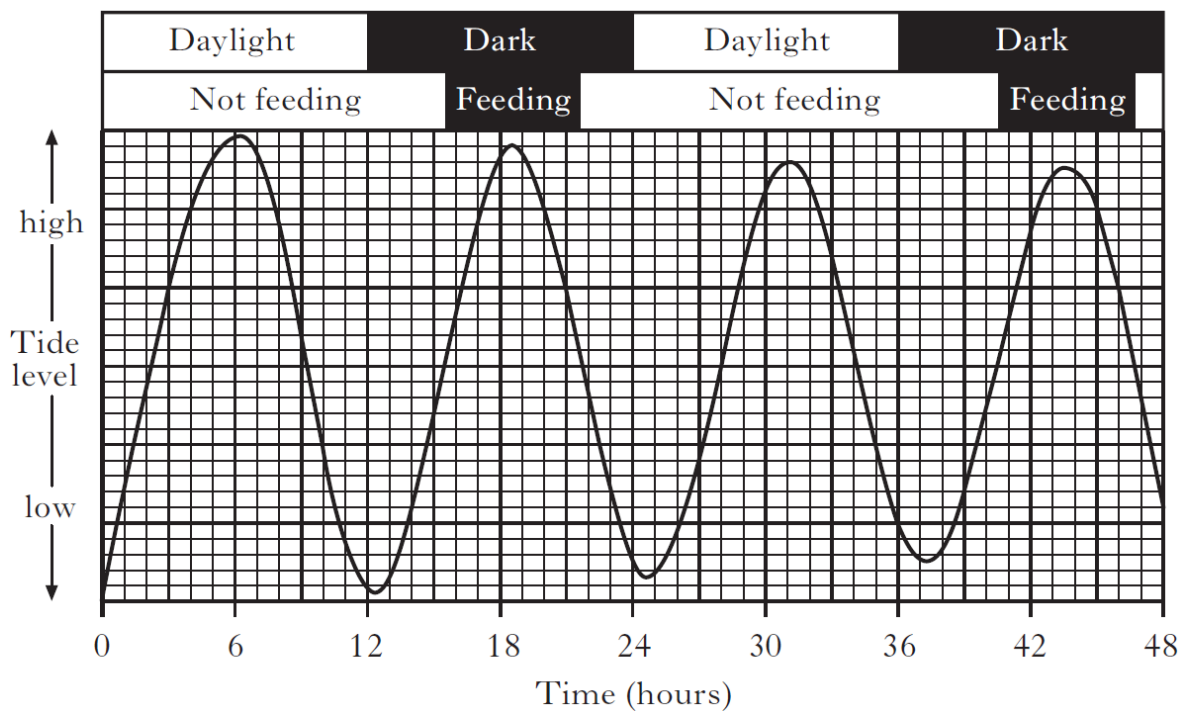
- (c) Add this additional information to the food web above.



- (d) Some people looking at this food web might say that rock cod numbers might decrease if shrimps die out. What reasons support this view?

- (e) Others people might think rock cod numbers might increase if shrimps die out. What reasons support this view?

Shrimps are found in many places around the coastline. The graph shows shrimp activity and changes in their environment over a 48 hour period.



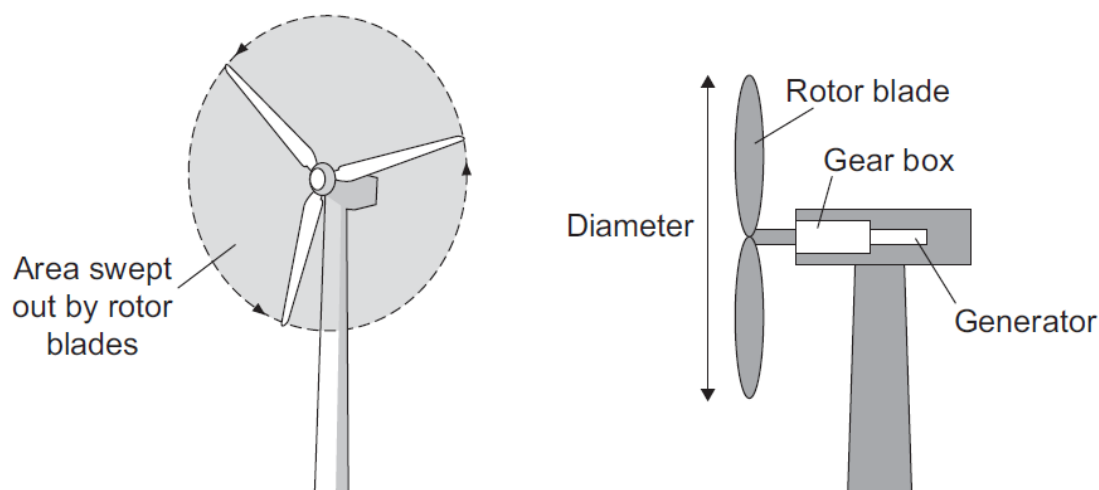
(f) How many high tides occurred during the two days shown?

(g) Describe the conditions when the shrimps feed.

(h) Explain how this behaviour could be important to the survival of the shrimps.

Question Twenty two: [8 marks]

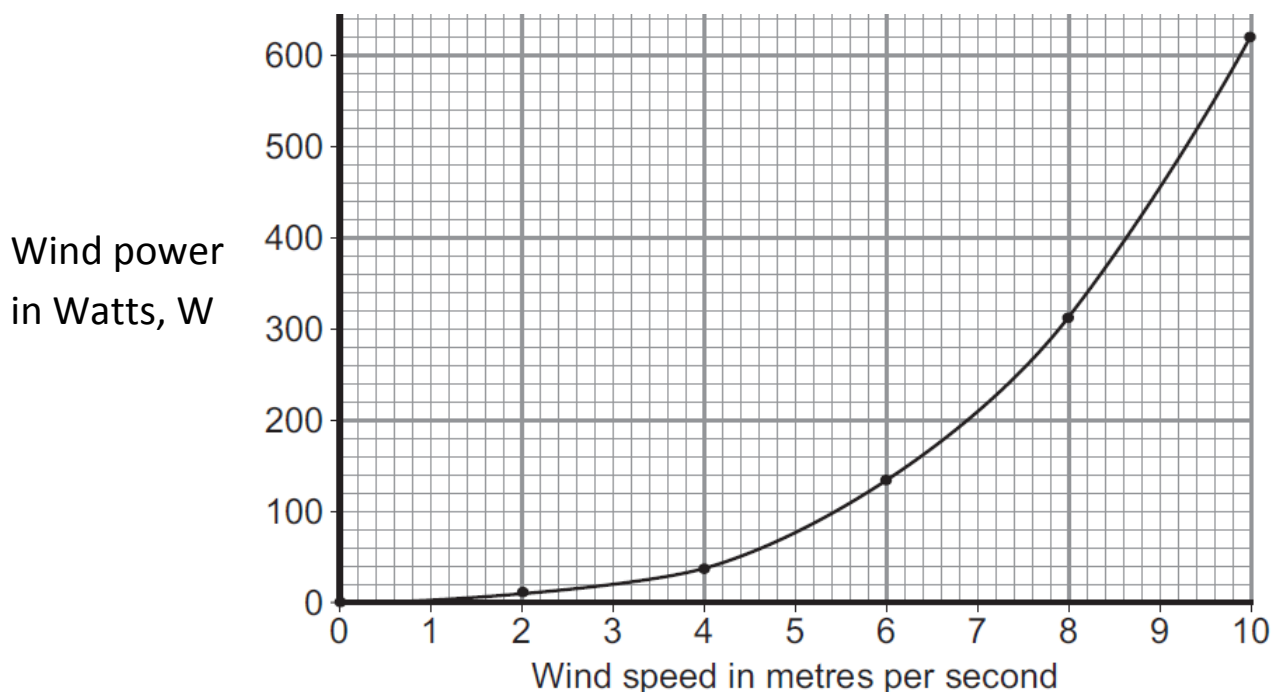
A wind turbine is an electrical generator. The rotor blades are connected to the generator through a gear box.



(a) Which is the correct energy transformation for the wind turbine generator? (Circle your answer).

- A. potential \rightarrow electrical, thermal and sound
- B. potential \rightarrow kinetic, electrical and thermal
- C. kinetic \rightarrow electrical, thermal and sound
- D. kinetic \rightarrow chemical, electrical and thermal

The graph shows the power developed by the wind at different wind speeds. The power is measured in watts, W.



(b) What is the wind power when the wind speed is 7 metres per second?

The table shows how the power output of a wind turbine changes with the diameter of the rotor blade.

Rotor blade diameter (m)	Power output (W)
1	400
2	1600
3	3600
4	6400
6	14400
8	25600
10	40000

- (c) What happens to the power output when the rotor blade diameter is doubled?

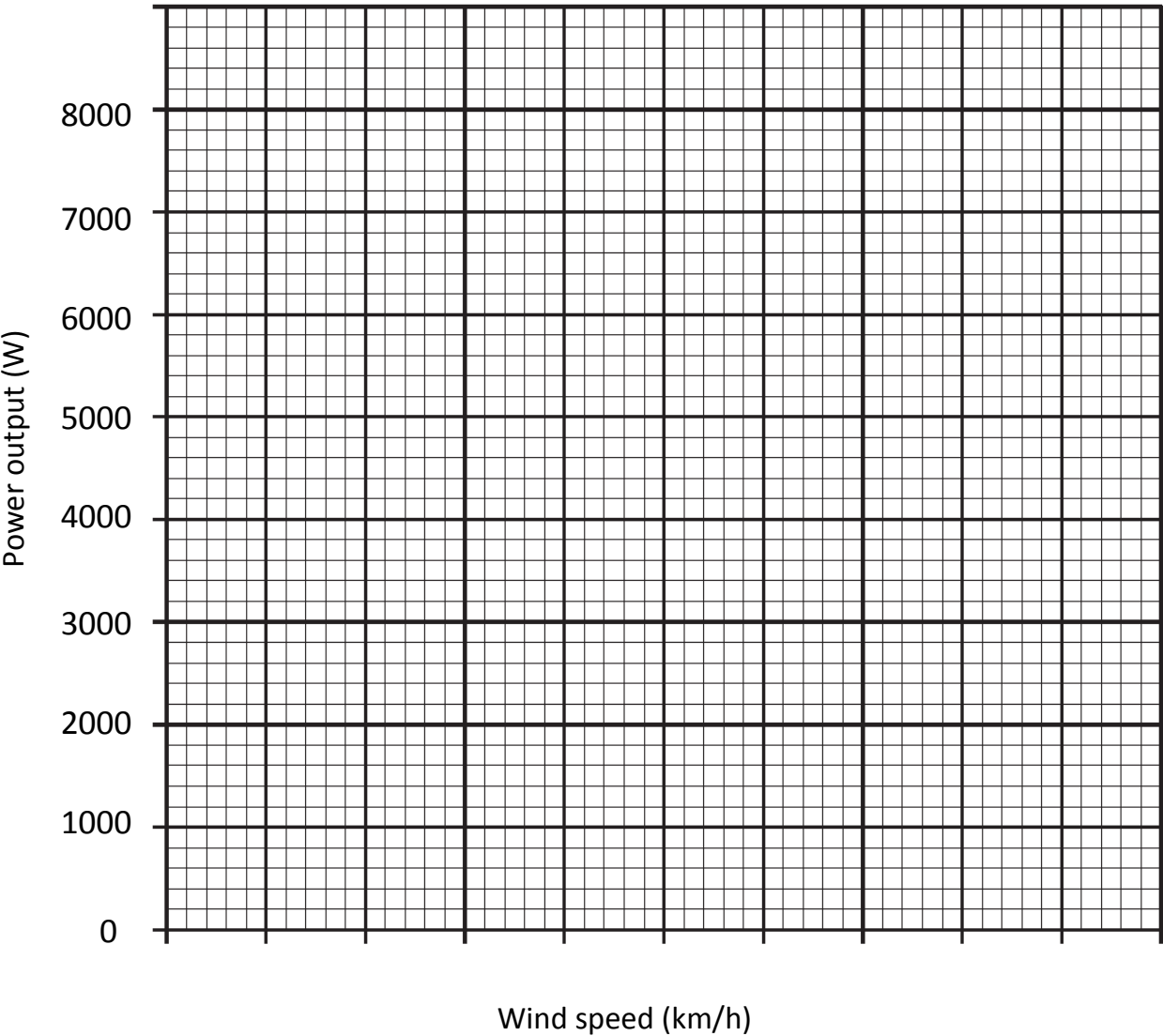
- (d) One advantage of this method of generating electricity is that the energy comes from a renewable source. Give one other advantage.

- (e) One disadvantage of this method of generating electricity is that no electricity is produced when there is no wind. Give one other disadvantage.

The power output of two wind turbines, A and B, was measured at different wind speeds. The results are shown in the table.

Wind speed (km/h)	Power output (W)	
	Turbine A	Turbine B
5	200	500
10	500	1400
15	1200	3000
20	2200	5200
25	3500	7600

- (f) Using the same axes, show these results as two **line graphs**. Label each line graph clearly. Put wind speed on the **x-axis** using a *suitable scale*.



- (g) Complete this statement:
The power generated by turbine B at wind speed 12.5 km/h is the same as turbine A at a wind speed of _____ km/h.

CHECK YOUR ANSWERS!