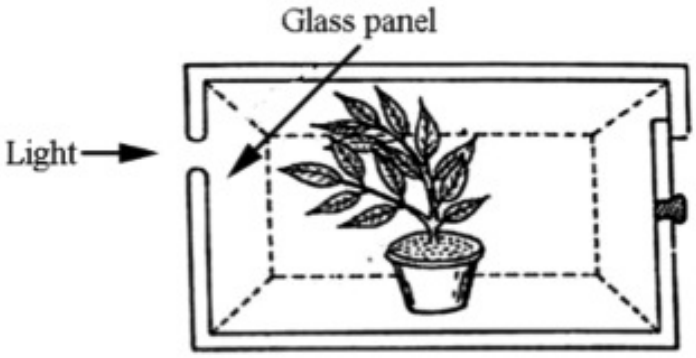
The Complete Second Year Science Revision Workbook.

(*c*)(*i*) What advantage does the plant get from bending towards the light?



What? _____

_____

(*ii*) Name this movement (growth response).

Name _____

(*d*) Nerves can carry messages in one direction only.

Clearly distinguish between sensory and motor nerves.

Distinction _____

_____

(*c*) Barometers are used to predict weather. What kind of weather would you expect if the pressure was (*i*) high *or* (*ii*) low?

High _____

Low _____

(*d*) Two identical beakers, one holding 50 cm^3 of water and the second holding 100 cm^3 of water, are at the same temperature of 80 °C. Which contains the most heat energy? Give a reason.

Which? _____

Reason _____

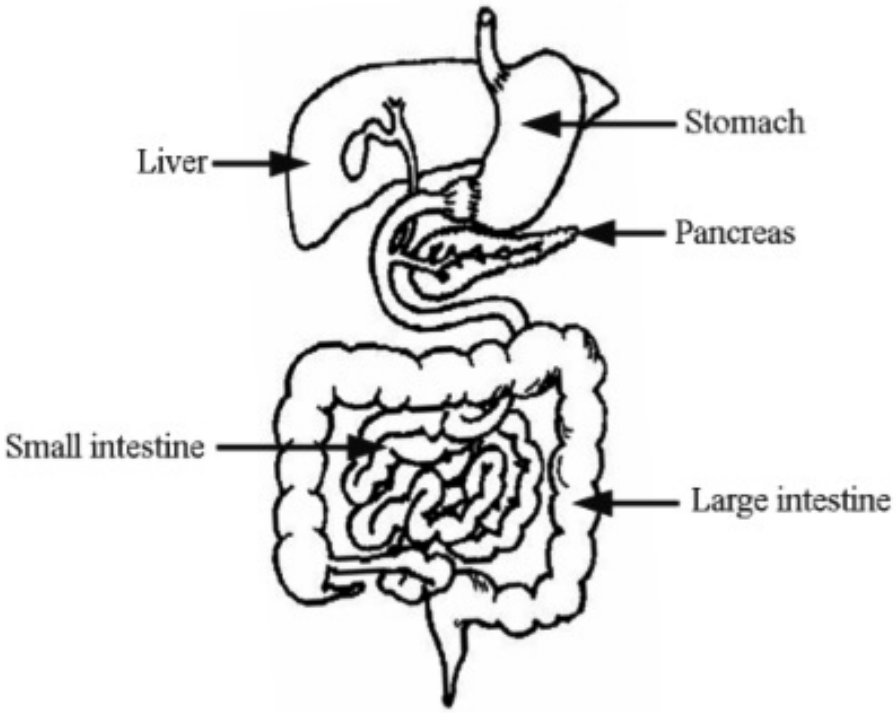
(*a*) Most of the food we eat requires digestion.

(*i*) What is meant by digestion? State clearly why we need to digest food. (6)

What? _____

Why? _____

The labelled diagram shows most of the organs involved in digestion and associated processes in our bodies.



(*ii*) Give one function for each of the five organs labelled in the diagram. The word 'digestion' alone will not merit marks; if it is used in an answer it must be qualified in some way. (15)

Stomach _____

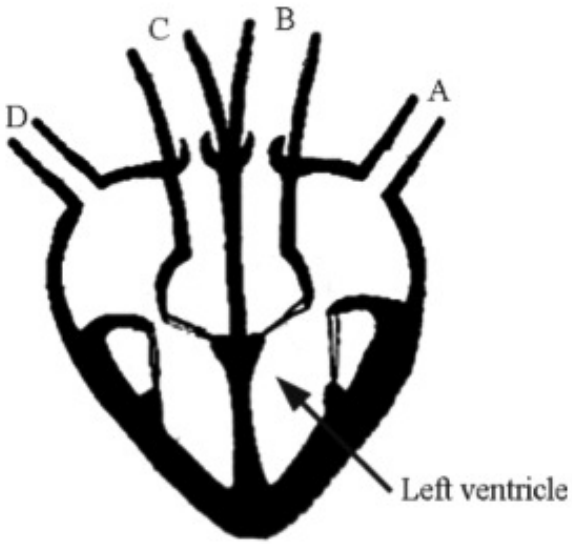
Liver _____

Pancreas _____

Small intestine _____

Large intestine _____

(*b*) Four blood vessels are attached to the heart. These blood vessels are labelled A, B, C and D in the diagram.



Select any two of the blood vessels A, B, C or D from the diagram.
Identify your selection in each case by using the appropriate letter.
Name the blood vessels selected.
Give the direction of movement of blood into *or* out of the heart in each case.
State if the blood is oxygenated *or* deoxygenated in each case. (18)

Identify _____

Name _____

Direction _____

Oxygenated *or* deoxygenated _____

Identify _____

Name _____

Direction _____

Oxygenated *or* deoxygenated _____

(*e*)(*i*) Name a metal that can be cut with a knife as shown in the photograph.

Name _____

(*ii*) What happens if a piece of this metal is dropped into water?

What? _____

(*f*) Ernest Rutherford (1871-1937) suggested the existence of the atomic nucleus in 1911.

Give two properties of the atomic nucleus.

1 _____

2 _____

(*g*) Explain what a 'biodegradable plastic' means.

Explanation _____

_____

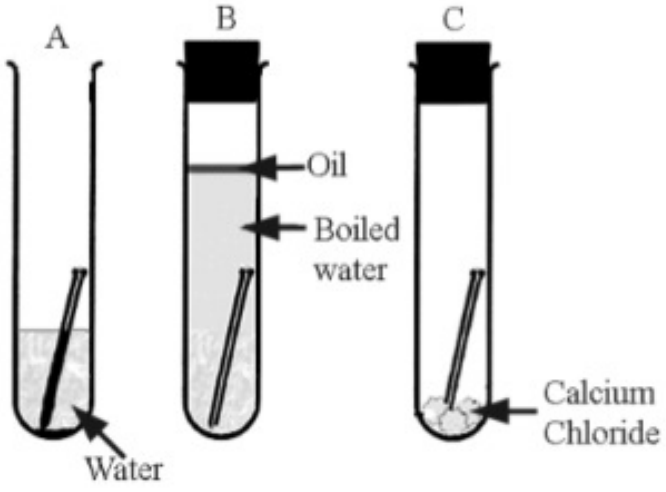
(*h*) A science student investigated the conditions for the rusting of iron nails. A diagram of the apparatus used is given below.

(*i*) Why did the iron nail rust only in test tube A?

_____

_____

_____



(*ii*) Why did the iron nail not rust in test tube B?

_____

(*iii*) Why did the iron nail not rust in test tube C?

_____

(*b*)(*i*) Describe, using a labelled diagram in the box provided, an experiment to show that carbon dioxide gas (CO_2) is more dense than air. (12)

(*ii*) Explain how the conclusion that CO_2 gas is denser than air can be drawn from your experiment. (6)

(*a*)(*i*) Distinguish between an element and a compound. (6)

Element _____

Compound _____

(*ii*) Iron and sulfur react to produce iron sulfide.
Complete the table below. (9)

Property	Iron	Sulfur	Iron sulfide
Colour			
Attracted by magnet			

(*b*) Carbon dioxide dissolves in water to give an acidic solution. Other gases dissolve to give solutions that are more acidic and give rise to acid rain.

(*i*) Name two gases that react in the atmosphere to produce acid rain. (6)

Gas 1 _____

Gas 2 _____

(*ii*) Give a source of one of the gases that you have named above. (6)

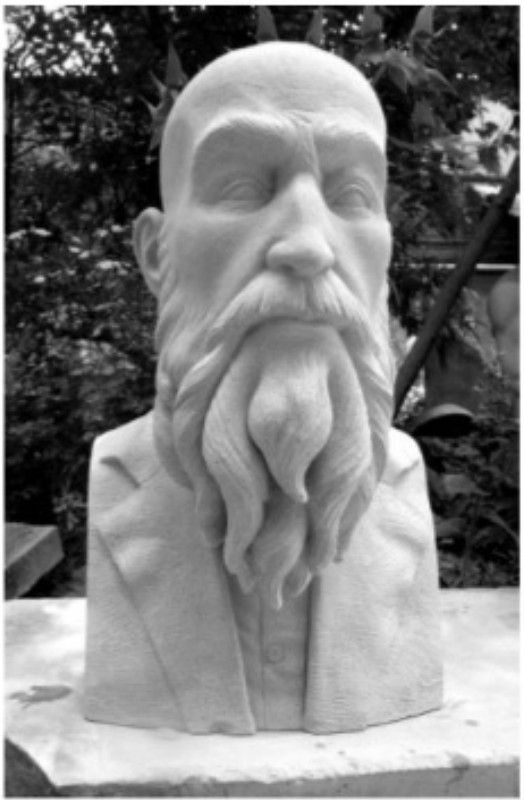
Name of gas _____

Source of gas _____

(*iii*) The sculpture, carved from limestone, of a bearded man in the photograph is new. How would you expect its appearance to change after years of exposure to acid rain? (3)

How? _____

_____



(*iv*) Limestone is calcium carbonate.
Write a balanced chemical equation for the reaction of calcium carbonate with an acid of your choice. (9)

_____

(*c*) The cartoon represents global warming.
How can human activity give rise to global warming?

How ? _____

_____

Give one effect of global warming.

Give _____

(*d*) What is contraception?

What? _____

_____

Name one form of contraception.

Name _____

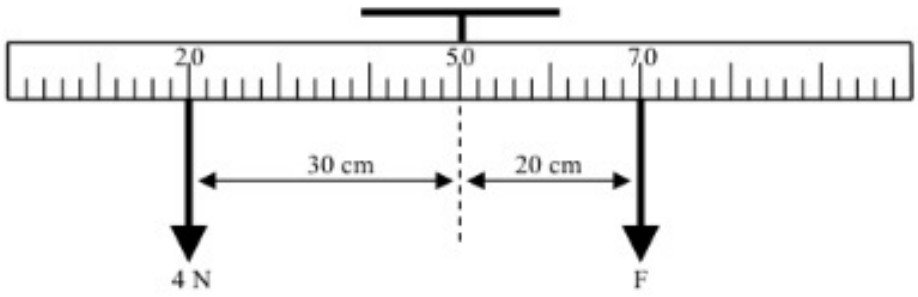
(*a*)(*i*) Distinguish between mass and weight. (6)

Mass _____

Weight _____

(*ii*) Define moment of a force. (6)

Definition _____



The diagram shows a metre stick suspended from its centre of gravity.
A force of 4 N acts on the stick at the 20 cm mark and a force of F N acts on the stick at the 70 cm mark. The metre stick is balanced horizontally.
Calculate force F. (6)

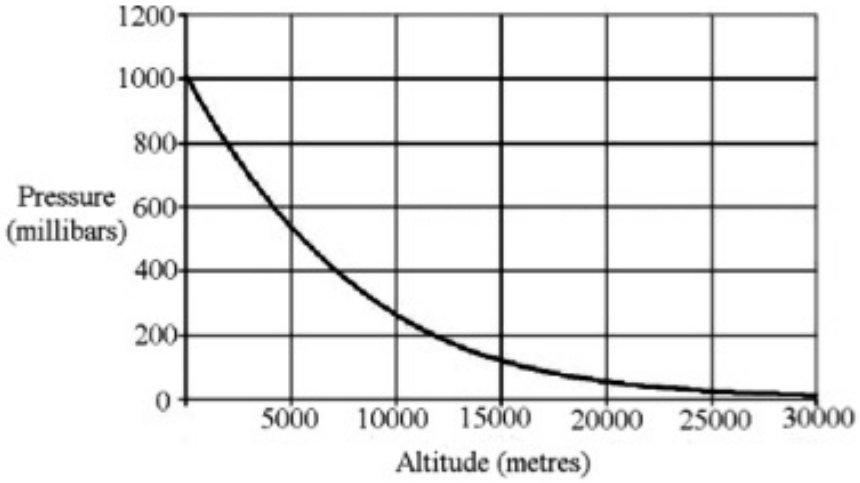
_____

_____

(*iii*) Give one everyday application of levers. (3)

Application _____

(*b*) The graph is of pressure *versus* altitude for our atmosphere.



(*i*) Look carefully at the graph of pressure *versus* altitude. Two conclusions can easily be drawn: (1) that atmospheric pressure depends on altitude, and (2) that the dependence of atmospheric pressure on altitude is not a direct one. Explain why each conclusion can be drawn from the graph. (6)

Pressure depends on altitude _____

Not direct _____

(*ii*) Give two reasons why atmospheric pressure is greatest near the earth's surface. (6)

Reason 1 _____

Reason 2 _____

(*iii*) What is the effect of increased pressure on the boiling point of water? (6)

_____

Give a reason for your answer.

Reason _____

_____

Question 2 (39)

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

Write the letter **T** beside the **type of tooth** labelled **T**.

Write the letter **M** beside the **mineral** needed for healthy bones and teeth. (6)

	Incisor
	Molar
	Calcium
	Iron

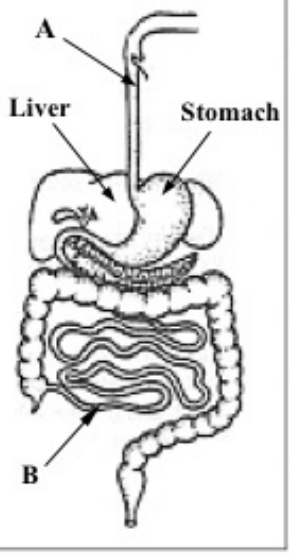
(*b*) The diagram shows the **human digestive system**.
Examine the diagram and answer the questions below. (9)

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 **F** beside the **function** of the part labelled **B**.

	Intestine
	Oesophagus
	Mouth
	Digestion
	Excretion
	Egestion



(*c*) A student carried out a number of food tests on two different food samples, **Food A** and **Food B**.
Answer the following questions about food tests. (12)

(*i*) **Food A**, when tested, formed a **translucent spot** on brown paper.
Which food type, **protein**, **fat** or (**reducing**) **sugar**, is mainly found in **Food A**? _____

(*ii*) **Food B**, when tested with Benedict's (Fehling's) solution, produced a **brick red** colour.
What **colour** was Benedict's (Fehling's) solution at the beginning of the test? _____

Is **heat** required for this food test? _____

Which food type, **protein**, **fat** or (**reducing**) **sugar**, is mainly found in **Food B**? _____

(*d*) Food (e.g. crisps) is a store of chemical energy.
Describe, with the help of a labelled diagram, an investigation to **show the conversion of chemical energy in a food to heat energy**. (12)
The headings below may be helpful.

Equipment: _____

_____

_____

_____

Procedure: _____

_____

_____

_____

_____

_____

_____

Result: _____

_____

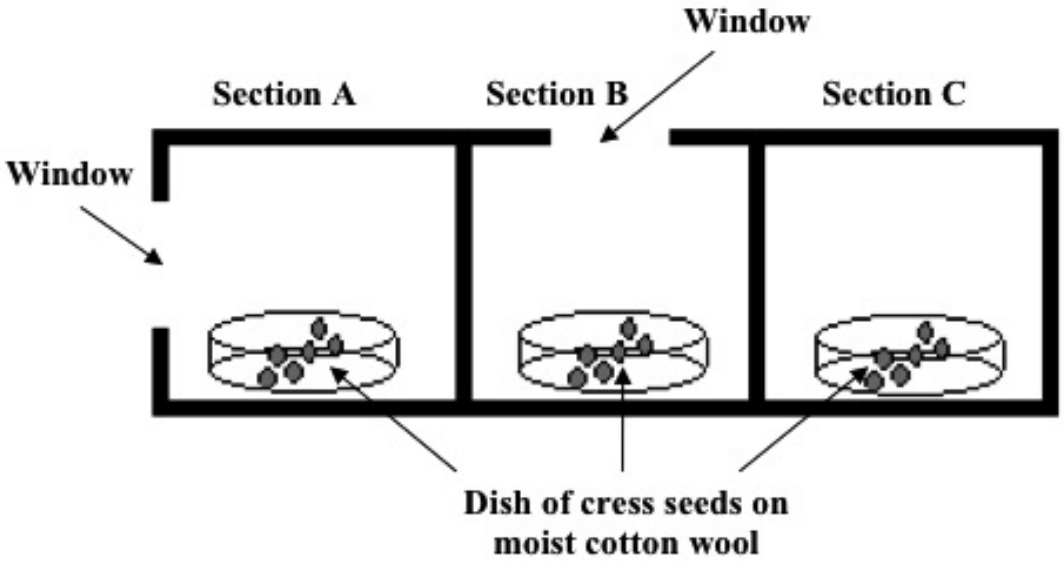
_____

_____

Labelled diagram

(*c*) The diagram shows the apparatus used to **investigate the growth response of cress seedlings to light**. The cress seeds were left to germinate in the segmented box for one week.

Study the diagram and answer the questions below. (12)



In what direction will the seedlings in **Section A** grow?

_____

In what direction will the seedlings in **Section B** grow?

_____

Write the letter **G** beside the word which describes this **growth response** of the seedlings.

	Photosynthesis
	Phototropism
	Respiration

(*e*) Choose an alloy from the list on the right.

Steel
Copper
Bronze
Silver
Brass

Alloy _____

Give one use for the alloy you have chosen.

Use _____

(*f*) The known elements are listed in the Periodic Table. Use words from the list on the right to correctly complete the sentences below.

Compounds
Mixtures

When elements **chemically combine** _____ are formed.

When elements **physically combine** _____ are formed.

(*g*) Complete the table below. Insert the correct phrase for the location of the electron and the proton, '**outside the nucleus**' *or* '**inside the nucleus**'.

Particle	Relative mass	Relative charge	Location
NEUTRON	1	0	Inside the nucleus
ELECTRON	$^{1}/_{1840}$	Negative (−1)	
PROTON	1	Positive (+1)	

(*h*) The pieces of equipment drawn on the right are used when reacting **sodium hydroxide (NaOH)** with **hydrochloric acid (HCl)** in a titration.

Name the pieces of equipment labelled **A** and **B**.

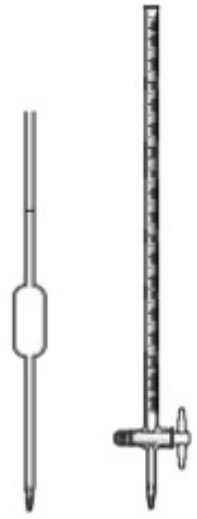
A _____

B _____

When sodium hydroxide and hydrochloric acid react, water and another product are formed.

Name the other product.

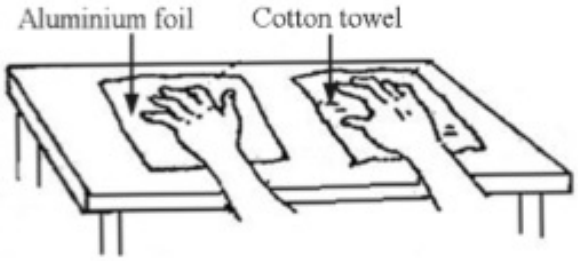
Product _____



A **B**

(7 × 6 + 1 × 10)

(*e*) The foil and the towel were both at a temperature of 10 °C.
Why did the foil feel colder?



Why? _____

_____

(*f*) (*i*) What happens to white light when it is dispersed?

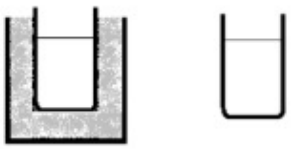
What? _____

(*ii*) What part of white light is refracted most by a triangular prism?

What? _____

(*d*) Label clearly the ***pulmonary artery with an*** **A**, and the ***pulmonary vein with a*** **V** in the diagram of the heart.

(*g*) The diagram shows two metal cans of equal size. They contain equal volumes of water at 100 °C. Can **A** is wrapped in cotton wool and can **B** has no wrapping.



Can A **Can B**

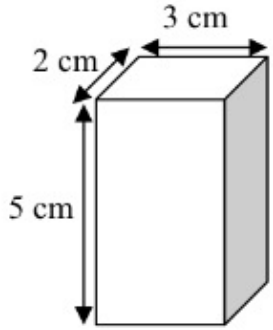
After 20 minutes, which can, **A** *or* **B**, would have the higher temperature?

Answer _____

Give a reason for your answer.

Reason _____

(*h*) A metal block as shown has a mass of 60 grams.



Name the instrument you would use in the laboratory to find the mass of the block.

Instrument _____

In the table write the letter **V** beside the **volume** of the block.

Write the letter **D** beside the **density** of the block.

	30 cm^3
	10 cm^3
	2 g/cm^3
	20 g/cm^3

$(7 \times 6 + 1 \times 10)$

c) The diagram shows a **ball and ring apparatus**.

This piece of equipment was used to examine the effect of heat on a metal.

When the ring and the ball were cold, the ball passed through the ring.
When the ball was heated it no longer passed though the ring.

Answer the following questions about this experiment. (12)

(*i*) What does this experiment tell you about the effect of heat on the metal?

_____

_____

_____

(*ii*) If the hot metal ball was cooled down again, would you expect it to pass through the ring?

_____

Give a reason for your answer.

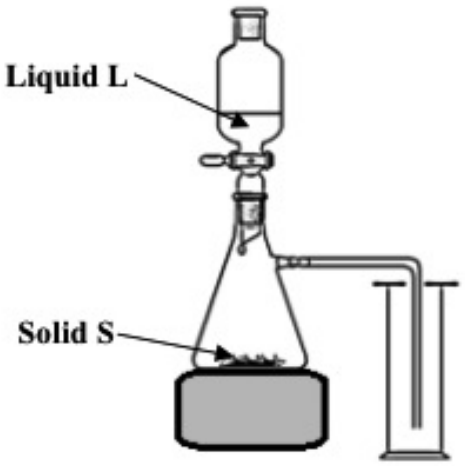
_____

_____

_____

_____

(*c*) The diagram shows the apparatus used to **prepare and collect carbon dioxide gas** in the laboratory. (18)



(*i*) Write the letter **L** beside the name of the **liquid L** used to prepare carbon dioxide.

(*ii*) Write the letter **S** beside the name of the **solid S** used to prepare carbon dioxide.

	Hydrogen peroxide
	Hydrochloric acid
	Marble chips
	Manganese dioxide

(*iii*) What would a student observe when **liquid L** is allowed drop onto **solid B**?

Observation _____

(*iv*) **Name the liquid** which turns milky white when carbon dioxide is bubbled through it.

Name _____

(*v*) State **one use** for carbon dioxide in everyday life.

Use _____

(*a*) Alloy car wheels are made from an alloy of aluminium or magnesium. Name another alloy and give a use for it.

Alloy _____

Use _____

_____

(*d*) Using their atomic symbols, arrange the metals, copper, calcium, zinc and magnesium in order of decreasing reactivity with dilute hydrochloric acid.

_____

(*b*) Without enzymes we would not be able to exist. Enzymes release energy from food, help build the molecules that our bodies are composed of and break down structures and wastes that we no longer need.

(*i*) Name an enzyme. (3)

Name _____

(*ii*) Name the substrate that the enzyme you have named acts on. (3)

Name _____

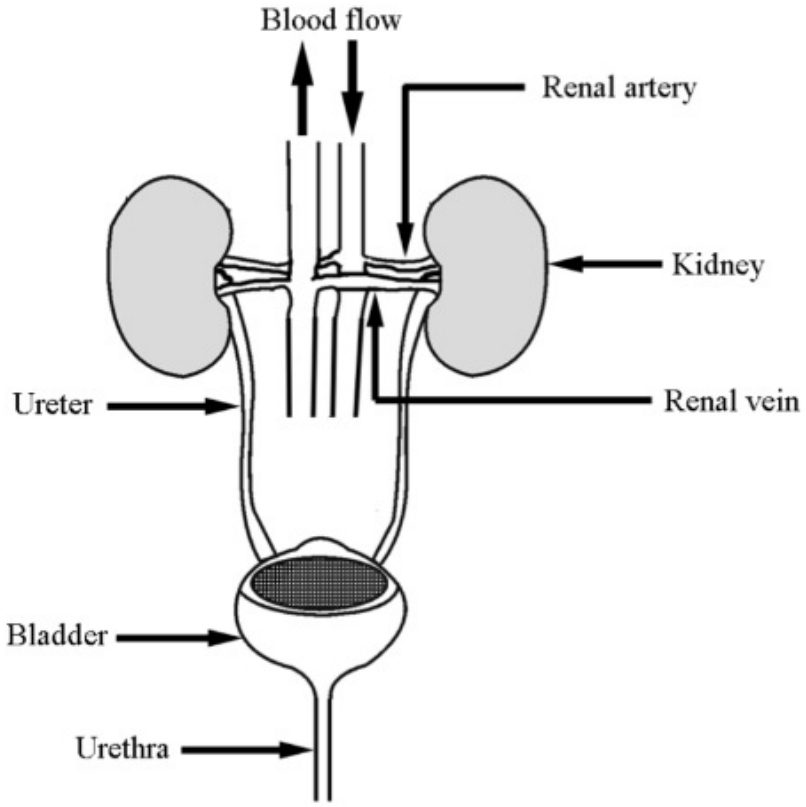
(*iii*) Name the product of the action of this enzyme. (3)

Name _____

(*iv*) What reagent might you use, in a laboratory, to test that the reaction has taken place? (3)

Name _____

(*a*) The diagram is of the urinary system. Give the function of **five** of the six parts labelled. (15)



Renal artery _____

Kidney _____

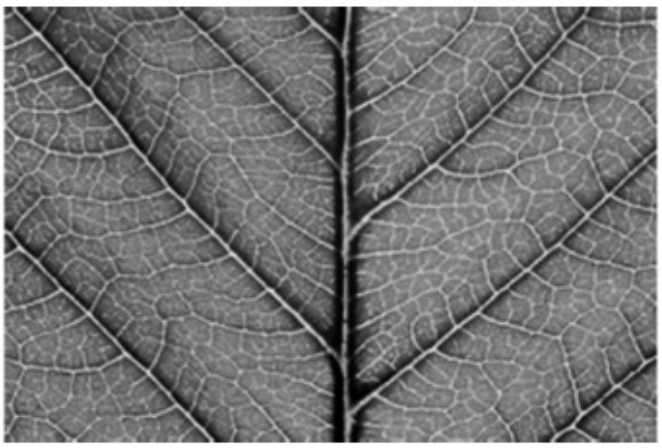
Renal vein _____

Ureter _____

Bladder _____

Urethra _____

(*b*) The photograph shows part of a leaf of a green plant.



(*i*) Name a gas that moves into and a gas that moves out of a green leaf during active photosynthesis. (6)

Gas in _____

_____

Gas out _____

(*ii*) Outline an experiment to show that photosynthesis produces starch. Use the box provided for an **optional** labelled diagram. (18)

_____

_____

_____

_____

_____

_____

_____

_____

_____

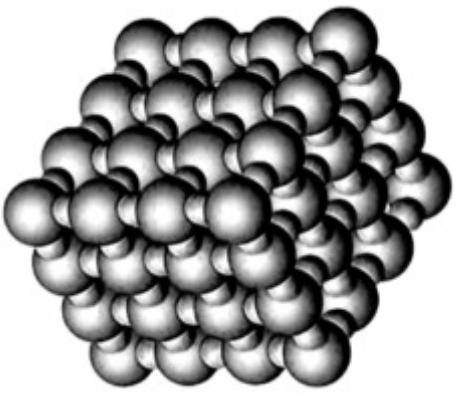
_____

_____

_____

_____

(*e*) The diagram shows part of a crystal of sodium chloride. Name the type of bonding in sodium chloride. Describe this type of bonding.



Name _____

Describe _____

_____

(*f*) Select a substance from the list with a pH less than 7 and one with a pH greater than 7: orange juice, rain water, toothpaste, bread soda, vinegar, sour milk, milk of magnesia, cola, washing soda.

pH less than 7 _____

pH greater than 7 _____

(*g*) Name two non-metallic elements.

1 _____ 2 _____

(*c*) Describe the reaction of a named alkali metal with water and name a product of the reaction. (9)

_____

_____

_____

_____

_____

(*f*) **Blood** is part of the circulatory system.

Complete the following statements using the correct word(s) from the list on the right.

Plasma
Red blood cells
White blood cells
Platelets

The **liquid part** of blood is known as

_____.

Oxygen gas is carried around the body by the

_____.

(*g*) **Respiration** is the release of energy from digested food e.g. glucose.

Complete the word equation given below using words from the list on the right.

Water
Oxygen

Glucose + _____ ⟶ **Energy** + **Carbon dioxide** + _____.

(*c*) Exercise and rest are good for the health of a person. Exercise has an effect on pulse rates.

Answer the following questions about exercise and pulse rates. (6)

What is the **average pulse rate** for an adult at rest?

_____ beats per minute (bpm).

Choose a word from the list on the right to correctly complete the statement below.

Increase
Decrease

Exercise causes a person's pulse rate to _____.

(*d*) The diagram shows a **human heart**. Study the diagram and answer the questions below. (9)

Choose from the list on the right, the **name** of the chamber labelled **A** in the diagram.

Ventricle
Atrium

Name _____

Why is the wall of the **left side** of the heart **thicker** than the **right side**?

_____

_____

In Ireland today, **heart disease** is a major problem. State **one** way in which heart disease can be prevented.

_____

(*d*) When hydrochloric acid (**HCl**) and sodium hydroxide (**NaOH**) react in a neutralisation reaction, a salt and one other substance are formed.

Name the salt formed.

Salt _____

Name the other substance formed.

Substance _____

(*g*) Choose the correct words from the list on the right, in each case, to complete the statements below about bonding.

Ionic bonding involves an attraction between positive and negative _____.

Covalent bonding involves the sharing of pairs of _____.

Protons
Ions
Electrons
Neutrons

(*h*) The diagram shows an arrangement of apparatus suitable for the preparation of **carbon dioxide gas** in a school laboratory.

Name a suitable substance for **liquid X** and **solid Y** from which carbon dioxide can be made.

Liquid X _____

Solid Y _____

Limewater is used to test for the presence of carbon dioxide gas. What happens to limewater when carbon dioxide gas is bubbled through it?

_____

(*a*) **Fossil fuels** are sources of hydrocarbons and can be burned in air. (12)

List two examples of fossil fuels.

1 _____ **2** _____

Name the two products formed when fossil fuels are burned.

1 _____ **2** _____

(*b*) **Plastics** have many uses in today's world. (6)

Complete the statement below
about plastics using the correct word(s)
from the list on the right.

Alcohol
Water
Crude oil

Most plastics are made from _____.

Most plastics are **non-biodegradable**. What is meant by non-biodegradable?

Non-biodegradable _____

_____

(*c*) **Calcium** is a member of the **Group II** elements in the Periodic Table.

(*i*) What **name** is given to the Group II elements? (3)

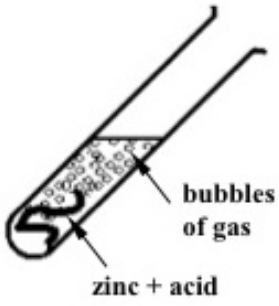
_____ metals

(*ii*) The diagram shows **zinc metal reacting with hydrochloric acid, HCl**. Bubbles of gas are given off. Answer the following questions about this reaction. (9)

Name the gas given off. _____

Give the **test** for this gas. _____

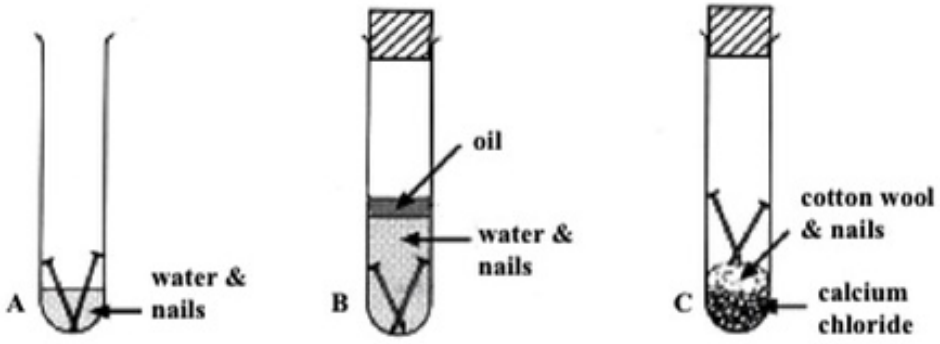
_____



(*d*) The diagram shows an apparatus set up by a student to investigate **the rusting of iron nails**. Nails were placed in the test tubes as shown.

After a number of days the nails in test tube **A** only, had a coating of rust.

Answer the following questions about rusting. (9)



Name **two conditions** necessary for rusting of iron to occur.

1 _____ **2** _____

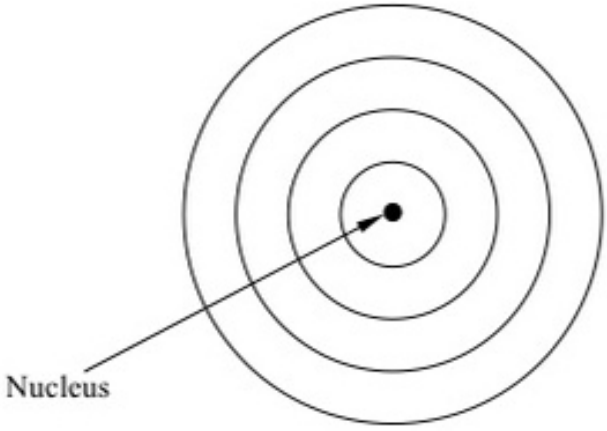
Name one method that can be used to **prevent** the rusting of iron.

_____

_____

(*d*) A potassium atom has atomic number 19 and a mass number of 39.

Complete the diagram using dots or crosses to clearly show the arrangement of electrons in the potassium atom.



(*g*) A plant in an otherwise dark room bends towards the light from a window.

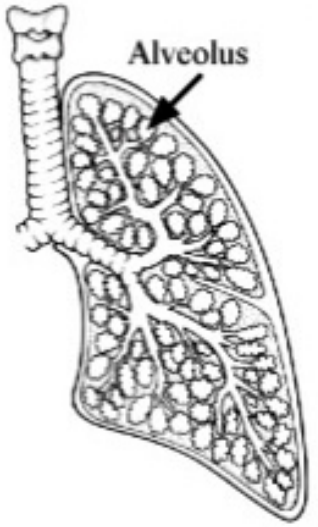
(*i*) What is the ***growth response*** of a ***plant to light*** called?

What? _____

(*ii*) What ***benefit*** does the plant get from this response?

What? _____

(*h*) The diagram shows the internal structure of a human lung. There are about 350 million alveoli per lung.



Describe clearly the ***exchange of gases*** that occur between the ***air in the alveoli*** and the ***bloodstream***.

Describe _____

_____

_____

_____

_____

(7 × 6 + 1 × 10)

(*a*) The diagram of the human digestive system has been simplified for clarity.

(*i*) What is ***digestion***? (3)

What? _____

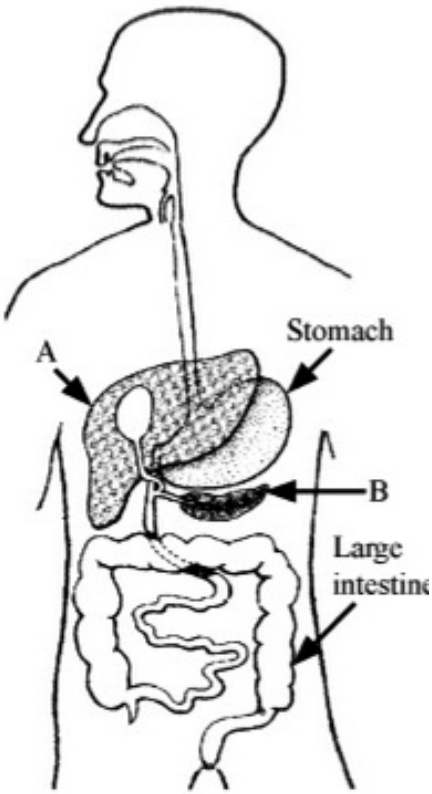
(*ii*) Why is ***digestion necessary***? (3)

Why? _____

(*iii*) Name the ***organs*** labelled **A** and **B**. (6)

Organ **A** _____

Organ **B** _____



(*iv*) Give **one *function*** of the stomach. (3)

Give _____

_____

(*v*) Give **one *function*** of the large intestine. (3)

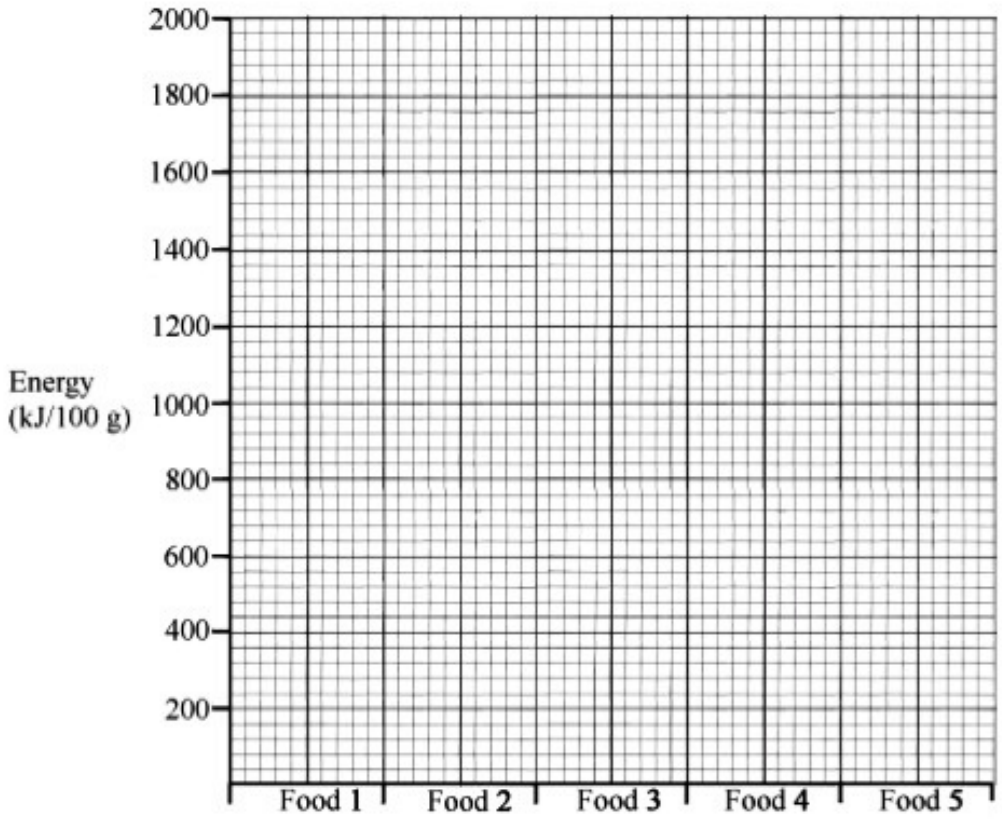
Give _____

_____

(*b*) Protein, carbohydrate and fat can all be used to provide energy in our bodies. The table gives the amount of these food constituents, in grams per 100 grams for five common foods. The energy content per 100 g of each food has also been given. The energy values have been rounded off to the nearest 100 kJ.

Food Constituent	Protein	Carbohydrate	Fat	Energy kJ/100 g
Food 1-Baked beans	4.0	17.5	0.4	400
Food 2-Cooked chicken	26.2	nil	1.6	500
Food 3-Eggs	12.5	nil	11.2	600
Food 4-Bread (wholemeal)	9.0	45.0	2.2	1000
Food 5-Cheddar cheese	25.4	0.1	34.9	1700

(*i*) Draw a ***bar chart***, in the grid below, to ***compare the energy content*** of 100 g of foods 1-5 given in the table above. (9)



(*ii*) Which ***food constituent*** is primarily responsible for the high energy content of cheese? What ***evidence*** does the table provide to support your answer? (6)

Which? _____

What? _____

_____

(*iii*) Describe how to ***test a food*** for the presence of ***fat***. (6)

_____

_____

_____

_____

_____

(*c*) The photograph shows a statue that was cast in the alloy bronze.

(*i*) What is an ***alloy***? (3)

What? _____

_____

(*ii*) Name an ***alloy***, other than bronze, and give ***one use*** for it. (6)

Name _____

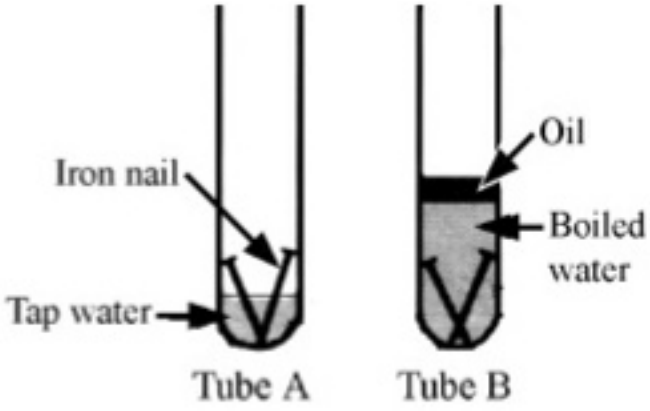
Use _____

(*iii*) Metals are malleable and ductile. Explain the underlined terms. (6)

Malleable _____

Ductile _____

(*h*) A pupil performed an experiment on the rusting of iron using the apparatus shown in the diagram. The iron nails in one of the tubes rusted after a few days, while the nails in the other test tube did not rust.



(*i*) In ***which tube*** did the nails ***rust***?

Which? _____

(*ii*) Why was ***boiled water*** used in tube B?

Why? _____

(*iii*) What is the ***function*** of the oil in tube B?

What? _____

(*iv*) What ***conclusion*** can be drawn from this experiment?

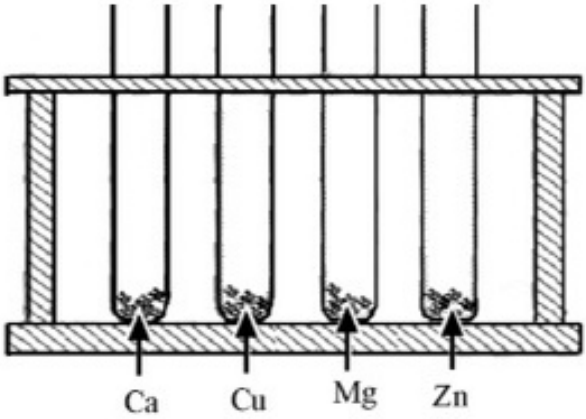
What? _____

Name ***two processes*** that the ***leaves*** of ***green plants*** carry out.

(*i*) _____

(*ii*) _____

A investigation was carried out to see how different metals react with water and dilute acid. The diagram shows the metals used in this investigation. When a metal reacts with water or a dilute acid it produces a gas. The water in this experiment was added to the metal at room temperature.



(*i*) Name the ***gas*** produced by the reaction of a metal used in this experiment with water or a dilute acid. (3)

Name _____

(*ii*) Name a ***dilute acid suitable*** for use in this experiment. (3)

Name _____

(*iii*) Name a ***metal***, used in this experiment that ***reacts with water*** at room temperature. (3)

Name _____

(*iv*) Name a ***metal***, used in this experiment that ***does not react*** with the ***dilute acid*** that you have named above. (3)

Name _____

(*v*) List the ***metals*** used in this experiment in ***decreasing order of reactivity with the dilute acid*** named (most reactive first). (3)

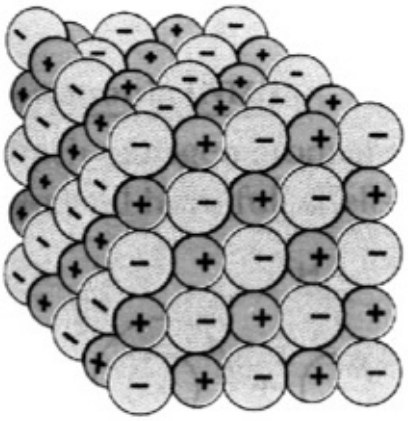
List _____

(*vi*) Give **one *safety precaution*** that you would take when performing this experiment. (3)

Give _____

_____

(*b*) The diagram shows sodium ions (+) and chloride ions (-) in part of a crystal of table salt, sodium chloride.



(*i*) How are ***sodium ions*** and ***chloride ions formed*** from their atoms? (6)

How? _____

_____

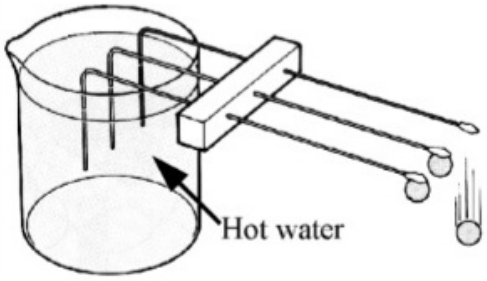
(*ii*) What ***force*** holds the ions together in sodium chloride? (3)

_____

(*iii*) Name ***one other*** compound that is ***composed of ions***. (3)

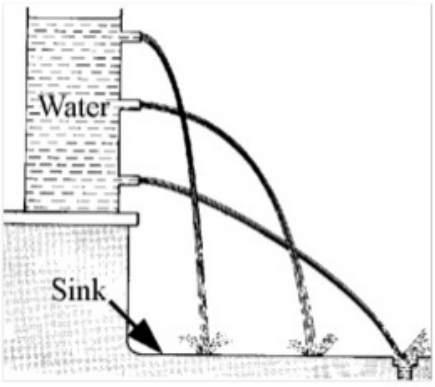
_____

(*b*) Copper, aluminium and iron rods are set-up as shown in the diagram. A metal ball is attached by wax to the end of each rod. Hot water is poured into the beaker. The ball falls from the copper rod first. What ***conclusion*** can be drawn from this observation?



Conclusion _____

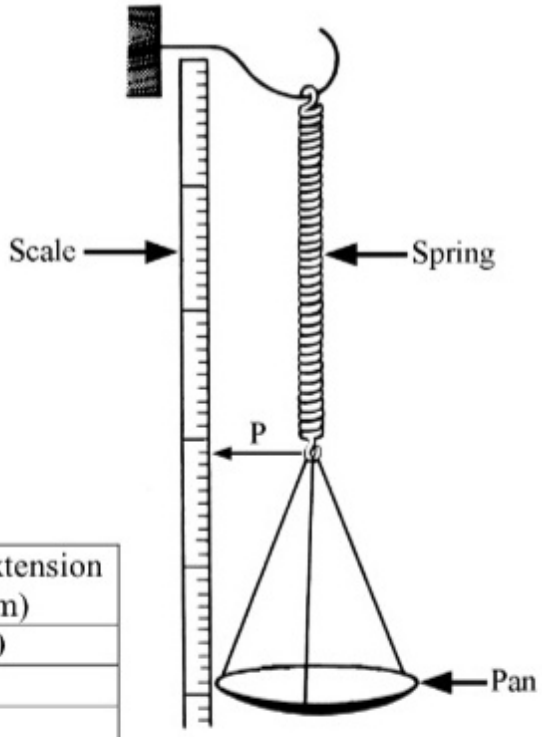
(*c*) The diagram shows a container with three spouts. The container is filled with water. Jets of water pour out of the spouts. Why does the ***jet of water from the bottom spout travel the furthest out from the container***?



Why? _____

_____

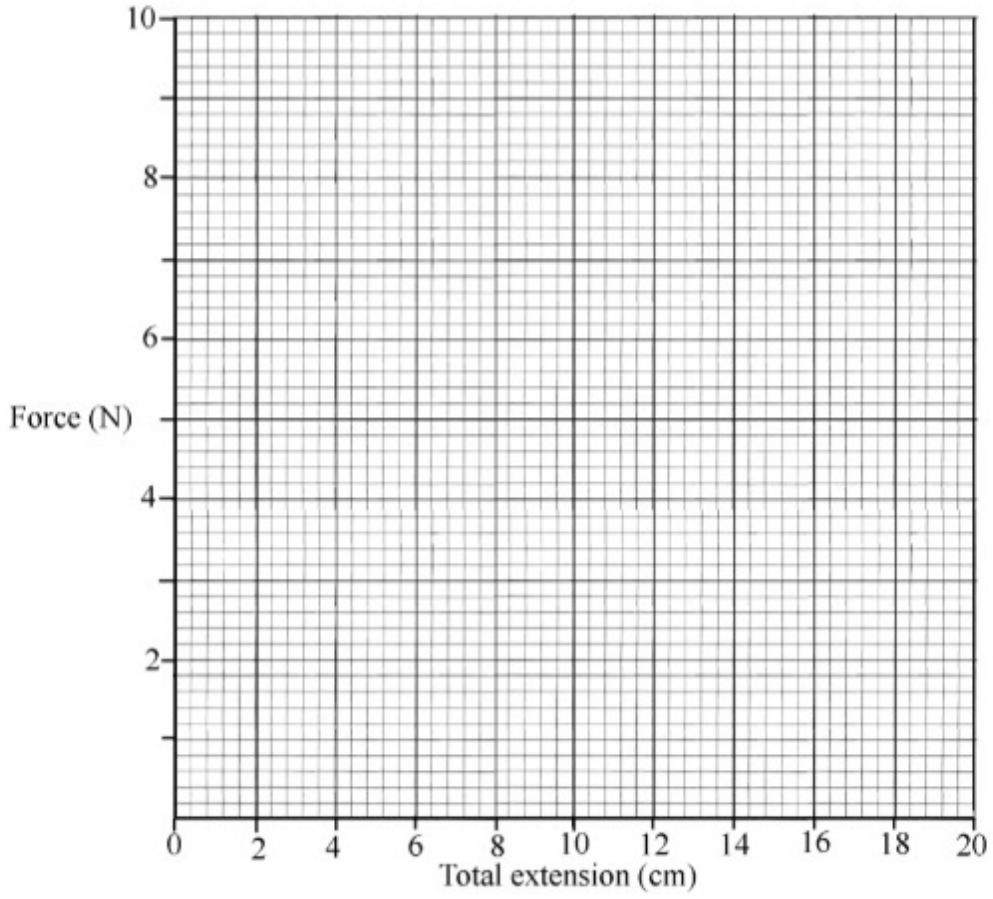
(*a*) A pupil used the apparatus shown in the diagram to investigate the relationship between the force applied and the extension produced in the spring by that force.
Pointer, P, was used to read the scale.
Weights were added to the pan to apply forces to the spring.
The data recorded is in the table.



(*i*) Calculate the ***total extension*** for each force and enter them in the table. (6)

Force (N)	Scale reading (cm)	Total extension (cm)
0	31.0	0
2	35.0	
4	39.0	
6	43.0	
8	47.0	
10	51.0	

(*ii*) Draw a ***graph*** of force against total extension in the grid below. (6)



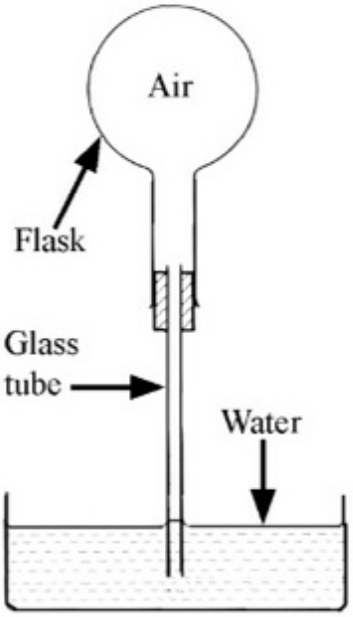
(*iii*) What ***conclusion*** can be drawn from the graph regarding the relationship between the force applied to the spring and the extension produced by it? (6)

What? _____

(*iv*) Use the graph to ***determine the weight*** of a stone that produced an extension of 14 cm in the spring. (3)

Use _____

(*b*) The apparatus shown in the diagram was used to investigate the expansion and contraction of a gas.



(*i*) What is ***observed*** when the flask is ***heated***? (3)

What? _____

_____

(*ii*) Explain your ***observation*** when the flask is ***heated***? (3)

Explain _____

_____

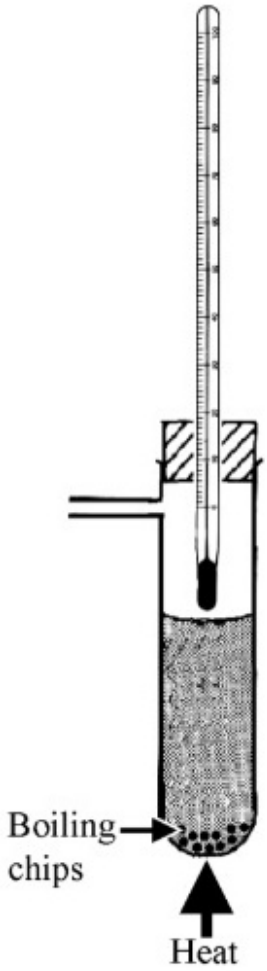
(*iii*) What is ***observed*** when the flask is allowed to ***cool***? (3)

What? _____

(*iv*) Explain what you ***observe*** as the flask ***cools***. (3)

Explain _____

(*a*) The ***boiling point of water*** can be determined using the apparatus shown in the diagram.



(*i*) Why are ***boiling (anti-bumping) chips*** added to the water? (3)

Why? _____

(*ii*) At what ***temperature*** does ***water boil***, at ***standard*** (normal) ***atmospheric pressure***? (3)

What? _____

(*iii*) What ***effect*** does the ***raising of pressure*** have on the ***boiling point*** of water? (3)

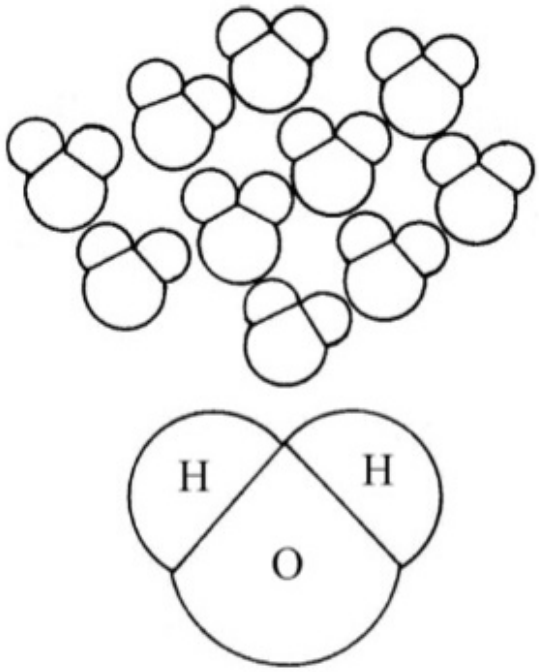
Effect of raising pressure _____

(*iv*) What ***effect*** does the ***lowering of pressure*** have on the ***boiling point*** of water? (3)

Effect of lowering pressure _____

Atoms of elements can combine to form compounds using chemical bonds between their atoms. There are different types of chemical bonds.

(*a*) The diagram shows a group of water molecules with one enlarged below with its constituent atoms identified by their atomic symbols. Water molecules are very tiny, one teaspoon of water contains approximately 2×10^{23} molecules.



(*i*) Name the ***type of bonding*** in the water molecule. (3)

Name _____

(*ii*) ***Describe*** this ***type of bond***. (6)

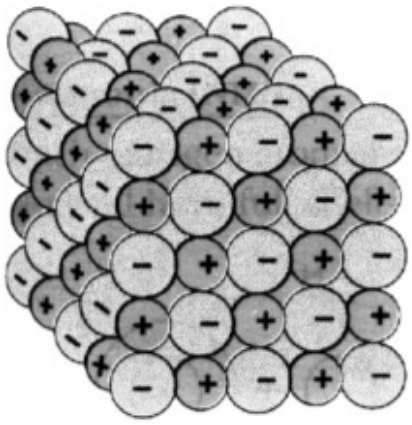
Describe _____

_____

(*iii*) Name ***one other*** compound with this ***type of bonding***. (3)

Name _____

(*b*) The diagram shows sodium ions (+) and chloride ions (-) in part of a crystal of table salt, sodium chloride.

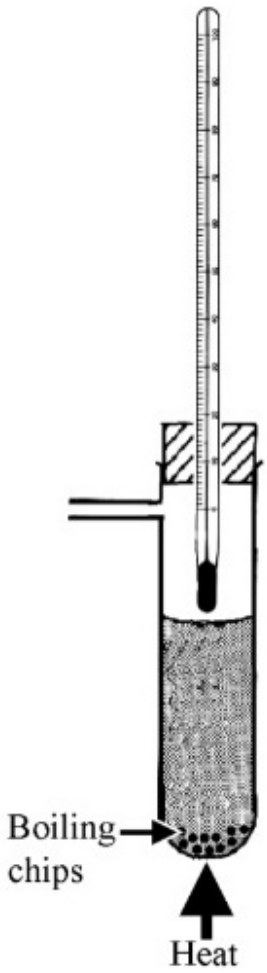


(*i*) How are ***sodium ions*** and ***chloride ions formed*** from their atoms? (6)

How? _____

_____

(*a*) The ***boiling point of water*** can be determined using the apparatus shown in the diagram.



(*i*) Why are ***boiling (anti-bumping) chips*** added to the water? (3)

Why? _____

(*ii*) At what ***temperature*** does ***water boil***, at ***standard*** (normal) ***atmospheric pressure***? (3)

What? _____

(*iii*) What ***effect*** does the ***raising of pressure*** have on the ***boiling point*** of water? (3)

Effect of raising pressure _____

(*iv*) What ***effect*** does the ***lowering of pressure*** have on the ***boiling point*** of water? (3)

Effect of lowering pressure _____

The diagram shows a gas jar of **carbon dioxide** gas being poured onto a lighting candle.
The candle quenches (goes out).

This test **demonstrates two properties** of carbon dioxide gas.

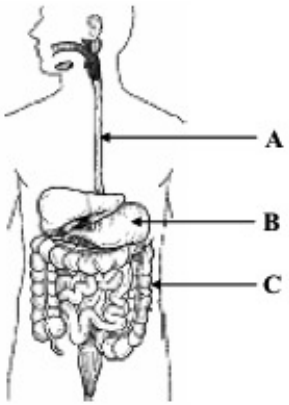
State these two properties. (6)

1 _____

2 _____

(*c*) Digestion of food is important so that we can obtain energy from our food.

(*i*) **Name** the parts of the digestive system labelled **A**, **B** and **C** in the diagram. (9)



Name of A _____

Name of B _____

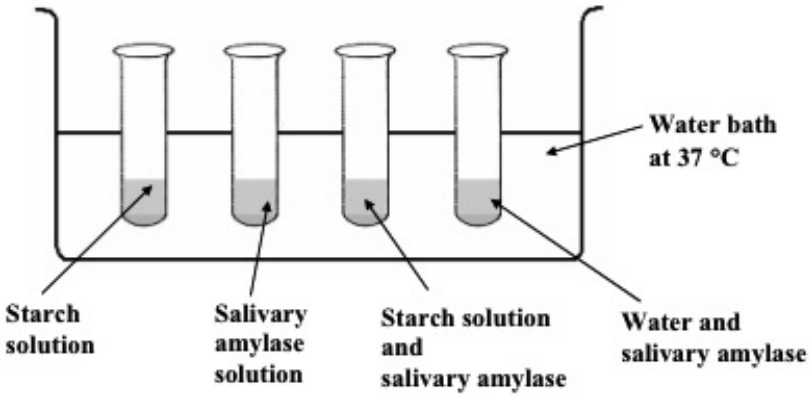
Name of C _____

(*ii*) Give **one** function of the part of the digestive system labelled **B**. (3)

Function of B _____

_____

(*iii*) **Salivary amylase** found in the mouth acts on starch in the food we eat. This action can be investigated in the laboratory.



Name the chemical used to test for the **presence of starch** at the beginning of the experiment. _____ (3)

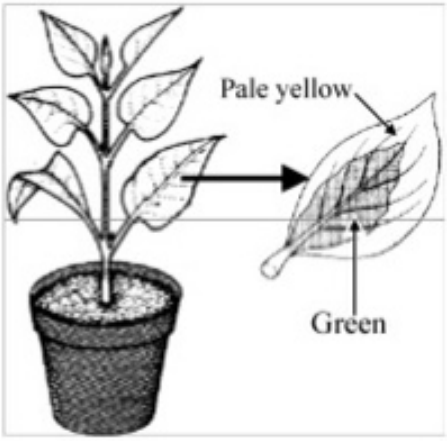
When the salivary amylase is added to starch solution and the mixture placed in a water bath at 37 °C for 5 minutes, a new product is formed. **Name the product formed**. (3)

Name of product _____

Another **chemical** is used to test for the presence of this **new product**. This chemical reacts with the new product to produce a a brick-red colour when they are heated together in a hot water bath for 5 minutes. **Name this chemical**. (3)

Name _____

(*a*) The diagram shows a plant with variegated leaves i.e. the leaves have areas with different colours. The leaves of this plant have a green centre with pale yellow margins. This plant was used in an experiment to investigate the production of starch by photosynthesis.



(*i*) Why was the plant left in darkness for a day at the start of the experiment? (3)

Why? _____

_____

(*ii*) The plant was then exposed to bright light for some hours after which a leaf was removed and boiled in water for a few minutes.
Why was the leaf boiled in water? (3)

Why? _____

(*iii*) Draw a labelled diagram, in the box, showing the apparatus and named liquid used to remove the green pigment from the leaf. (6)

(*iv*) The leaf was finally covered with a solution that turned the area which was previously green to blue-black while the leaf margins did not turn blue-black.
Name the solution used. (3)

Name _____

(*v*) Suggest a reason why the leaf margins did not turn blue-black. (3)

Suggest _____