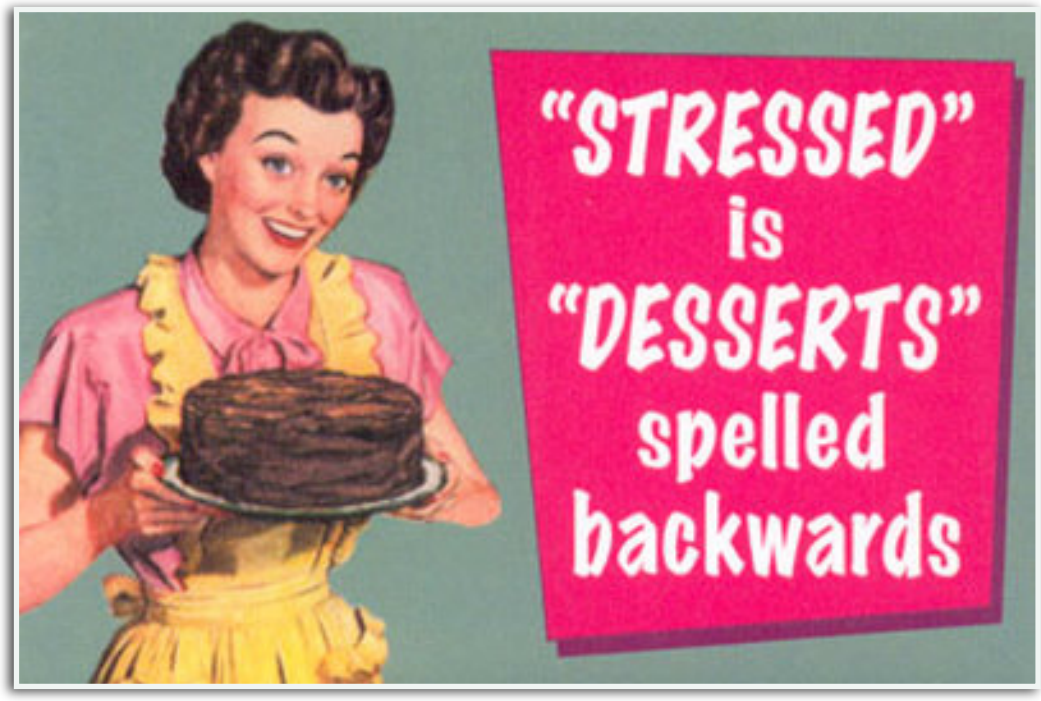
Science

Third Year Science. Additional Revision Paper.

Contains OL & HL.
Some tricky!



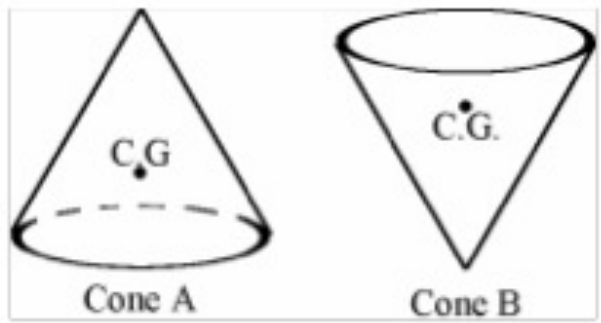
(*a*) (*i*) Explain what is meant by the *centre of gravity* of an object. (6)

Describe an experiment to locate the *centre of gravity* of the shape shown, in the diagram, which was cut from a thin sheet of card. Use a labelled diagram in your answer. (9)

(*ii*) The solid cones shown in the diagram are made of the same material and are standing on a flat surface. The dots show their centres of gravity.

Which cone is in *stable equilibrium*?

Give **two** *reasons* why the other cone is in *unstable equilibrium*. (9)



1

2

(*b*) The photograph shows 'rays' of light from the sun, which is obscured by clouds.

(*i*) Describe, using a labelled diagram, how to show in a laboratory experiment that *light travels in straight lines*. (12)

(*ii*) Name the *primary colours* of light. (9)

(a) Choose a **term** from the list on the right to complete the sentences below.

Burning is an example of a _____ **change**. (3)

Making a magnet is an example of a _____**change**. (3)

Air is an example of a _____. (3)

Table salt is an example of a _____. (3)

MIXTURE
PHYSICAL
COMPOUND
CHEMICAL

(b) **Rusting** causes damage to iron.

Give **two conditions** necessary for an iron nail to rust.

1 _____ (3)

2 _____ (3)

Give **one** way to stop iron rusting. _____ (3)

A **mixture** of metals is called an _____. (3)

2

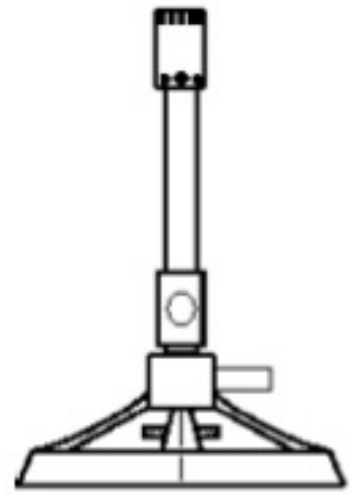
3

(c) Describe, with the aid of a labelled diagram, a laboratory experiment to **obtain a pure sample of salt from a solution of salt and water.** (12)

Labelled diagram

24

(h) **Name** the piece of equipment shown in the diagram.



_____

Give **one use** of this piece of equipment in the laboratory.

_____

Give **two safety precautions** when using this piece of equipment in the laboratory.

1 _____

2 _____

3

(i) State whether each of the following is a **solid**, a **liquid** or a **gas** at room temperature.

SUBSTANCE	STATE AT ROOM TEMPERATURE
Helium	
Sulphur	
Alcohol	
Mercury	

4

(j) The **fire triangle** on the right is used to show the three things that a fire needs in order to burn.

What is needed at **X** to keep a fire burning? _____

Name one type of fire extinguisher. _____

Give **two ways** of reducing the risk of fire in the home.

1 _____

2 _____

(k) **Ecology** is the study of plants, animals and the habitat they live in.

Name a habitat you have studied. _____

Name **one plant** found growing in this habitat. _____

Name **one animal** found living in this habitat. _____

Name **one substance** that causes **pollution** in this habitat. _____

4

(a) **Fossil fuels** are used for heating our homes. Choose a **term** from the list on the right to complete the sentences below.

NON-RENEWABLE
CARBON DIOXIDE
ENERGY
COAL

_____ is an everyday **example** of a fossil fuel. (3)

Fossil fuels are used as a **source** of _____. (3)

There is a **limited supply** of _____ energy sources. (3)

Water and _____ are formed when a fossil fuel **burns**. (3)

(b) There are two types of **water hardness**. **Name both** types.

1 _____ 2 _____ (6)

Which type of hardness can be removed by **boiling**?

_____ (3)

Give **one advantage** of hard water.

_____ (3)

_____

5

(c) The diagram shows how **oxygen gas** can be made in the laboratory.

What **colour** is the manganese dioxide? _____ (3)

Name the **liquid X** used to prepare oxygen.

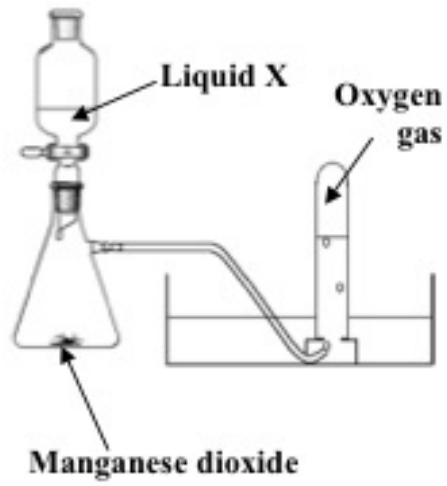
_____ (3)

What is the **test** for oxygen gas? _____

_____ (3)

Give **one use** for oxygen gas. _____

_____ (3)



4. (*a*) Describe, using a diagram, how to measure the density of a *liquid*. (15)

Give the unit used to express density measurements. (3)

Explain why icebergs float on water. (6)

(*b*) Describe a laboratory experiment to show that light is a form of energy. (9)

Give **two** observations that suggest that light travels in straight lines. (6)

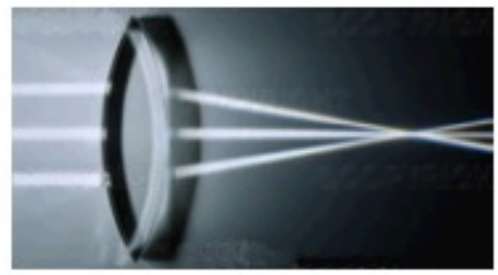
Draw a diagram showing the effect of a convex lens on parallel light rays.

Name a *second* lens type. (9)

5

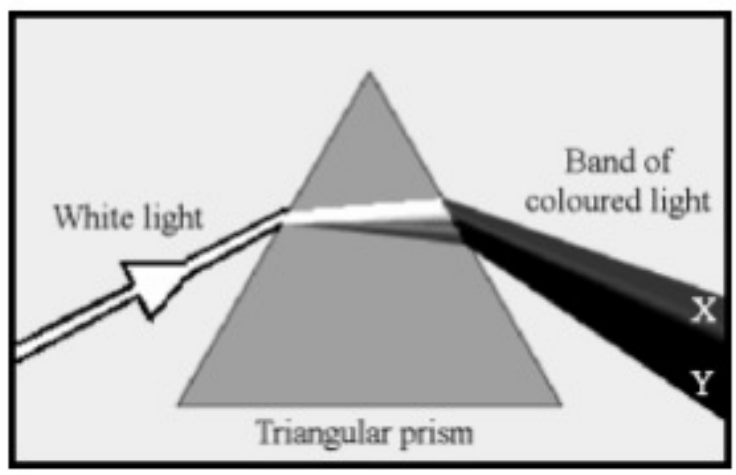
6

(*b*) The photograph shows narrow beams of light (rays) passing through a lens-shaped piece of transparent material. *Parallel rays of light enter* the material from the left and when they *leave* the material *they converge and pass through a common point*, before moving apart.



Give a ***use*** for a lens having this effect on light. (3)

(*c*) The diagram shows a *ray of white light entering* a triangular glass prism. The light passes through the prism and *emerges* as a *band of coloured light*.



(*i*) What does this experiment ***show*** about the ***composition of white light***? (3)

(*ii*) What is this ***separation*** of white light into different colours called? (3)

(*iii*) What ***name*** is given to the ***band*** of coloured light produced? (3)

(*iv*) State the ***colour of the light labelled*** **X** and the ***colour of the light labelled*** **Y** at the extreme ends of the band of light illustrated in the diagram. (6)

X _____

Y _____

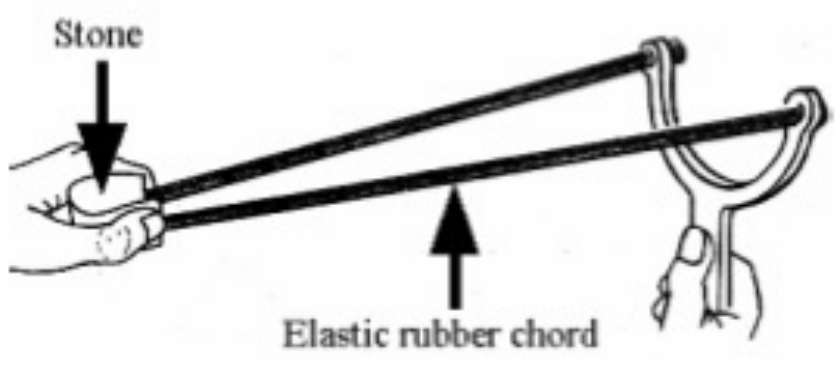
(*a*) Fill in the ***missing words*** in both sentences.

(*i*) The ***stretched rubber chord***

has _____ energy.

(*ii*) If the ***stone is released*** it will

have _____ energy.



7

(*b*) State the ***law of the lever***.

_____

_____

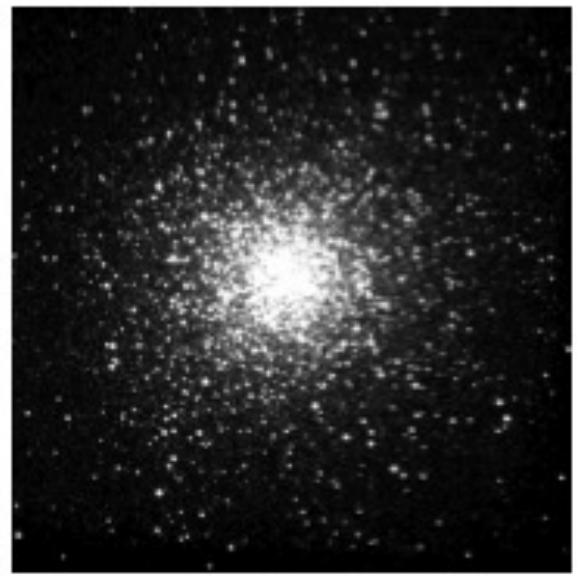
_____

(*c*) The globular cluster shown is a group of stars (like a small galaxy). ***Gravity is the force that holds the stars together*** in this formation.

Give **two *effects*** that gravity has on your everyday life.

1 _____

2 _____



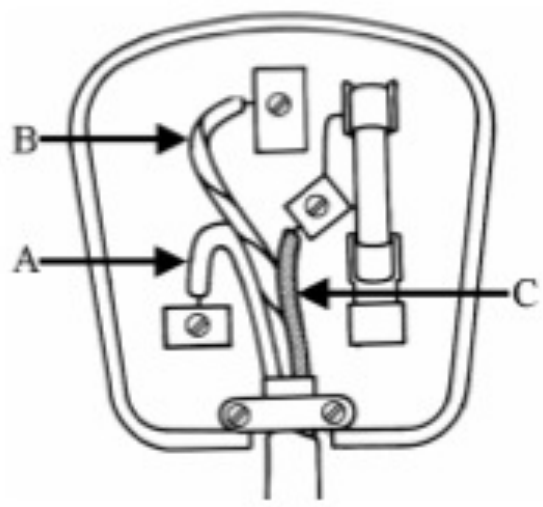
∞

(*d*) Wiring a plug correctly is most important. Give the ***colour/s*** of **any two** of the plastic insulations on the wires labelled **A**, **B** and **C**.

A _____

B _____

C _____

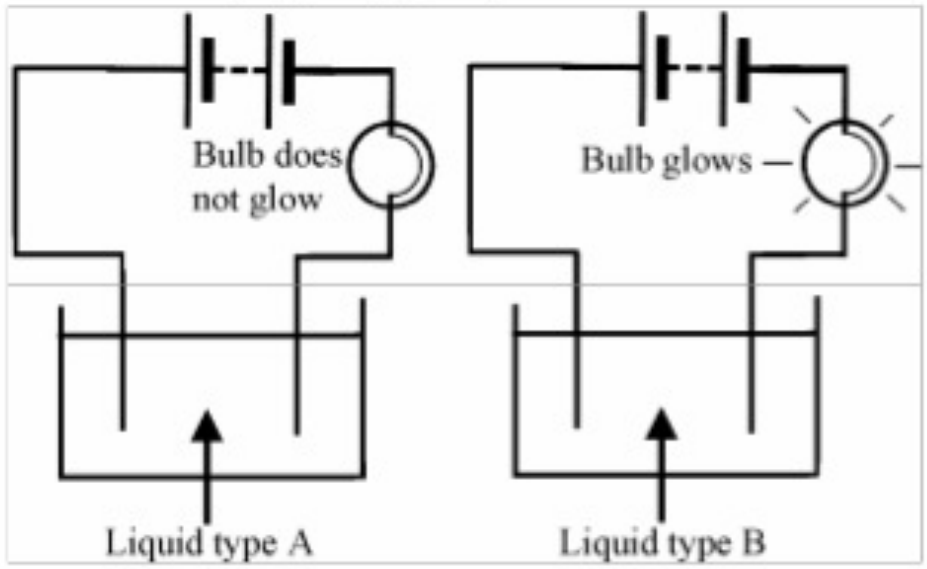


(*a*) Atoms of *different elements* can form *compounds* by *bonding* together.

(*i*) What is an ***ionic bond***? (6)

A pupil investigated the *ability of covalent and ionic substances to conduct electricity*. Four substances were selected. One was a liquid. The other three substances were solids and these were dissolved in pure water before testing. The apparatus used in the investigation is drawn below. When the liquids were tested the bulb did not glow in some cases (Liquid type A) and the bulb glowed in other cases (Liquid type B).

8



The results of the investigation are given in the table.

Liquid	Cooking oil	Table salt	Table sugar	Copper sulphate
Liquid type	A	B	A	B

(*ii*) Name the ***ionic substances*** in the table.
Give a ***reason*** for your answer. (9)

Name _____

Reason _____

(*iii*) **Three** of the *substances tested* are *solid at room temperature*. Why were these ***substances dissolved in water*** before the investigation? (3)

(*f*) Name a ***method*** of treating iron that helps ***prevent rusting***.

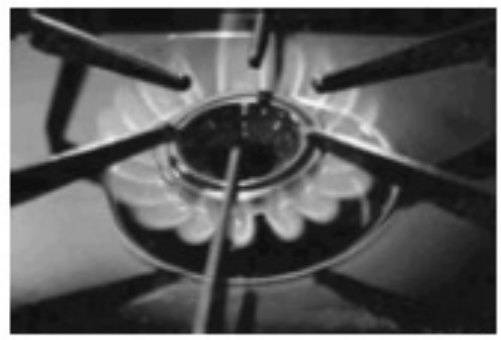
Name _____

How does the ***method*** that you have named ***work***?

How? _____

9

(*g*) Natural gas is a fossil fuel. What is a ***fossil fuel***?



What? _____

_____

Name the ***main constituent*** of natural gas.

Name _____

10

(*h*) Magnesium was burned in oxygen as shown in the diagram.

(*i*) What ***colour*** was the flame?

_____

(*ii*) Pieces of *moist blue* and *red litmus paper* were mixed with the product of the combustion. What ***result*** was seen?

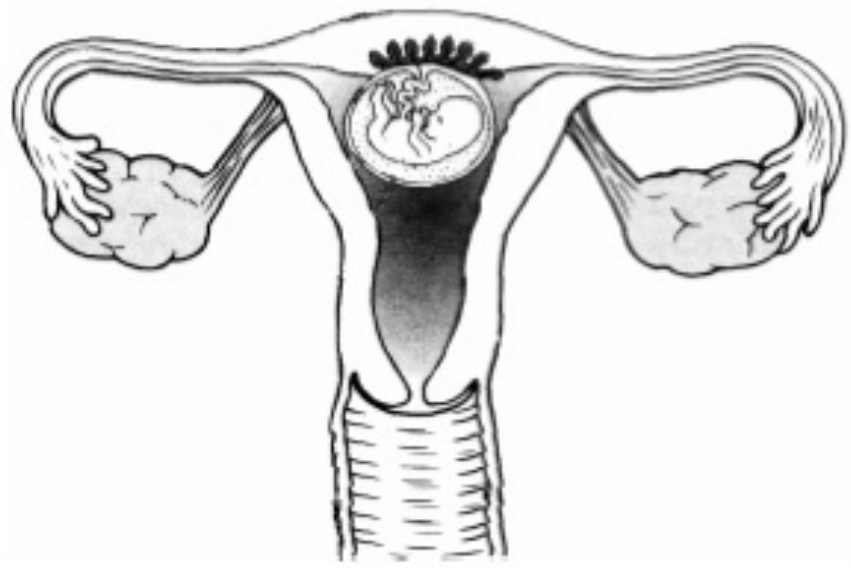
_____

(*iii*) What ***conclusion*** can be made from the result of the litmus test?

_____

10

(*a*) The diagram shows a *human female's reproductive system with an eight week embryo (foetus)* which is clearly recognisable as human. The organs of the foetus are formed and will grow and mature for the next seven months.



(*i*) Mark clearly on the diagram, **using an arrow and the label *S*, *where the semen*** (liquid containing sperm) ***was released*** into the female. (3)

(*ii*) Mark clearly on the diagram, **using an arrow and the label *F*, *where fertilization*** took place. (3)

(*iii*) Explain the term ***fertilisation***. (6)

_____

_____

(*iv*) State **two *events*** that occur ***in the hours before birth*** and **one *event*** that takes place shortly ***after the baby is born***. (9)

Before

1 _____

2 _____

After

1 _____

(*b*) The diagram shows part of a *food web from a mixed habitat* with meadows, streams and hedges.

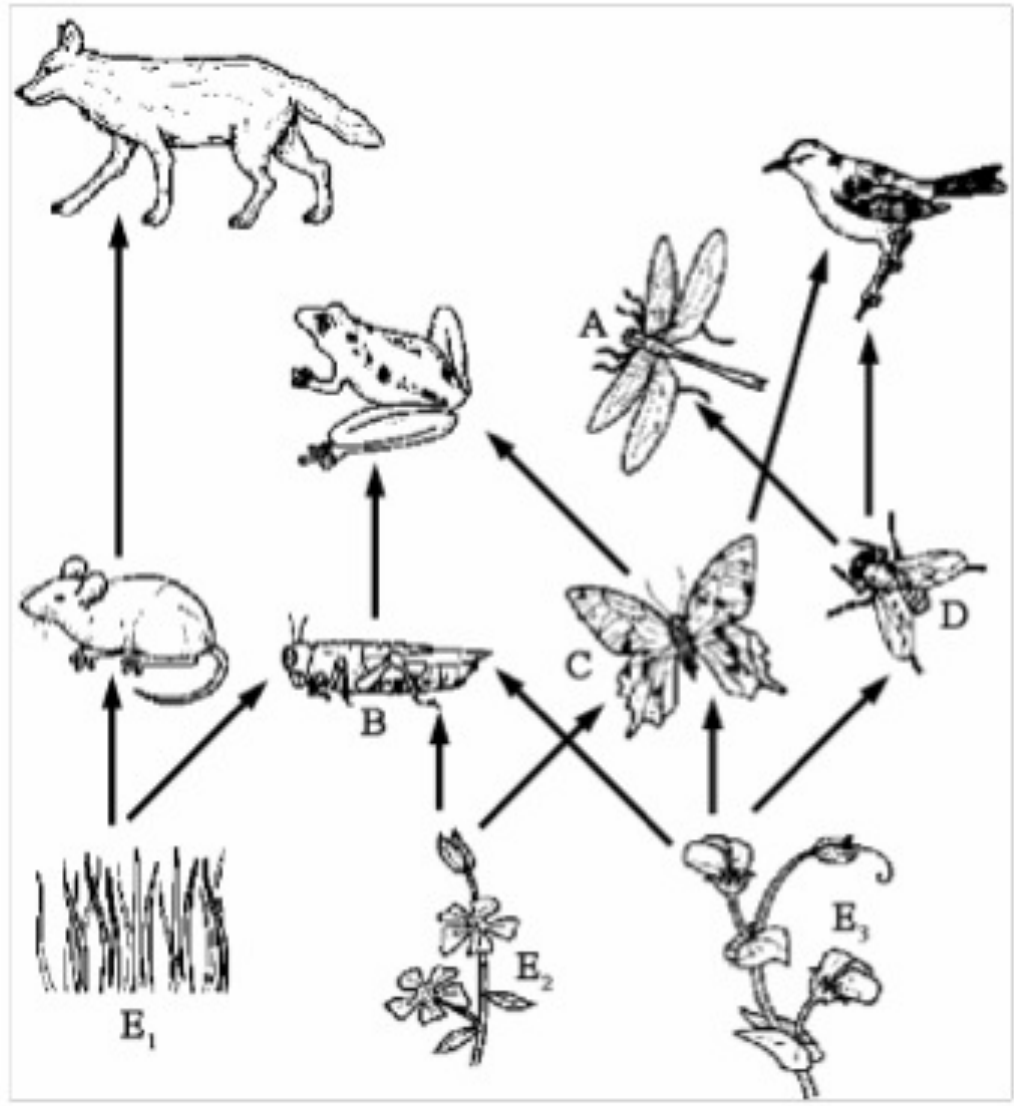
A is a dragonfly

B is a grasshopper

C is a butterfly

D is a house fly

E_1, **E_2** and **E_3** are plants.



11

(*i*) Write down a ***food chain*** from the food web shown. (6)

(*ii*) Select an ***organism*** from this habitat *or* name another organism from a habitat you have studied and state **one *adaptation*** that the organism has that makes it suited to its habitat. (3)

Organism _____ **Adaptation** _____

(*iii*) What is meant by ***competition*** in a habitat? (3)

(*iv*) Give an example of ***interdependence*** from the food web shown. (6)

12

(*b*) A pupil performed an experiment in a school laboratory to show the action of a ***digestive enzyme*** on a ***food substance***.

(*i*) Name an ***enzyme*** suitable for such an experiment. (3)

12

(*ii*) Name a ***food substance*** on which the enzyme that you have named will act. (3)

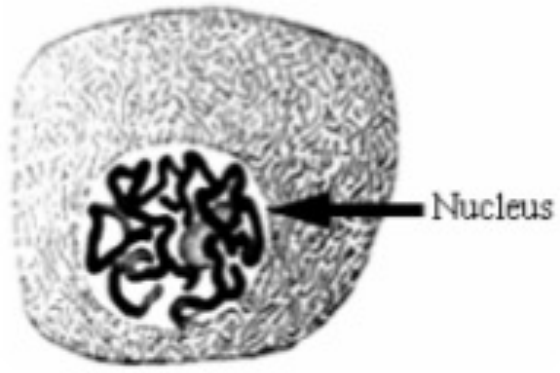
(*iii*) Describe any ***preparation*** of the food required before the experiment is performed. If no preparation is required state why. (3)

(*iv*) Give the ***temperature*** at which the enzyme-food mix should be maintained for the experiment to work. (3)

(*v*) How much ***time*** is needed for digestion of the food in this experiment? (3)

(*vi*) Describe a ***test*** to confirm that digestion has occurred. (6)

(*e*) At certain stages in the life of a cell ***thread-like structures*** that contain genes can be seen in the nucleus.
What are these thread-like structures called?



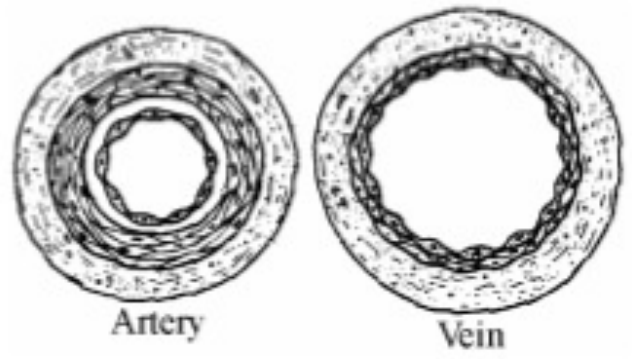
What? _____

Genes are located on these thread-like structures. Give a ***role*** that genes play in life processes.

Role _____

13

(*f*) The diagram shows cross sections of an artery and of a vein. Why do ***arteries have much thicker walls*** than veins?



Why? _____

Give **one** other ***structural difference*** between arteries and veins.

Difference _____

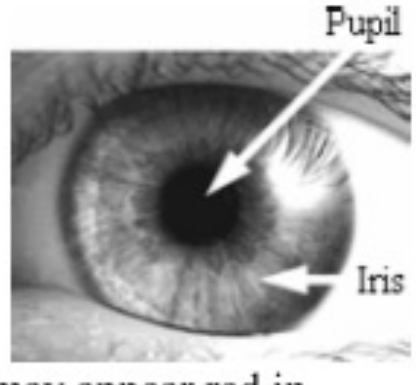
14

(*g*) The postage stamp shown commemorates the awarding of the Nobel Prize to Dorothy Hodgkin (1910-1994) for her work on vitamin B_{12} in 1964. Vitamins are part of a balanced diet. Give **one *function each*** for (*i*) vitamins (*ii*) minerals in our bodies. (Two *different functions* are required.)

(*i*) _____

(*ii*) _____

(*h*) Give the ***function*** of (*i*) the iris (*ii*) the pupil.



(*i*) _____

(*ii*) _____

The pupil is transparent. Why does the ***pupil appear to be black*** in most situations? (Note: the pupil may appear red in photographs taken in the dark using a flash).

Why…black? _____

Question 1 (52)

(*a*) The photograph shows Amanita Phalloides, a poisonous fungus, whose common name is *'Death Cap'*. Fungi are decomposers.
Explain the ***underlined term***.

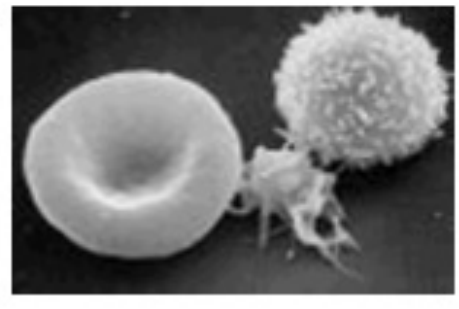
_____

_____

_____

14

(*b*) The photograph shows a red blood cell and a white blood cell taken using an electron microscope.
Give **one *function*** for each type blood cell.



Red blood cell _____

White blood cell _____

(*c*) The photograph of 'spaceship earth' was taken by a member of the crew of Apollo 17.
Give **two *ways*** in which we can care for our planet.

1 _____

_____

2 _____

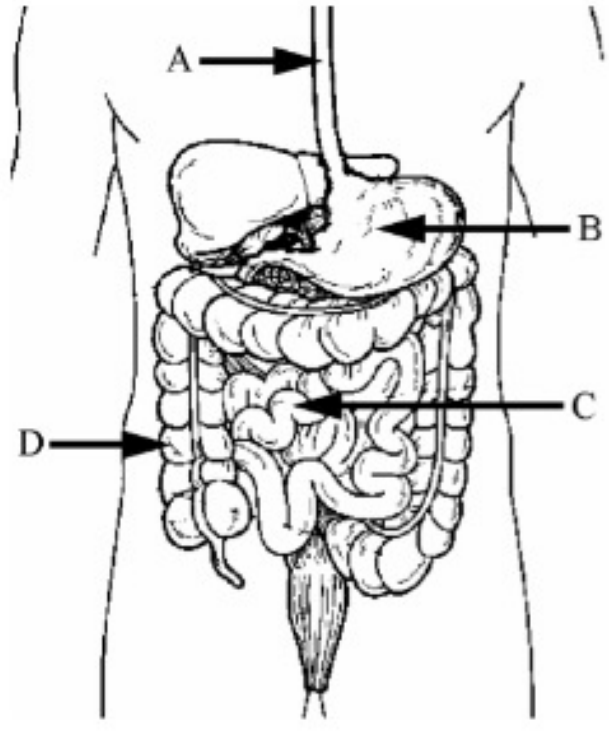
_____

(*d*) Phloem and xylem are plant transport tissues. Name a ***substance***, other than water, that is transported in (*i*) phloem (*ii*) xylem.

(*i*) phloem _____

(*ii*) xylem _____

8. (*a*) The diagram shows part of the human digestive system.



(*i*) Name the parts labelled **A**, and **C**. (6)

(*ii*) What *happens to food* in part **B**? (6)

(*iii*) Where is the digested food *absorbed* into the blood stream? (3)

(*iv*) What is meant by '*assimilation*' when applied to nutrition? (6)

(*v*) Give a *function* of part **D**. (3)

15

(*b*) A pupil performed an experiment, in a school laboratory, to show the action of a *digestive enzyme* on a *food substance*.

(*i*) Name an *enzyme* suitable for such an experiment. (3)

(*ii*) Name a *food substance* on which the enzyme that you have named will act. (3)

(*iii*) Describe any *preparation* of the food required before the experiment is performed. If none is required say why. (3)

(*iv*) Give the *temperature* at which the enzyme-food mix should be maintained for the experiment to work. (3)

(*v*) How much *time* is needed for digestion of the food in this experiment? (3)

(*vi*) Describe a *test* to confirm that digestion has occurred. (6)

(*vii*) Name the *end product* of the process. (3)

24 (a) Choose a **word** from the list on the right to complete the sentences below.

The ESB **supply** a.c. electricity at **230** _____. (3)

The unit of electricity used by the ESB for **costing** is the

_____. (3)

The unit of **electrical current** is the _____. (3)

The unit of **power** you would find stamped on a **light bulb** is

the _____. (3)

AMPERE

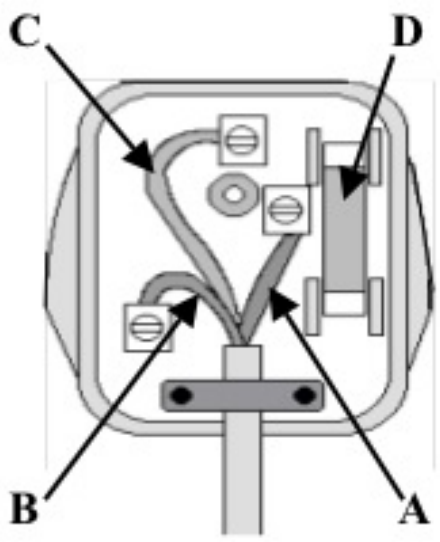
VOLTS

WATT

KILOWATT-HOUR

16

(b) The diagram shows the inside of a **three-pin plug**.



Name the **brown** wire labelled **A**. _____ (3)

Name the **blue** wire labelled **B**. _____ (3)

Name the **green & yellow** wire labelled **C**.

_____ (3)

Name the **device** labelled **D**. _____ (3)

(c) A **1.5 kilowatt (kW) heater** is used to heat a room for **four hours**.

How many **units** of electricity are used? _____ (3)

How much does it **cost** to heat the room if **one unit** of electricity costs **11 cent**?

_____ (3)

Give **one reason** why such a heater should be **earthed**.

_____ (3)

Give **one other electrical safety precaution** in the home.

_____ (3)

(*c*) A magnesium *atom* has an *atomic number* of 12 and a *mass number* of 24.

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

(*ii*) Define *atomic number*. (3)

(*iii*) Define *mass number*. (6)

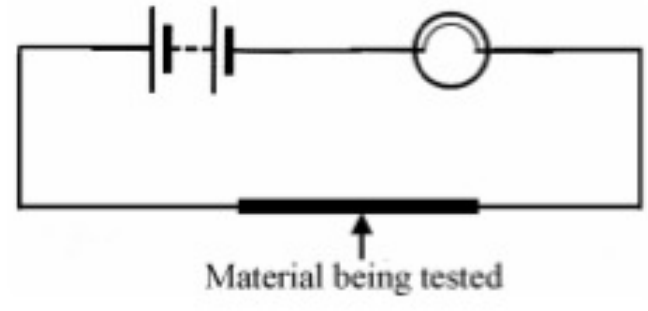
(*iv*) Draw a diagram, of a magnesium atom, showing the *electronic structure* and *nuclear composition*. (9)

17

18

(*j*) The apparatus shown was used to test the *electrical conductivity* of metals and non-metals.

What result would you get with
(*i*) a metal (*ii*) a non-metal?

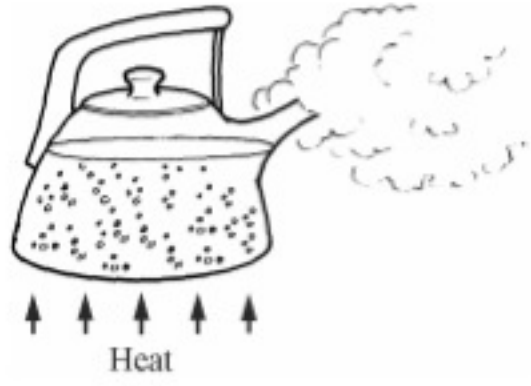


(*i*) a metal _____

_____

(*ii*) a non-metal _____

(*g*) The kettle shown in the diagram was heated on a gas cooker. A pupil found that the temperature of the boiling water did not increase even though it was still being heated.

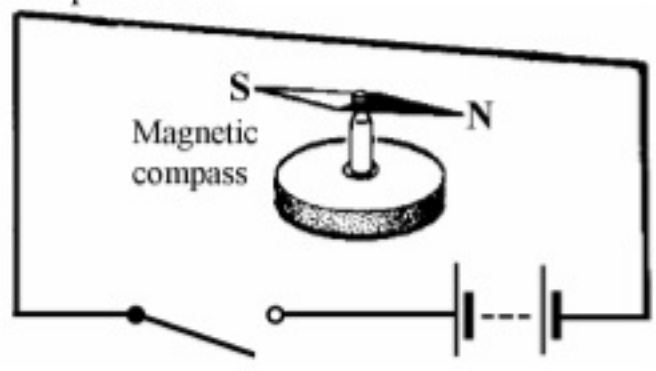


If there is no temperature change produced by this heat what *other effect* is the heat having on the water?

18

(*d*) A domestic electric grill is rated 1500 W. If a unit of electricity costs 12 cent how much does it *cost* to use the grill for 20 minutes a day for 30 days?

(*e*) Hans Christian Oersted (1777-1851), a Danish physicist, used the apparatus shown in the diagram to perform a famous experiment.



What happens to the compass needle when the switch is closed?

What *conclusion* can be made as a result of this experiment?

(*f*) When wiring a house to use *mains* electricity to which; *earth*, *live* or *neutral* should *fuses* be connected?

Give a reason for your answer.

(*f*) Butterflies and other insects disperse pollen. Why is *pollen dispersal* important?

Why? _____

Give a **second** way, other than by insects, in which pollen is dispersed.

Way _____

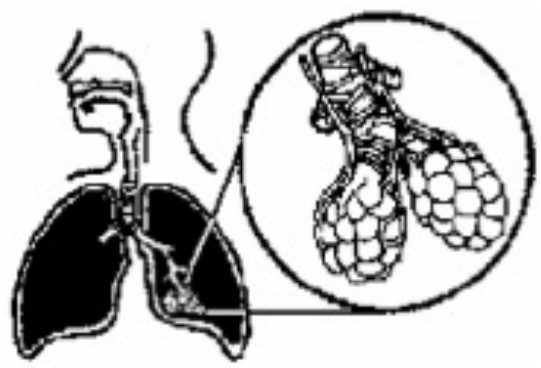
(*g*) What is *phototropism*?

19

_____

_____

(*h*) The diagram shows a detail of the structure of the human lung. Alveoli (air sacs) with associated blood capillaries are drawn in the expanded portion of the diagram. Describe what *happens* between the air in the alveoli and the blood in the capillaries.



Description _____

_____

(*i*) The quadrat is used for sampling plants and animals living in a habitat. Draw a *quadrat*, in the box provided.

Explain how to take a *random sample* using a quadrat.

_____

_____

_____

(*j*) Respiration releases energy from food in cells. Complete the *equation* for the aerobic respiration of glucose.

$C_6H_{12}O_6$ + _____ ⟶ 6 CO_2 + _____

(*d*) Explain the *difference* between electrical conductors and electrical insulators. Make *reference in your answers to electric current.*

Conductors _____

Insulators _____

(*e*) The photograph shows 'Wavebob' which changes the energy of waves into electrical energy off the Galway coast. A full scale version could provide 1 MW.

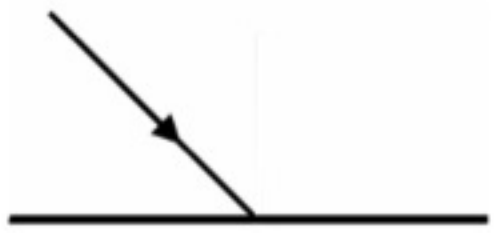
Give **one** *advantage* and **one** possible *disadvantage* of this way of generating electricity.

Advantage _____

Disadvantage _____

20

(*f*) The diagram shows a ray of light striking a flat surface. The surface *reflects* the light. Draw the *reflected ray* in the diagram. Lenses change the direction of light in a different way. What is this *change* of direction of light called?



_____

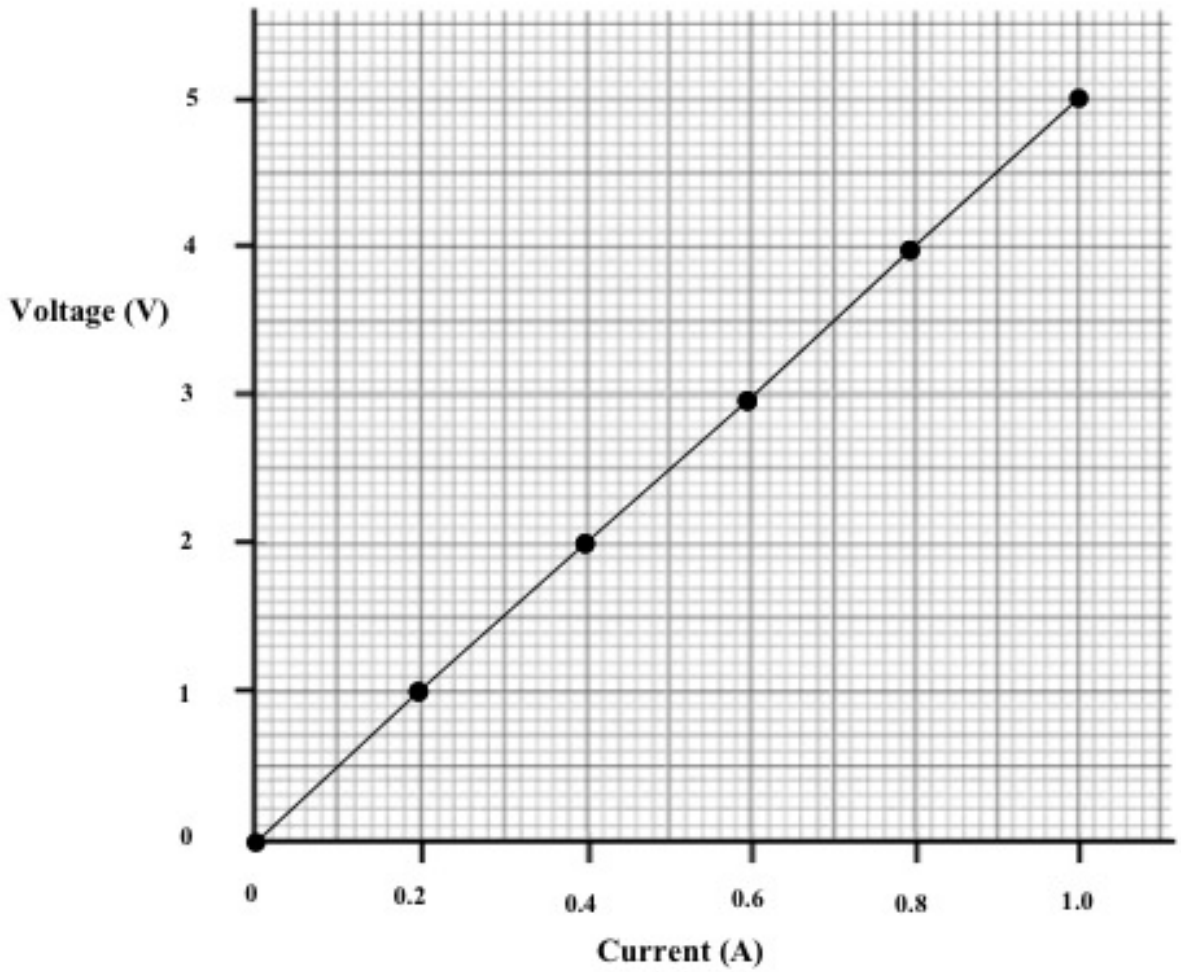
21

(*d*) A student carried out an investigation of the **relationship between current flowing through a wire resistor and the voltage across it**.

The data collected is presented in the table below.

Current (A)	0	0.2	0.4	0.6	0.8	1.0
Voltage (V)	0	1	2	3	4	5

The student then used this data to draw a graph of voltage (*y*-axis) against current (*x*-axis) as shown on the grid below.



(*i*) Use the graph to estimate the **current** at **2.5 V**. _____ (3)

(*ii*) **Name** the instrument used by the student to measure voltage. (3)

Instrument _____

(*iii*) What is the relationship between voltage and current in this investigation?

_____

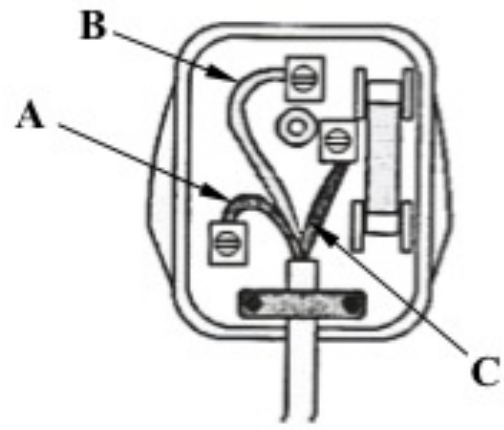
_____ (6)

22

(*a*) The diagram shows a plug with its cover removed. Study the diagram and answer the questions that follow. (9

Which labelled wire, **A**, **B** or **C** is the

earth wire?_____



Why is there a plastic coating covering each of the wires **A**, **B** and **C**?

_____

Name the wire to which the fuse should be connected.

Name of wire _____

22

(*b*) **Complete** the following statements using the correct word in each case from the list on the right. (6

Current which flows from a **battery** is called

_____ current.

Current from the **mains supply** to homes is called

_____ current.

Alternating
Direct

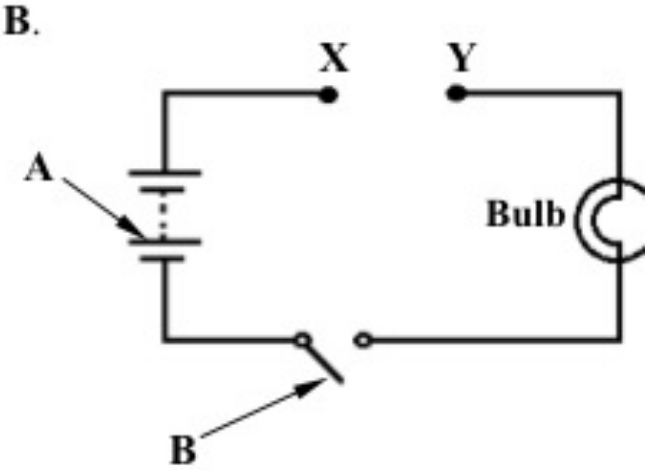
23

(*c*) A student set up a simple electric circuit as shown. (12

Name the parts of the circuit labelled **A** and **B**.

A _____

B _____



The student was then given a piece of **wood** and a piece of **copper metal**.

Which piece, copper or wood, should be connected between **X** and **Y** so that the bulb will light in the circuit when **B** is closed? _____

Give a reason for your answer.

Reason _____

(*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).

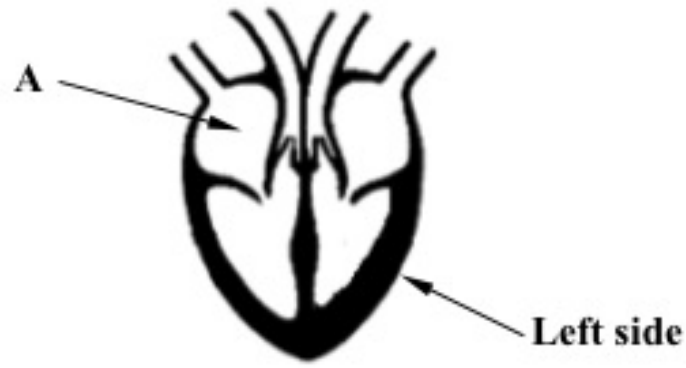
23

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)



24

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**?

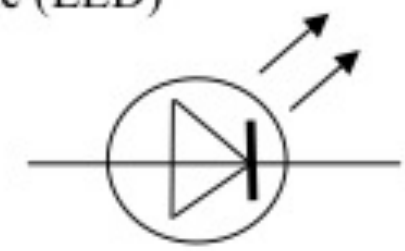
_____

_____

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

_____

(*b*) The electrical circuit symbol for a light emitting diode (LED) is shown on the right.

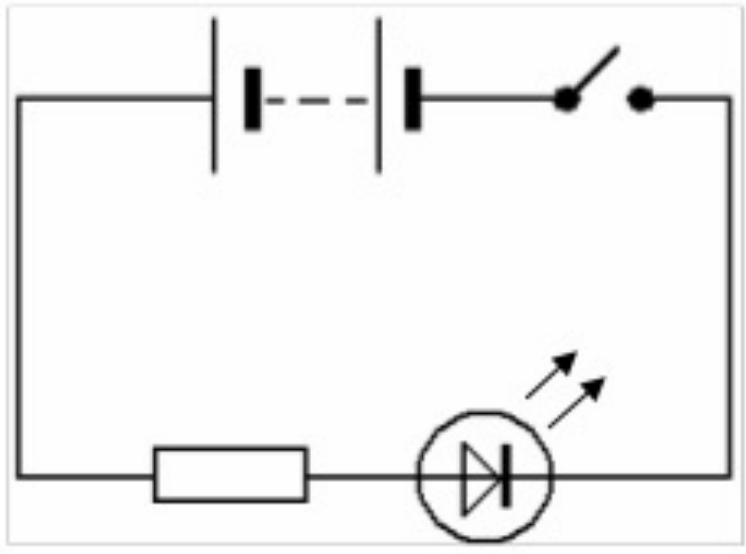


LEDs are used in some flashlights (torches).

Give one reason why LEDs are often preferred for this use ahead of standard light bulbs. (3)

24

The circuit on the right includes a resistor, a switch and an LED.



Will the LED light if the switch is closed? (3)

Give a **reason** for your answer. (3)

Why is it necessary to place a resistor in series with the LED? (3)

25

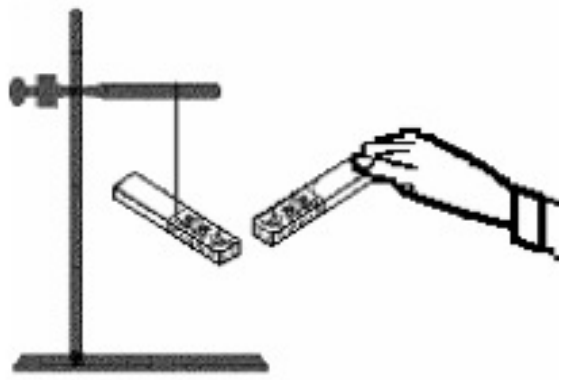
(*e*) Complete the statements below using words from the list on the right.

Sound is a form of _____ caused by vibrations.

A reflected sound is called an _____.

Energy
Electricity
Noise
Echo

(*f*) The diagram shows the north pole of one magnet being brought up to the north pole of a freely suspended magnet.



What would you expect to happen to the freely suspended magnet?

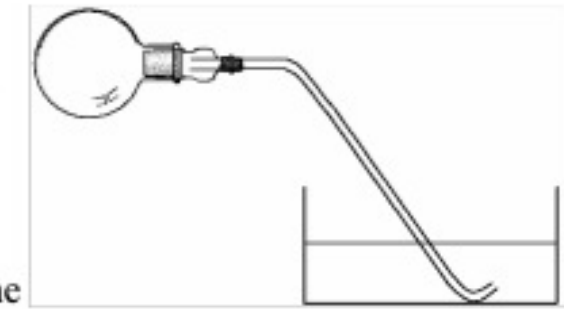
_____

What does this tell us about **like poles**?

_____

25

(*g*) The picture shows a round-bottomed flask filled with air being heated gently with a hairdryer.



What effect does the heating have on the volume of air in the flask?

Effect _____

What would you expect to notice in the dish of water?

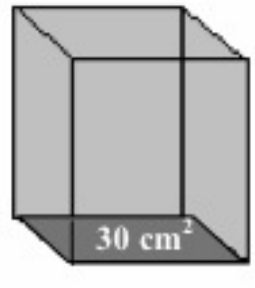
_____

(*h*) Complete the equation in the box below using the words on the right.

Pressure = _____

Force
Area

If the **area** of the face of a metal block is **30 cm^2** and the **force (weight)** of the block is **90 N**, find the pressure being applied by the block.



Pressure = _____ N/cm^2

Name the instrument used to measure pressure.

Instrument _____

(7 × 6 + 1 × 10)

26

26

a) In the table write the letter **M** beside the unit used to measure **mass**.

Write the letter **T** beside the unit used to measure **time**.

	m
	kg
	s

b) Which of the following items **does not involve** a lever?

stapler

wheelbarrow

traffic cone

scissors

Which item _____

Give a **reason** for your answer.

_____

c) A household water supply has a water tank in the attic.

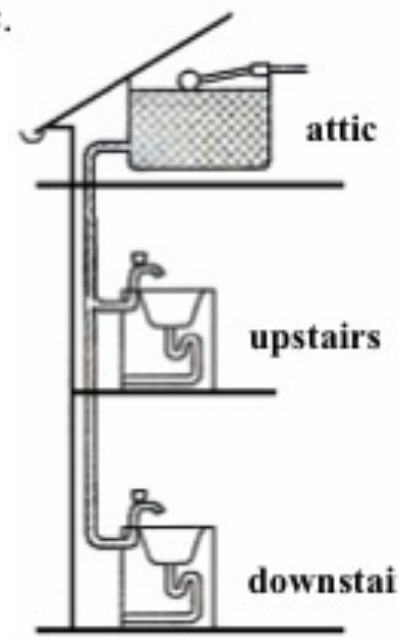
The water pressure at the upstairs tap is lower than at the downstairs tap.

Give a reason why this is the case.

_____

_____

_____



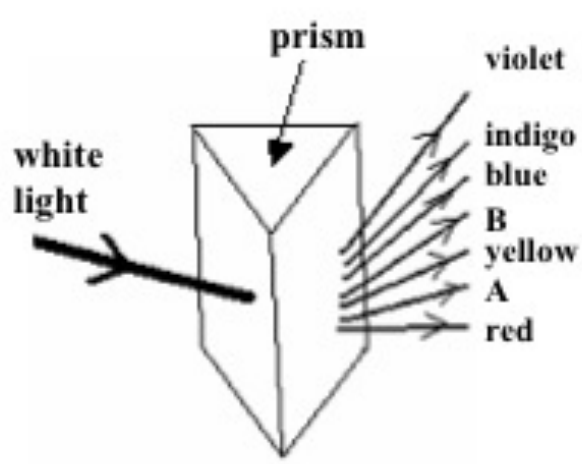
27

d) The diagram shows a ray of white light entering through a triangular glass prism. The light passes through the prism to form a band of colours.

Name the missing colours **A** and **B**.

A _____

B _____



27

(*a*) Water is a compound composed of **two elements**.

(*i*) **Name** these two elements. (6)

1 _____ **2** _____

(*ii*) Name a chemical that can be used in a laboratory to **test for the presence of water**. (3)

Chemical _____

What **colour change** is noticed in this test for water? (3)

Colour change _____

(*b*) Some elements form compounds that dissolve in water to cause hardness. (9)

(*i*) Name an element whose compounds dissolve in water to cause **hardness**.

Element _____

How can hardness be removed from water?

_____

(*ii*) The same volume of two water samples **A** and **B** were tested with soap flakes to test for hardness. The number of soap flakes needed to form a lather was measured.

The number of soap flakes added to each water sample was recorded in the table below.

Water sample	Number of soap flakes added
A	8
B	25

Which sample **A** or **B** had the most hardness? _____

(*c*) Water is treated before it is supplied to our homes.

Complete the statements below by choosing the correct word from the list on the right in each case. (6)

Germs and bacteria are killed by adding _____ .

Floating materials are removed by _____ .

Fluoride
Chlorine
Ozone
Screening

28

(*c*) An investigation about how plants make food was carried out in a laboratory using a green plant.

Answer the questions below. (18)

(*i*) Name the process by which green plants make their food.

Name _____

28

(*ii*) Name the gas released by the plant during this process.

Name _____

(*iii*) Name the green chemical found in leaves that help plants make food.

Name _____

29

A plant was left in the dark for 24 hours and then it was placed in bright light for 6 hours.

(*iv*) A leaf was taken from the plant and boiled in a liquid to remove the green chemical.

Name the liquid in which the leaf was boiled.

Name _____

(*v*) An iodine solution was then poured onto the 'white' leaf and the leaf became blue/black in colour.

What does this result tell us about the green leaf?

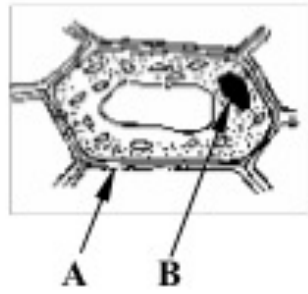
_____

_____

29

(*a*) The diagram shows an onion cell.

Name the parts of the cell labelled **A** and **B**.



Name **A** _____

Name **B** _____

(*b*) New plants are produced by **seed germination**.

Complete the following statement using the correct words from the list on the right.

Carbon dioxide
Water
Oxygen

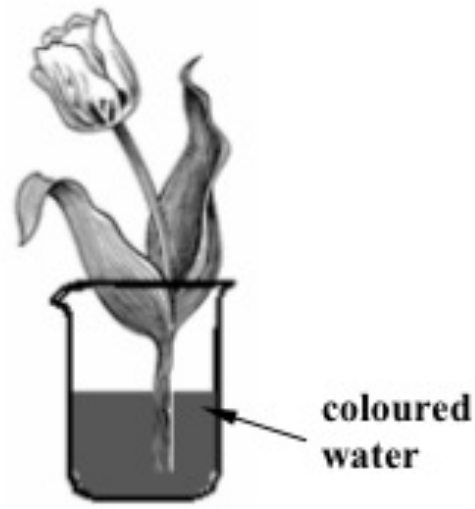
Seeds need warmth, _____

and _____ to germinate.

(*c*) A white flower was placed in coloured water for a few days as shown in the diagram.

What effect would you expect this to have on the flower?

_____



30

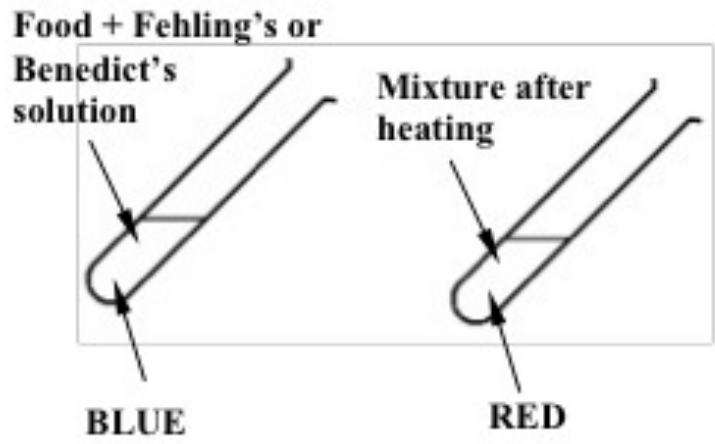
What conclusion can be drawn about the movement of water in plants?

_____

(*d*) Some Fehling's (or Benedict's) solution was added to a food sample.

The mixture was blue at the start.

When the mixture was heated a brick-red colour appeared.



For which **food type** is this a positive test?

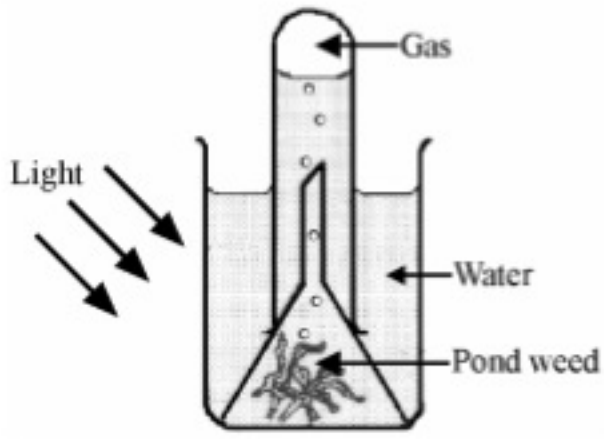
_____

What is the **function** of this food type in the body?

_____

30

(*b*) Pondweed is a green plant that lives in water. In the presence of light pondweed undergoes photosynthesis and a gas is produced as one of the products. Name the ***gas*** produced. (3)



Name of gas _____

The pondweed, and all green plants, take in and use another gas, from their environment during photosynthesis. (3)

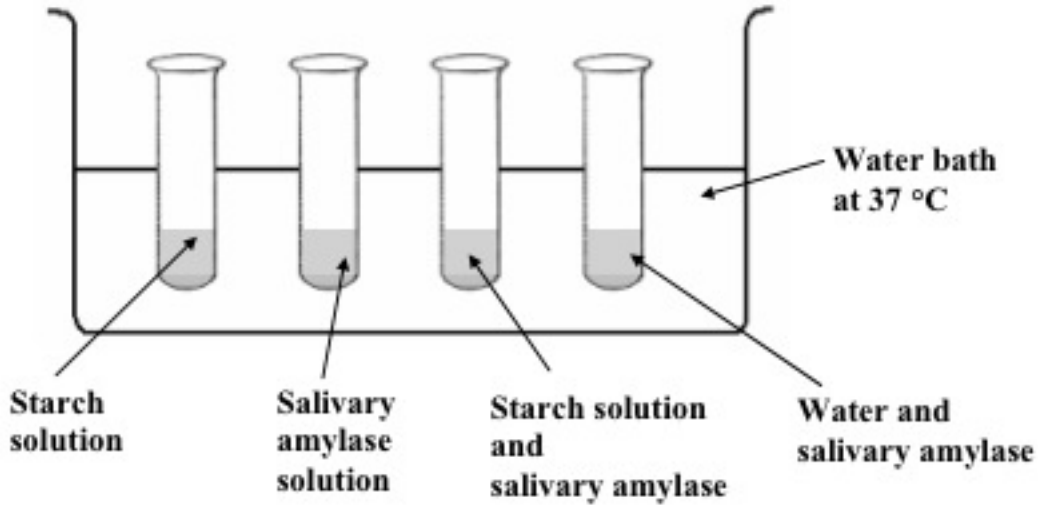
Name of gas used _____

How might the ***rate of production*** of bubbles, by the pondweed, be increased? (3)

How? _____

31

(*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)

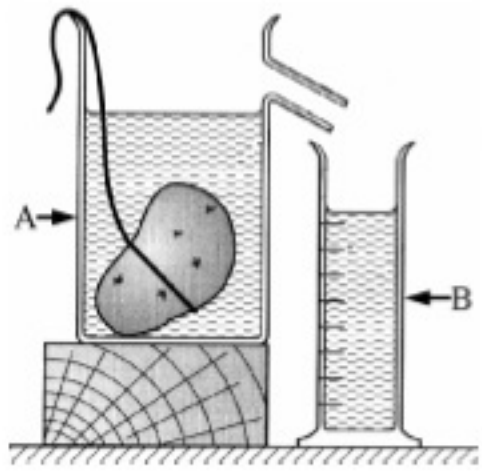
When the salivary amylase is added to starch solution and the mixture placed in a water bath at 37 °C for 5 minutes, a new product is formed. **Name the product formed**. (3)

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 _____

(*b*) A pupil measured the volume of a potato using the apparatus shown. Name *items* A and B. (6)



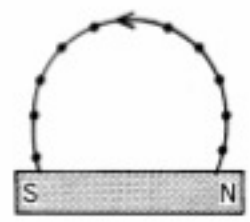
How might the pupil measure the *mass* of the potato? (3)

The mass of the potato was found to be 175 g and its volume was 125 cm^3.

Calculate the *density* of the potato. (9)

31

5. (*a*) The diagram shows a magnetic compass and a bar magnet with a magnetic field line plotted using this compass.



How does a magnetic compass *work*? (6)

Why can magnetic compasses be used for *navigation*? (6)

Describe how the magnetic field line shown was *plotted* using the compass or by using an alternative method. (9)

(*b*) What is *electric current*? (6)

Name a *substance* that does not conduct electric current. (3)

Outline, using a labelled diagram, an experiment to show the *chemical* effect of electric current. (9)