

Name:	Form Class:	Teacher Code:
--------------	--------------------	----------------------

SCIENCE

9BC

Year 9 Examination 2015

9BC – 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 – 25.

Question	m/c	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
Marks gained															
Marks available	30	4	5	2	2	3	3	5	4	5	5	4	5	3	80

Question	14	15	16	17	18	19	20	Total
Marks gained								
Marks available	6	6	6	6	6	5	5	40

120



MULTIPLE CHOICE

Thinking with evidence in Science - Multiple Choice Questions

- Use a **blue or black pen**
- For each answer **completely fill in the circle** as shown.
- Do **not** extend beyond the circles.
- If you want to change your answer **you must** cross out your original answer as shown.
- 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.

A ○	B ●	C ○	D ○
A ○	B ✕	C ○	D ●
A ○	B ✕	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 ○

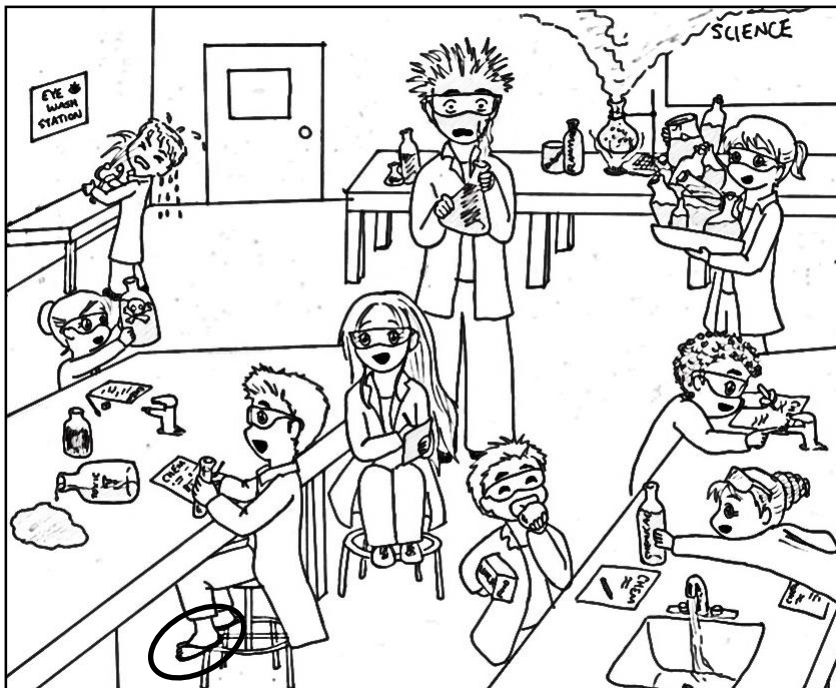
- 26 A ○ B ○ C ○ D ○
 27 A ○ B ○ C ○ D ○
 28 A ○ B ○ C ○ D ○
 29 A ○ B ○ C ○ D ○
 30 A ○ B ○ C ○ D ○

Do NOT answer questions 31-40 from the booklet.

Answer ALL the questions in the spaces provided.

Question One [4 marks]

Laboratory safety is very important.



(a) **Circle** any FIVE dangers. One has been done as an example.

For ONE danger explain, in detail;

- What the danger is.
- What might happen.
- What the student should be doing instead.

Hazard symbols are used on chemicals to warn of danger.





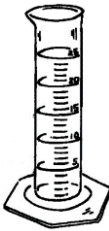

(b) Why is a hazard symbol better than just words on chemical bottle?

Question Two [5 marks]

Tane was asked to find the mass of salt dissolved in 100 mL of sea water.

- Step A Measure the mass of an empty evaporating basin
- Step B Put 50 mL of sea water into the basin
- Step C Heat the sea water until all the water has evaporated
- Step D Let the basin and residue to cool
- Step E Measure the mass of the basin and residue of salt

(a) During the experiment Tane used several pieces of apparatus. Complete the table.

Picture of apparatus	Name of apparatus	One step when the apparatus was used
	evaporating basin	C
		
	tripod	
		
		C

(b) Tane obtained the following results.

- mass of basin and salt (step E) = 81.50 g
- mass of empty basin (step A) = 78.60 g

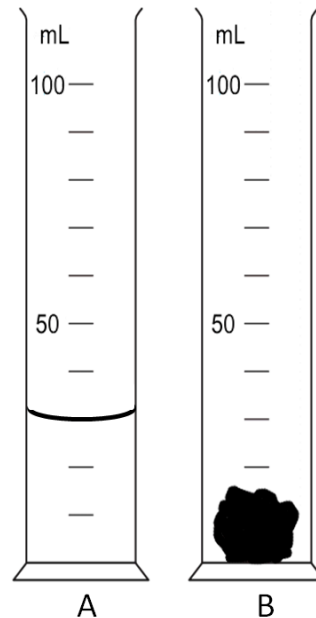
Calculate the mass of salt dissolved in 100 mL of sea water.

Question Three [2 marks]

(a) What is the volume of water in A? _____ mL

A stone with a volume of 15 mL was then added.

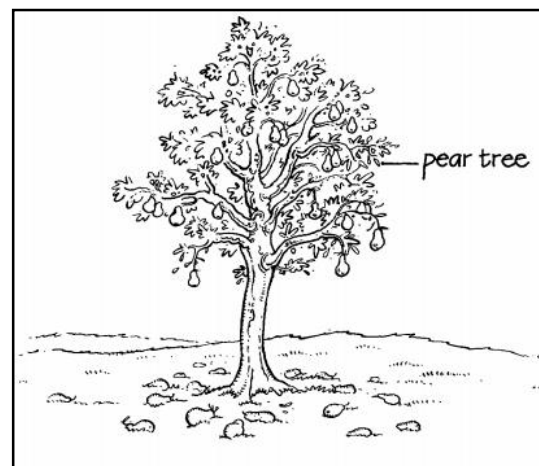
(b) Accurately draw the new water level on B.



Question Four [2 marks]

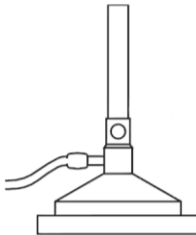
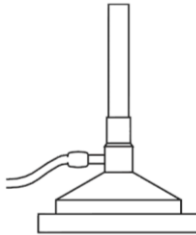
Look at the picture. Decide which statements are observations (O) and which are inferences (I). Label each statement as O or I.

- ___ The wind has blown some pears off the tree.
- ___ Some pears are on the ground.
- ___ The ripe pears have fallen off the tree.
- ___ The tree is too full and cannot hold all the pears.



Question Five [3 marks]

The diagrams show methane gas burning under different conditions. Complete the table.

Air hole	open	closed
Draw the flames you would see.		
Colour of flame		
What the flame is used for		

Question Six [3 marks]

Katelyn did an experiment to separate salt from rock salt (impure salt containing sand and clay).

- (a) Which TWO pieces of equipment would she use to grind up (crush) the rock salt at the start of the experiment? (Circle your answers).



A



B



C



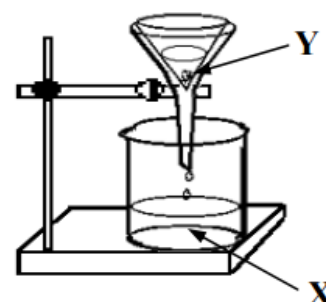
D



E

She put rock salt in a beaker, added hot water and stirred.

She separated the salty water from the insoluble impurities (dirt) using this apparatus.



- (b) What is the name of the separation technique?

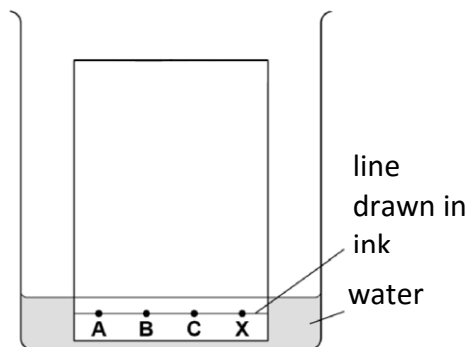
The salty water was collected at X.

- (c) Explain why the insoluble impurities (dirt) collected at Y.

Question Seven [5 marks]

Aroha investigated food colouring using chromatography.

- She put a spot of food colouring X on the start line.
- She put spots of three separate dyes, A, B and C on the start line.
- She placed the bottom of the paper in the water and left it for a few minutes.



- (a) Write down two mistakes Aroha made in setting up the experiment and explain what problems they would cause.

Mistake 1:

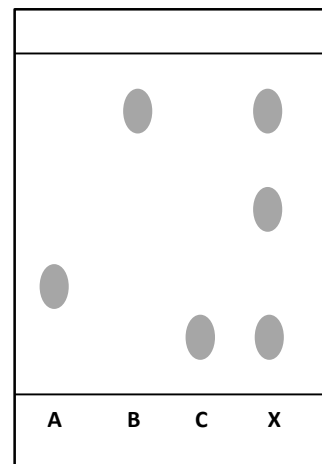
Problem:

Mistake 2

Problem:

Emily set up the apparatus correctly. The diagram shows the results.



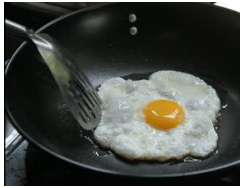

(b) What does the chromatogram tell you about food colouring X?







(c) Explain how paper chromatography separates mixtures of inks.

Question Eight [4 marks]

(a) Which of these is a reversible change? (Circle your answer.)

A	B	C	D
baking a cake	melting icecream	frying an egg	toasting bread
			

(b) Which of these is an irreversible change? (Circle your answer.)

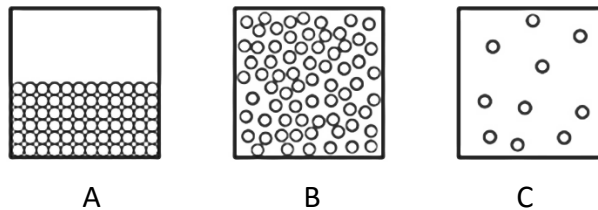
A	B	C	D
chocolate bar melting	ice cube freezing	pan of water boiling	Toasting marshmallows
			

(c) For the six objects shown below, match FOUR to their properties. (ONE object to ONE property: Two objects will not be used).

Object	Property
Tissue paper ●	
Glass ●	● Light and waterproof
Gold ring ●	● Elastic and light
Brick ●	● Transparent and easily breakable
Rubber band ●	● Shiny and strong
Plastic bag ●	

Question Nine [5 marks]

The diagrams A, B and C show the arrangement of the particles in a solid, liquid and a gas.



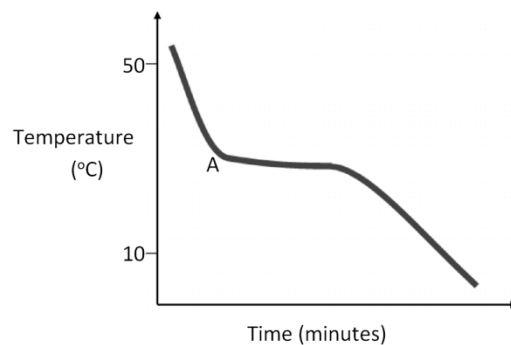
(a) Which diagram shows the liquid? _____

(b) Circle the physical change that takes place when C changes to B.

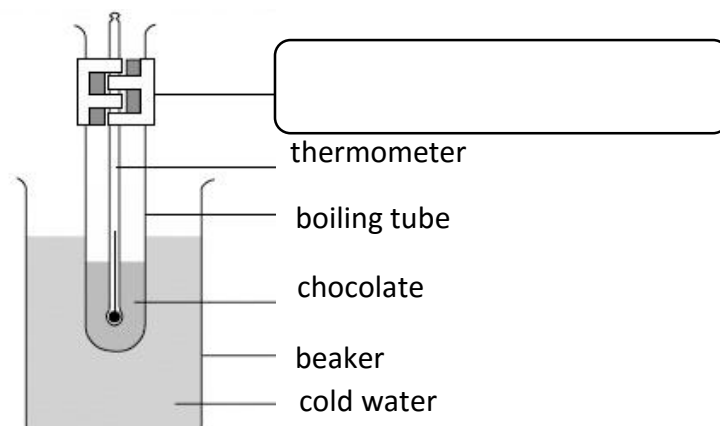
- evaporation
 condensation
 freezing
 melting

Some chocolate was put in a boiling tube and melted.

The temperature was taken every 20 seconds as it cooled down. The graph shows the cooling curve for chocolate.



(c) Complete the labelling of the diagram.



(d) Which state (solid, liquid, gas) describes the chocolate when it is at 50°C? _____

(e) From the graph, estimate the freezing point ((point when it turned solid) of chocolate. _____ °C

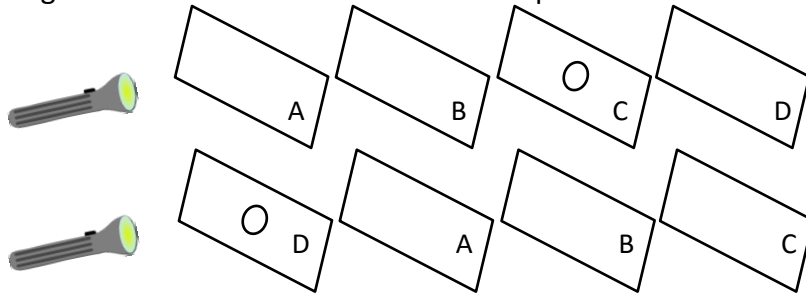
Question Ten [5 marks]

An experiment was done to investigate whether light can pass through sheets of material. A, B, C and D are all different materials.

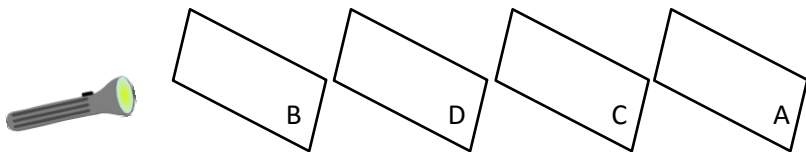
(a) What word means light can pass through making objects clearly visible? (Circle your answer).

transitional • opaque • translucent • transparent

A bright spot of light was seen on C and D in the two experiments below.

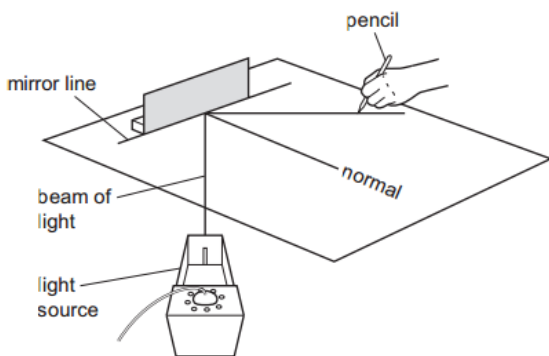


(b) Draw the spot of light you would expect if this third experiment was carried out.

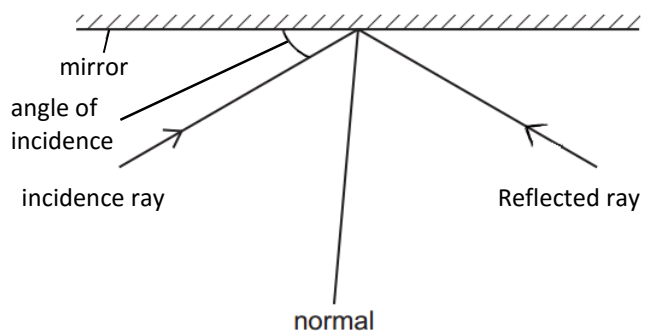


A student is testing the law of reflection which says 'the angle of reflection is equal to the angle of incidence'.

How he set up the apparatus



Students ray diagram



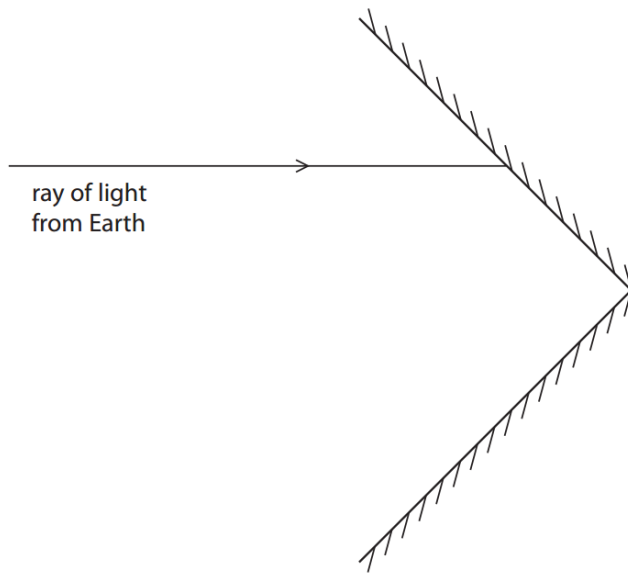
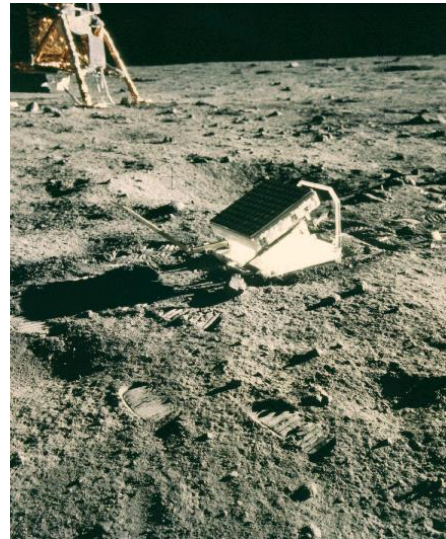
(c) List any 3 errors the student made when drawing their diagram.

In 1969, astronauts left a reflector on the surface of the Moon.

The reflector consists of a panel with 100 mirrors. Scientists on Earth aim light from a laser at the reflector. This light reflects back to them.

The diagram shows two mirrors at 90° to each other in the reflector.

(d) Complete the diagram to show the path of the ray of light. Use a ruler



The diagram shows the human eye.

(e) In the table

- write the letter A beside the name of the part labelled A.
- write the letter B beside the name of the part labelled B.
- write the letter C beside the function of the pupil.

Part	
	iris
	lens
	retina
Function	
	allows light in
	focusses light
	gives the eye its shape

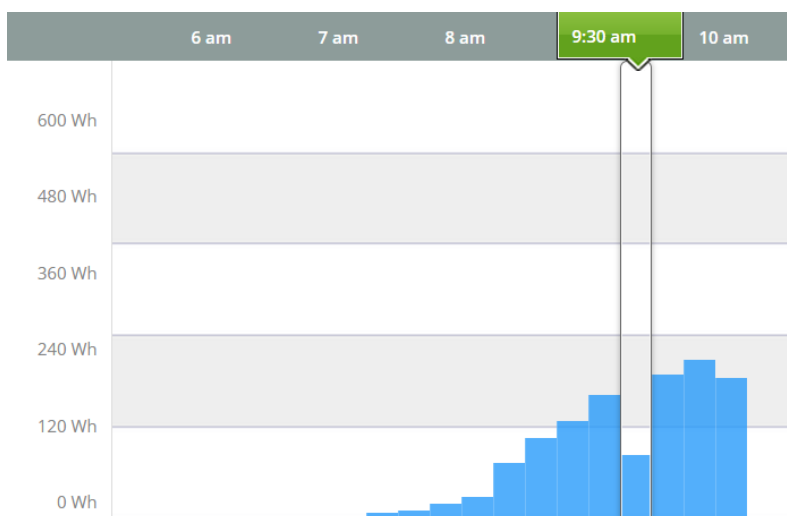
Question Eleven [4 marks]

Energy sources can be renewable or non-renewable.



(a) Identify the type of renewable energy being used.

The graph below shows the energy produced by (a) one morning.



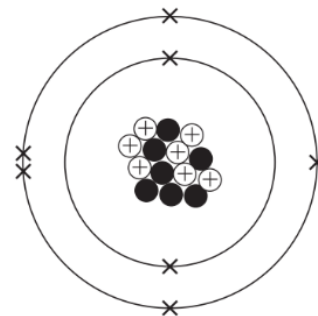
(b) Suggest what happened at 9.30 am.

(c) Match an energy change from the list with that occurring in each of the following. One answer won't be used. (Use a ruler).

- kinetic to heat •
- chemical to heat •
- light to chemical •
- kinetic to sound •
- guitar string vibrating •
- plant making food by photosynthesis •
- fuel being burned •

Question Twelve [5 marks]

- (a) The diagram shows a nitrogen atom.
Use a number / word from the list to complete the sentences below.

**7 14 electrons molecule neutrons nucleus**

- (i) The protons and _____ are in atom's centre.
 (ii) The centre of the atom is called the _____ .
 (iii) The tiny negatively charged particles are the _____ .
 (iv) The mass number of this atom is _____ .
- (b) Choose the correct word from each list. (Circle your answer.)

Seawater	element · compound · mixture
Gold	element · compound · mixture

- (c) Diagrams A-D represent the arrangement of atoms or molecules in four different gases. Each sphere represents one atom. For example ● represents one hydrogen atom.

Which diagram, A, B, C or D, represents:



- (i) oxygen (O_2) _____
 (ii) neon (Ne) _____
 (iii) water vapour (H_2O) _____
 (iv) methane (CH_4) _____

Question Thirteen [3 marks]

Seth is going to use the Durie Hill elevator and is walking along the tunnel. He claps his hands, once.



(a) Explain why he hears two claps.

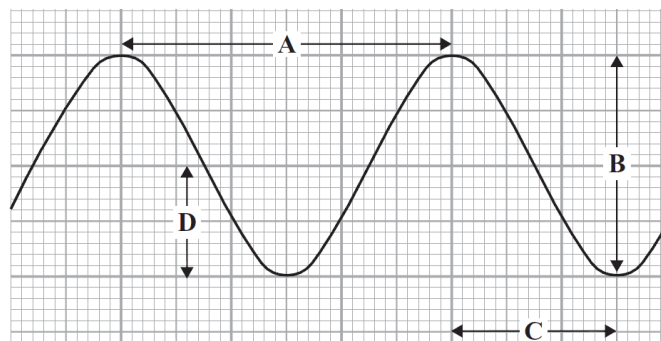
A ship is sinking in the dark.



The captain on the ship fires a distress flare. The lifeboat crew hear the bang and see the flash, but not at the same time.

(b) Which reaches the lifeboat first, the bang or the flash? Give a reason.

The diagram shows an a note produced by a musical instrument.



- (c) Which letter, **A**, **B**, **C** or **D**, represents:
- (i) the amplitude of the sound wave _____
 - (ii) the wavelength? _____

Question Fourteen [6 marks]

Chloe and Terina investigate the motion of different falling masses by measuring the time taken for empty cupcake cases to fall from a window. They drop one case from the window. They repeat the experiment with two cases stuck together, then with three cases and then with four.



(a) Name two measuring instruments that they would need for this investigation.

(b) What are the independent and dependent variables in this investigation?

- independent variable
- dependent variable

(c) State one factor that the students should keep constant in order to make this investigation valid (a fair test).

Chloe student draws this table to record their results.

(d) Add suitable headings to her table.

(e) Explain one way that the students can improve this investigation.



Question Fifteen [6 marks]

Read the passage below and answer the questions that follow.



In the wild, meerkats live in dry, open plains and scrubland. They are mainly insectivores – but also eat animals such as lizards, snakes, spiders, eggs, small mammals, as well as millipedes, centipedes, birds and plant roots. They are also very fond of a fungus called the desert truffle. They have no excess body fat stores and must forage (search) for food every day.

A colony of meerkats lives in a network of burrows with many entrance and exit holes. Meerkats memorise the locations of holes within their territory, so they can run to the closest one at a moment's notice to avoid a predator.

Each member of the group takes on a specific task – from baby-sitting and teaching youngsters how to survive, to sentry duty and foraging for food. When resting, they sunbathe or sleep in the shade.

Meerkats have a high immunity to snake venom and scorpion stings. They usually bite off the scorpion's sting and then eat its body. Meerkats have small black crescent-shaped ears that can close when digging to keep sand out. At the end of each of a meerkat's fingers are long non-retractable claws used for digging holes for prey and in combat and self-defence. Claws are used at the muscular hind-legs to help climb the occasional tree.

(a) Explain the term predator.

(b) What evidence is there, in the passage, to suggest that meerkats are omnivores?

- (c) Choose any adaptations shown by meerkats.
- (i) Describe the adaptation
 - (ii) Identify the type of adaptation (behavioural, functional (physiological) or structural)
 - (iii) Explain, in detail, how it helps the meerkat survive

- (d) Name the three kingdoms of organisms represented in the passage above.

Question Sixteen [6 marks]

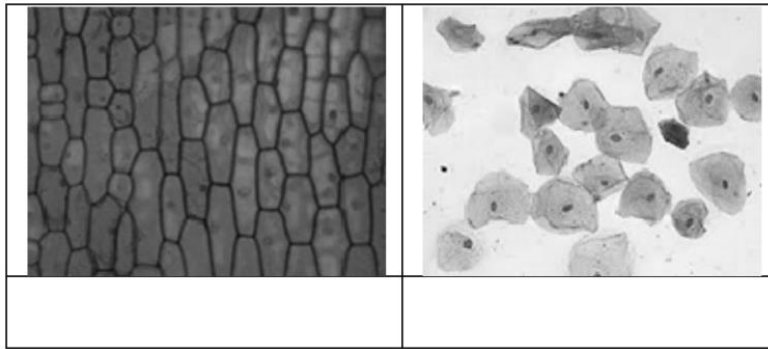
The diagram shows a microscope. Examine the diagram and answer the questions below.

Part	
	Arm
	Base
	Eyepiece
	Focus wheel
	Lamp
	Revolving nose piece
Function	
	To focus
	To hold sample
	To magnify

- (a) In the table:
- Write the letter A beside the name of the part labelled A.
 - Write the letter B beside the name of the part labelled B.
 - Write the letter C beside the name of the part labelled C.
 - Write the letter D beside the function (job) of the part labelled D.

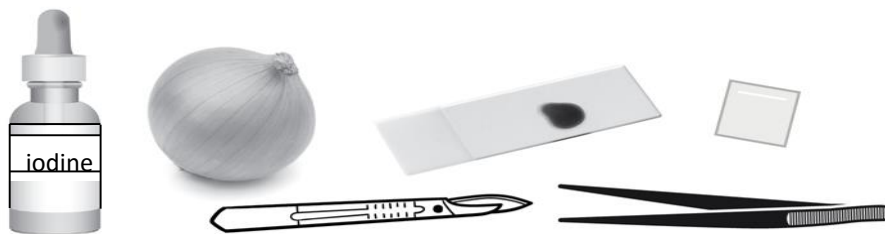
The images below show two different types of cell as seen using a light microscope.

(b) Write the words "onion cells" under the correct image.



(c) Describe how you would make a microscope slide to examine onion cells under the microscope.

Include the reason why iodine stain is added to the piece of onion skin.

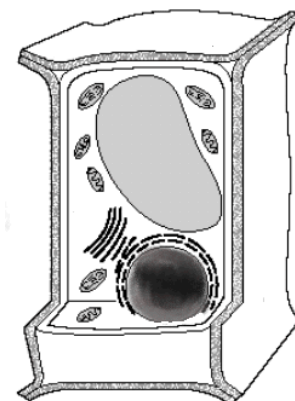


(d) The diagram shows a sketch of a cell. Is this a plant cell or an animal cell? Give TWO reasons for your answer.

Cell is :

1.

2.



Question Seventeen [6 marks]

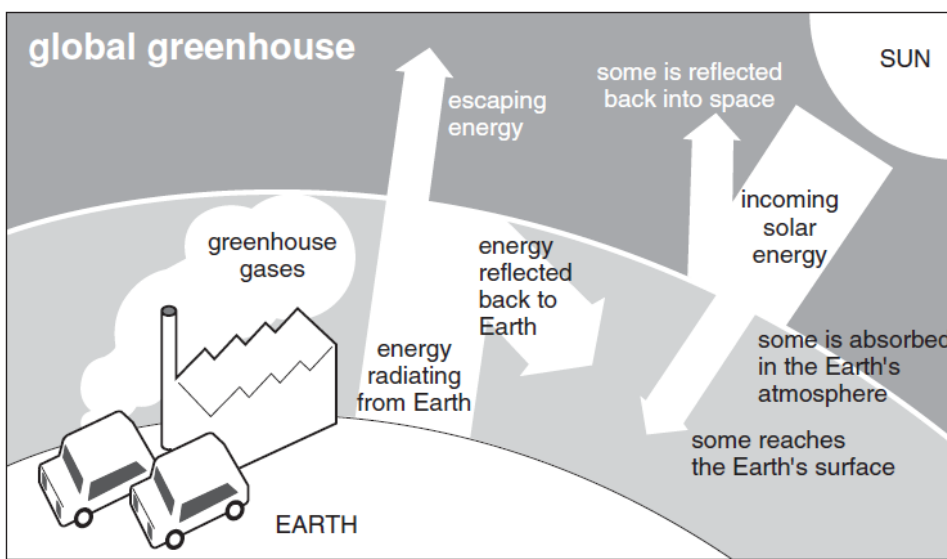
There is evidence that greenhouse gases in the earth’s atmosphere are causing global climate change. Major changes are expected in terms of temperature and rainfall.

One of the main greenhouse gases is carbon dioxide, released when fossil fuels are burned. Another is methane gas released by cattle. These gases cause pollution of the air. They are called greenhouse gases (GHG) as they have an effect similar to that of a greenhouse

- they prevent some of the sun’s heat escaping back into space.

Many scientists believe global warming could cause:

- climate change and make it impossible to grow some food crops in particular regions;
- extreme weather conditions in some regions;
- rising sea levels due to melting ice causing flooding of low-lying land.



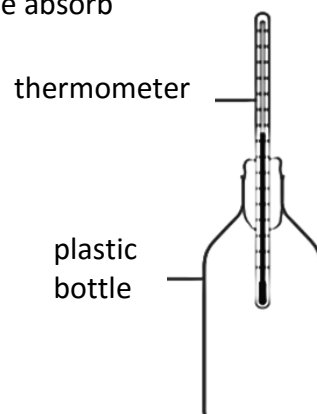
(a) Why do we call carbon dioxide and methane “greenhouse gases”?

(b) What is meant by the term pollution?

A student wanted to compare how air, carbon dioxide and methane absorb radiation (heat) from the Sun.

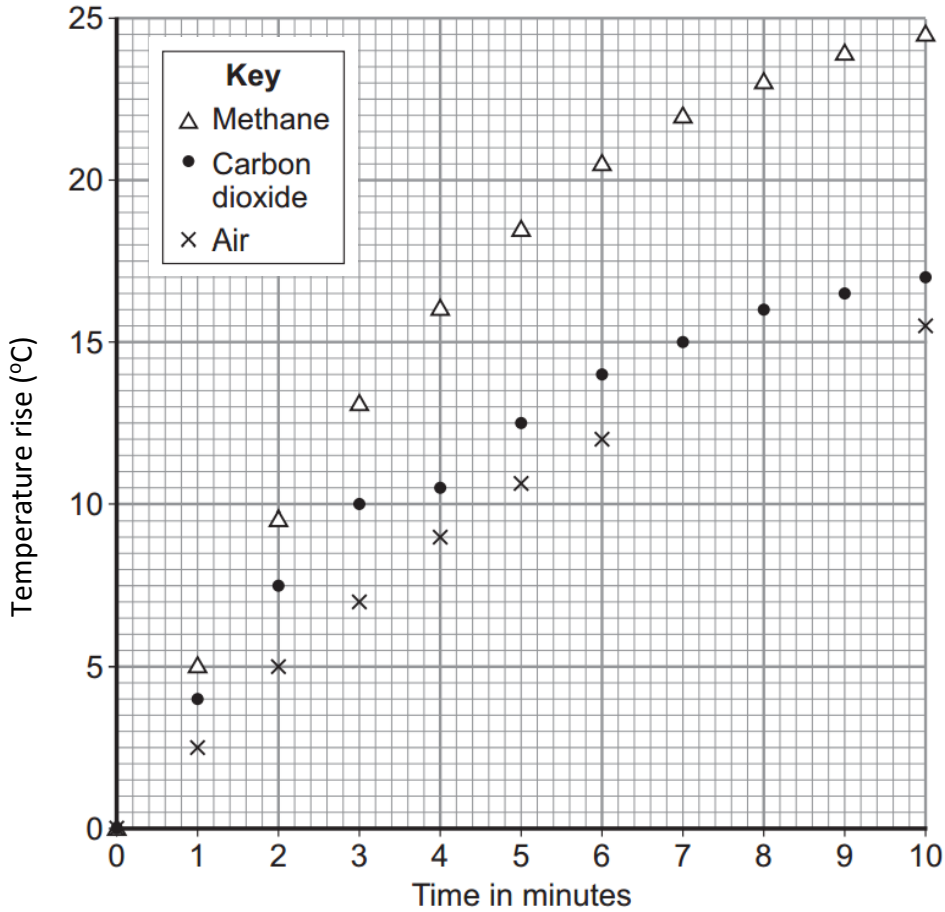
She filled the bottle with air and stood it in the sunshine and recorded the temperature every minute, for 10 minutes.

She repeated the experiment using carbon dioxide and then methane in the bottle.



- (c) Plot these points on the graph for air.
Draw a smooth curve through the points for air.

Time in minutes	Temperature rise (°C)
	Air
7	13.5
8	14.5
9	15.0



- (d) The results for carbon dioxide do not show a clear pattern.
Between which times was the change noticeable? (Circle your answer).

1- 2 minutes 2 - 3 minutes 3 - 4 minutes

- (e) Suggest a conclusion for the experiment.

- (f) Explain **one** way living organisms could be affected by climate change.

Question Eighteen [6 marks]

James carried out five experiments using a cabbage and three different types of animals, X, Y and Z. The table shows his observations at the start of the experiment and three days later.

Experiment	Start of the experiment	Three days later
1	1 cabbage leaf 5 living animal Z	Bits of the leaf left 5 living animal Z
2	1 cabbage leaf 5 living animal X 5 living animal Y	1 cabbage leaf 5 living animal Y
3	1 cabbage leaf 5 living animal X 5 living animal Z	1 cabbage leaf 5 living animal X
4	5 living animal X 5 living animal Y 5 living animal Z	5 living animal Y 1 living animal Z
5	1 cabbage leaf 5 living animal Y 5 living animal Z	Most of the leaf left 5 living animal Y 1 living animal Z

- (a) Based on the observations above, draw a possible food web by drawing FOUR arrows to show the relationships between the cabbage and animals X, Y and Z.

animal X

animal Y

animal Z

cabbage plant

(b) Why is the cabbage plant important in this garden community?

(c) Which animal is both prey and predator? Explain your answer.

(d) A gardener sprays his cabbages with a chemical which kills animal Z (but does not affect animals X or Y).
What effect could this have on the population of animal Y? Explain your answer.

(e) What is the role of decomposers like fungi and bacteria?



Question Nineteen [5 marks]

Scientists on planet Purnell have discovered some new species of animals and wish to classify them.

- (a) Here is one way they have divided them into 2 groups.
Give suitable headings for Group 1 and Group 2 to show how they have grouped them.

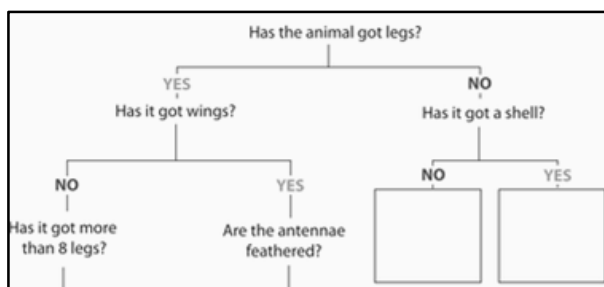
Group 1	Group 2	Key
		ear hands eye feelers

- (b) Classify the same six animals in a different way.
Give suitable headings for Group 3 and Group 4 to show how they have grouped them.

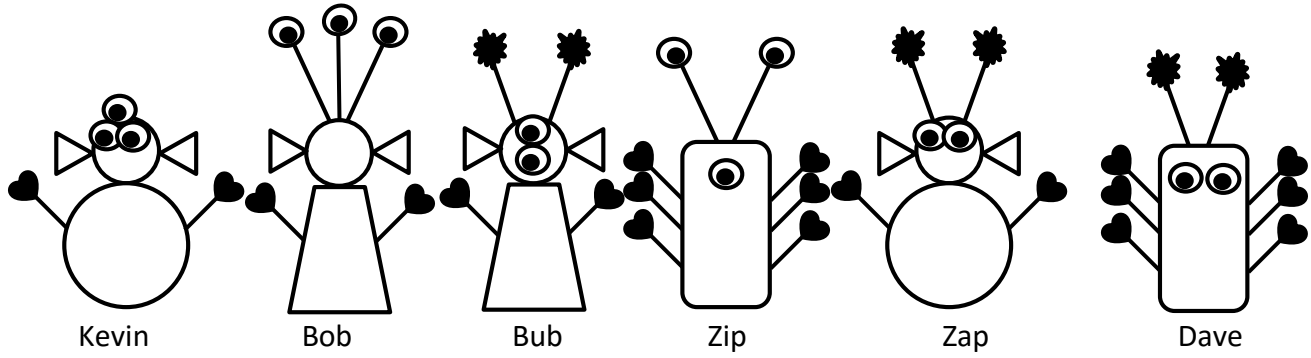
Group 3	Group 4	Key
		ear hands eye feelers

Examples of two types of key are given below.

Dichotomous Key – Family: Candius	
1a. Candy is chewy.....	2
1b. Candy is hard.....	7
2a. Candy is wrapped.....	3
2b. Candy is not wrapped.....	Ursa gummius
3a. Candy is rounded.....	4
3b. Candy is not rounded.....	5
4a. Wrapper is all white.....	Saltus taffinia
4b. Wrapper is not all white.....	5
5a. Wrapper is brown and white.....	Tutus rollus
5b. Wrapper is not brown and white....	6

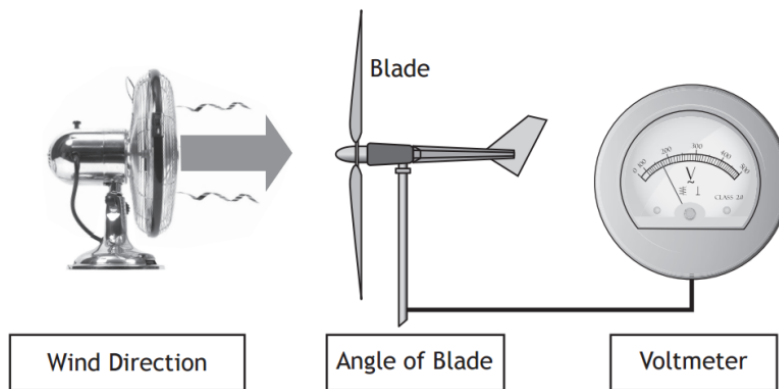


(c) Make a **go to key** or a **branching key** to identify the animals.



Question Twenty [5 marks]

The efficiency of a wind turbine depends on the angle of the blade.

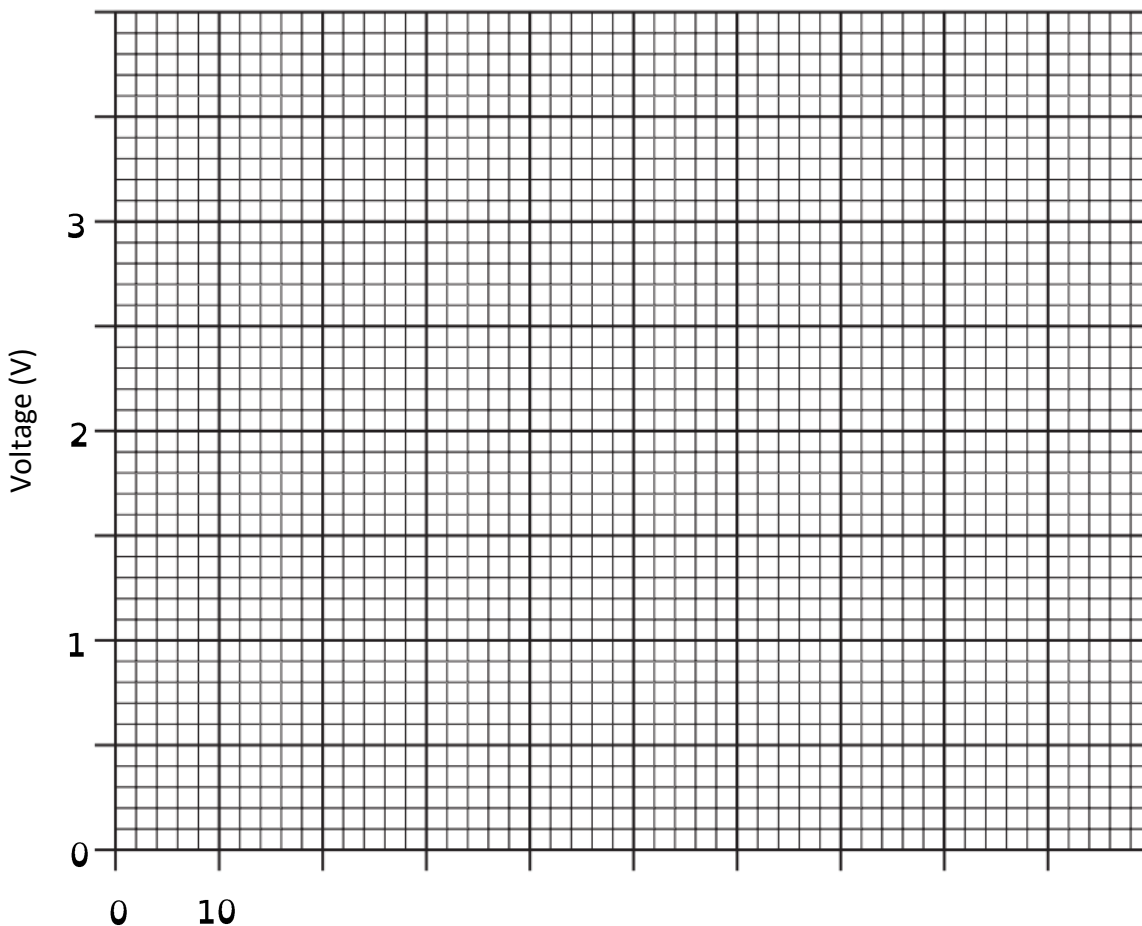


The table shows the voltage (electricity) produced at each blade angle.

Blade Angle (degrees)	0	10	20	30	40	50	60	70	80	90
Voltage (V)	0.00	0.80	1.50	2.20	2.95	2.30	1.80	1.10	0.60	0.00

(a) Use the information from the table to draw a line graph.

- add a scale and label to horizontal (x) axis;
- plot the points to show voltage produced against blade angle.



- (b) Describe the change in voltage produced when the blade angle of the turbine changed from 0° to 90° .

- (c) State two variables which should be kept constant to ensure the results obtained were valid.

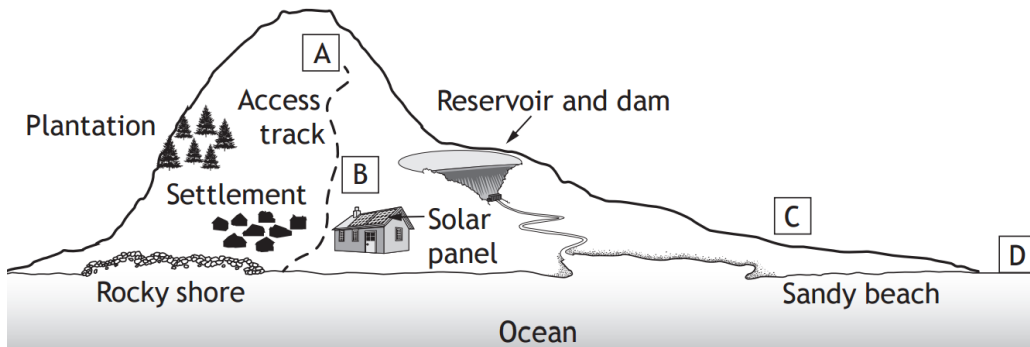
The number of wind farms in New Zealand is increasing.

- (d) Give one reason why some people think wind farms are NOT a good idea.



- (e) Give the energy change which occurs within a wind turbine.

The diagram below shows an island where renewable sources of energy are used to generate electricity for the islanders. Sites A, B, C and D show possible locations for a wind farm.



- (f) Choose one site and give one disadvantage of using this location for siting a wind farm.

CHECK YOUR ANSWERS