Biology

For Examiner use only

Question 1 (52)

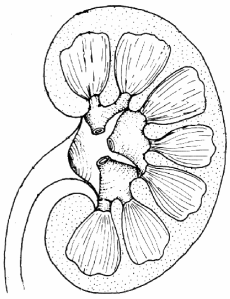
(1) (2)

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

(*i*) _____

(*ii*) _____

(*b*) (*i*) Name the ***organ*** shown in the diagram.

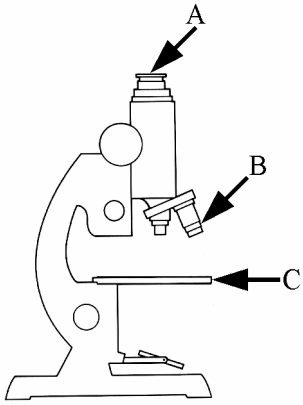


Name _____

(*ii*) Give the ***function*** of the organ shown.

Function _____

(*c*) The parts labelled **A** and **B** in the diagram of the microscope work together to perform a single function.



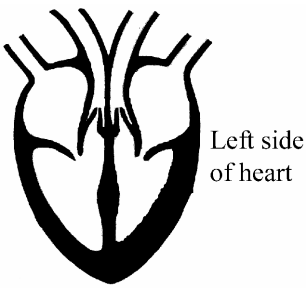
(*i*) What is the ***combined function*** of **A** and **B**?

What? _____

(*ii*) Name the ***part labelled*** **C** in the diagram.

Name _____

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



For Examiner use only

(1) (2)

(*e*) The child in the photograph is helping a dandelion to disperse its seeds.

(*i*) Why is ***seed dispersion*** important for plants?

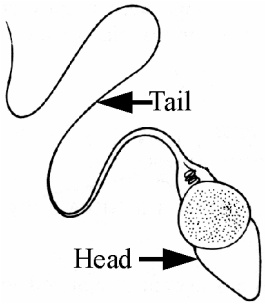
Why? _____

_____

(*ii*) Give a ***second way***, excluding wind, by which ***plants disperse seeds***.

Give _____

(*f*) The diagram shows a sperm. The tail enables the sperm to swim.



(*i*) Why does the sperm need to be able to swim?

Why? _____

(*ii*) Where does fertilisation occur?

Where? _____

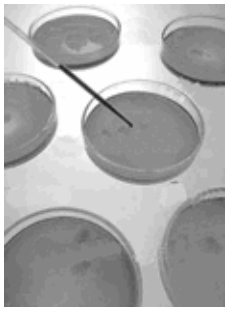
(*g*) (*i*) Name a ***plant*** that can reproduce ***asexually***.

Name _____

(*ii*) Describe ***the way the plant*** that you have named ***reproduces asexually***.

Describe _____

(*h*) The photograph shows petri dishes containing agar being exposed to the air for 5 to10 minutes before being covered. One petri dish containing agar was left covered. All of the dishes were kept warm for some days and inspected daily.



(*i*) What is the ***function*** of the agar?

What? _____

(*ii*) Why was ***one petri dish left covered***?

Why? _____

(*iii*) Describe and explain the ***appearance of the agar*** in the ***exposed dishes*** after some time passed.

Describe _____

Explain _____

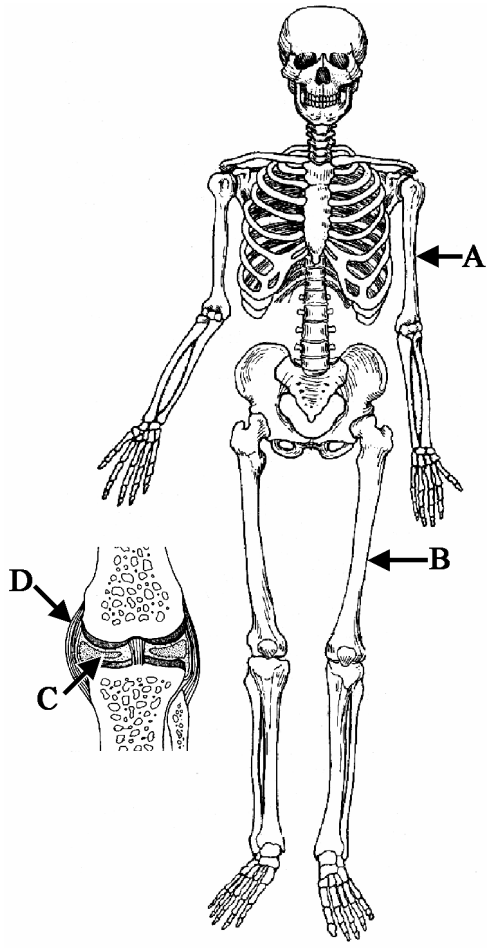
(7 × 6 + 1 × 10)

Question 2 (39)

For Examiner use only

(1) (2)

(*a*) The diagram shows a human skeleton with a detailed drawing of the structure of the knee joint. The kneecap is not shown.



(*i*) Name the ***bones*** labelled **A** and **B**. (6)

Bone **A** _____

Bone **B** _____

(*ii*) What ***type of joint*** is the knee? (3)

Type _____

C is synovial fluid. **D** is a ligament.

(*iii*) Give the ***functions*** of the parts labelled **C** and **D** in the knee. (6)

C _____

_____

D _____

(*iv*) Explain the ***action of antagonistic pairs of muscles*** in causing the ***movement*** of limbs. You may use a labelled diagram in your answer if you wish. (6)

_____

_____

_____

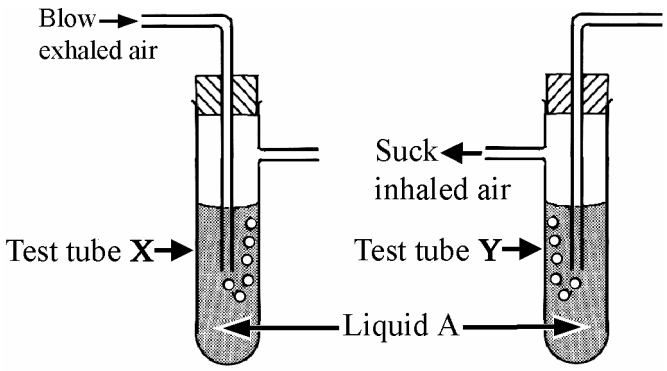
_____

_____

For Examiner use only

(1) | (2)

(*b*) The diagram shows the apparatus used by a pupil when performing an experiment in a school laboratory.



The pupil blew (exhaled) air into test tube **X**.

The pupil sucked (inhaled) air from test tube **Y**.

The pupil continued, alternately, blowing and sucking air, as above, until ***liquid* A** in ***one*** of the test tubes ***turned milky***.

(*i*) Name ***liquid* A**. (3)

Name _____

(*ii*) In ***which test tube***, **X** or **Y**, did the ***liquid turn milky***? (3)

Which? _____

(*iii*) Why did ***liquid* A *turn milky*** in ***one*** of the test tubes? (3)

Why? _____

(*iv*) What ***conclusion*** can be made from the ***result of this experiment*** regarding the ***difference in composition between exhaled and inhaled air***? (3)

Conclusion? _____

(*v*) Complete the ***word equation***, below, for ***aerobic respiration***. (6)

Food + _____ ⟶ _____ + energy + water

Question 3 (39)

For Examiner use only

(1) | (2)

(*a*) The study of a habitat requires the use of sampling instruments, as it is not possible to count every individual organism living there.

The photograph shows a pupil and teacher using a quadrat. The quadrat is placed randomly in a number of sites in the habitat being studied.

(*i*) How is ***random sampling*** achieved when using a quadrat? (3)

How? _____

_____

_____

(*ii*) Give ***two different types of data collected*** (***two different tasks performed***) at each site in the habitat when using the quadrat. (6)

One _____

_____

Two _____

_____

(*b*) Line transects are also used to sample habitats.

(*i*) What is a ***line transect***? (3)

What? _____

_____

(*ii*) Describe how to ***sample a habitat*** using a ***line transect***. (6)

_____

_____

_____

For Examiner use only
(1) (2)

(*c*) The photograph shows a pupil with a sweep net. The sweep net is used to collect small animals e.g. insects from vegetation in a habitat so that they can be identified.

(*i*) Name a ***second item*** of equipment ***used to collect small animals*** for identification. (3)

Name _____

(*ii*) Draw a ***labelled diagram***, in the box provided, ***of the item*** that you have named in (*i*) above. (6)

(*iii*) Describe how to ***use the item*** that you have named and drawn. (6)

_____

_____

_____

(*d*) Give ***two reasons*** why the ***groups of organisms*** living together ***can vary*** greatly ***from one part of a habitat to another.*** (6)

One _____

_____

Two _____

_____

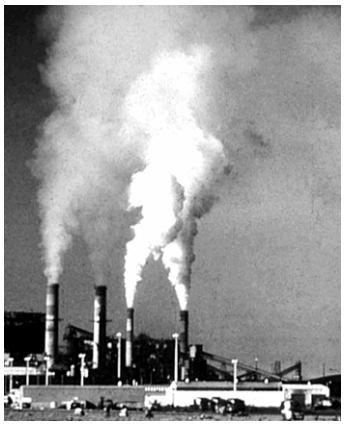
Chemistry

For Examiner use only

Question 4 (52)

(1) | (2)

(*a*) The photograph shows the emissions from a coal burning electricity generating station.
Name a ***pollutant*** present in the emissions and describe its ***effect*** on the environment.



Name _____

Effect _____

_____

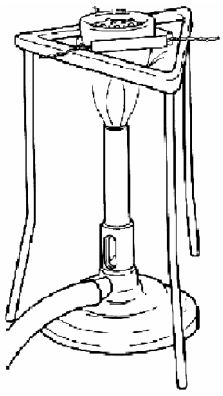
(*b*) There are three states of matter: solid, liquid and gas.

(*i*) Give ***one property*** that liquids and gases ***have in common***.

Give _____

(*ii*) Give ***one property*** in which liquids and gases ***differ***.

Give _____



(*c*) Name any ***two items of laboratory equipment*** shown in the diagram.

Item one _____

Item two _____

(*d*) Draw a ***labelled diagram***, in the box provided, of an ***apparatus*** that could be used to ***separate an insoluble solid from a liquid***.

For Examiner use only

(1) (2)

(*e*) Approximately 98.89% of carbon on the surface of the earth and in the atmosphere is carbon-12 the remaining approximately 1.11% is carbon-13. The numbers 12 and 13 are mass numbers. The atomic number of carbon is 6.

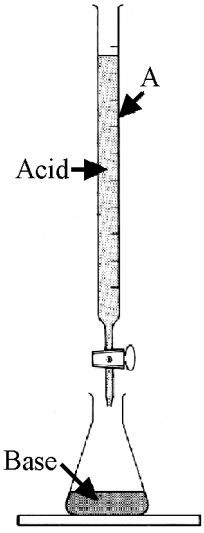
(*i*) ***How many neutrons*** are in the nucleus of a carbon-13 atom?

How? _____

(*ii*) Enter the ***missing word*** in the following sentence.

Carbon-12 and carbon-13 are _____ of carbon.

(*f*) (*i*) What is ***item* A *used for*** in the titration of an acid with a base?



What? _____

_____

(*ii*) What ***happens when an acid reacts with a base***?

What? _____

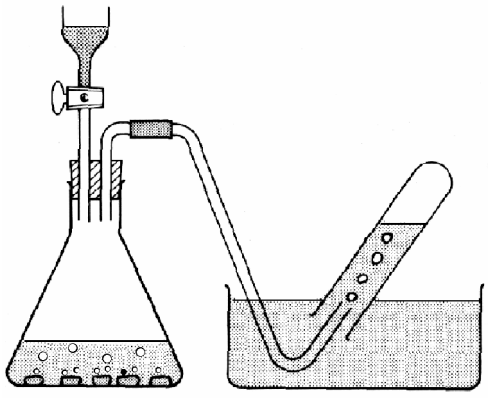
_____

(*g*) Give ***two uses*** of carbon dioxide.

Use one _____

Use two _____

(*h*) The apparatus shown in the diagram was used to investigate the reaction of zinc with hydrochloric acid. Hydrogen gas is produced.



(*i*) Describe a ***test for hydrogen***.

_____

_____

(*ii*) Write a ***chemical equation*** for the reaction of zinc with hydrochloric acid.

_____

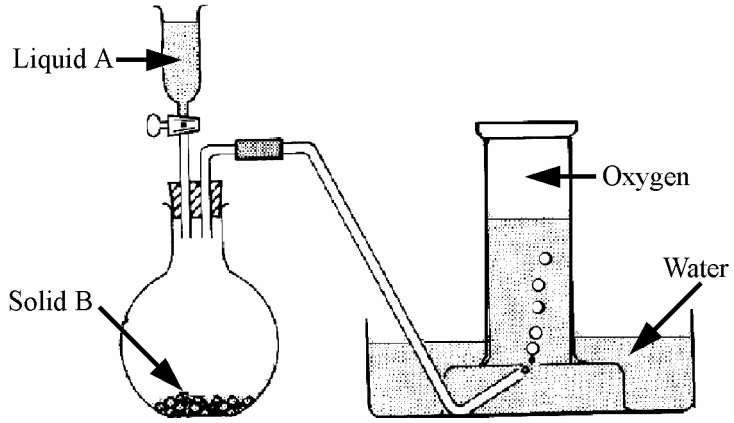
(7 × 6 + 1 × 10)

Question 5 (39)

For Examiner use only

(1) (2)

(*a*) Oxygen can be prepared by decomposing liquid **A** using solid **B** as a catalyst. This preparation is shown in the diagram.



(*i*) Name ***liquid* A**. (3)

Name _____

(*ii*) Name ***solid* B**. (3)

Name _____

(*iii*) What is a ***catalyst***? (3)

What? _____

Carbon was burned in oxygen and the products tested with pieces of moist red and blue litmus paper.

(*iv*) Give the ***result of the litmus test*** described above and make a ***conclusion*** based on this result. (6)

Result and conclusion _____

_____

(*b*) (*i*) State how to ***test*** water to ***confirm the presence of hardness***? (6)

Test _____

(*ii*) Name a ***metallic element*** some of whose compounds ***cause hardness*** in water. (3)

Name _____

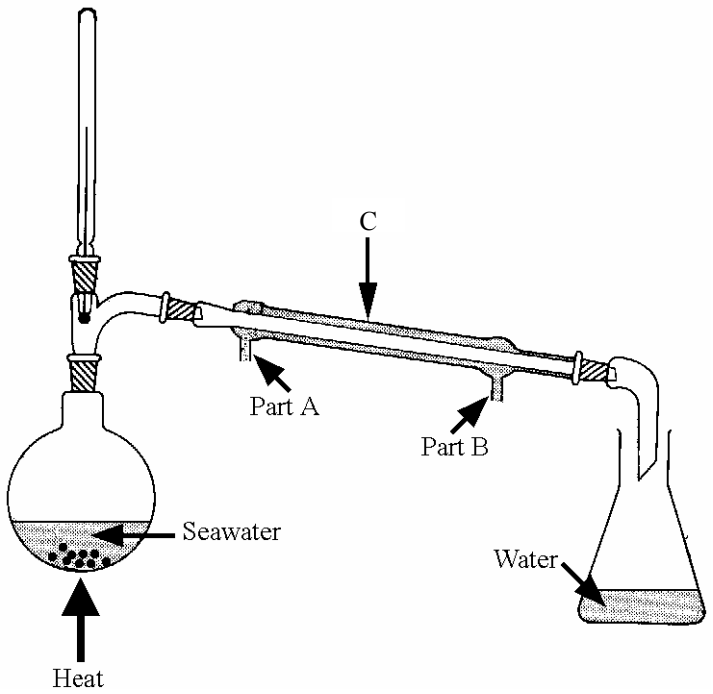
(*iii*) Give one ***effect*** of hard water. (3)

Give _____

For Examiner use only

(1) (2)

(*c*)



(*i*) Name the ***separation process*** shown in the diagram. (3)

Name _____

(*ii*) Name the ***item labelled*** **C** in the diagram. (3)

Name _____

(*iii*) Identify the ***part*** **A** ***or*** **B** ***of item*** **C** which is connected to the cold tap. (3)

Identify _____

(*iv*) How could you show that the water collected contains no salt? (3)

How? _____

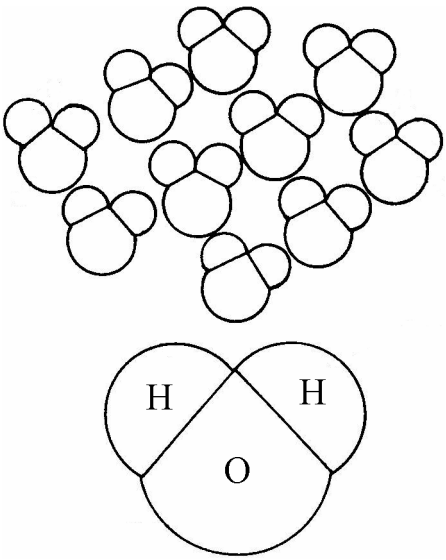
Question 6 (39)

For Examiner use only

(1) (2)

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)

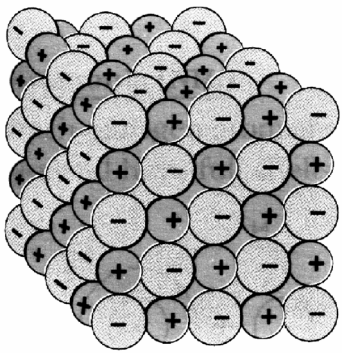
Describe _____

_____

(*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? _____

_____

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

_____

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

_____

For Examiner use only

(1) (2)

(*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 <u>malleable</u> and <u>ductile</u>. Explain the underlined terms. (6)

Malleable _____

Ductile _____

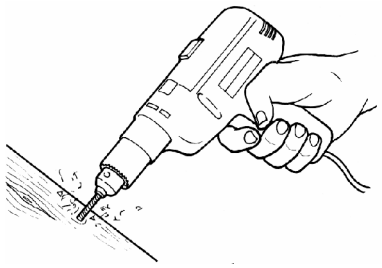
Physics

For Examiner use only

(1) | (2)

Question 7 (52)

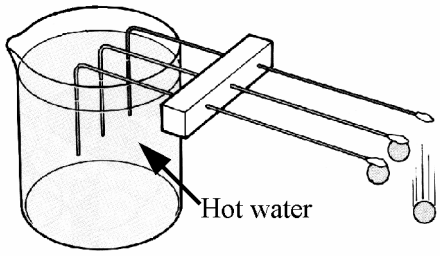
(*a*) Give ***two <u>useful</u> energy conversions*** that occur when the drill shown in the diagram is being used.



(*i*) _____

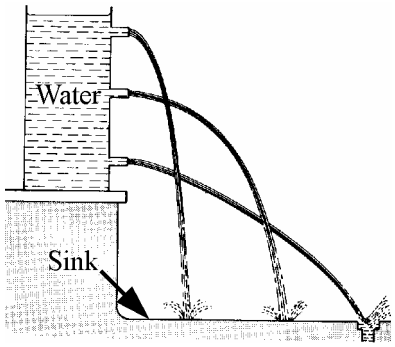
(*ii*) _____

(*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 _____

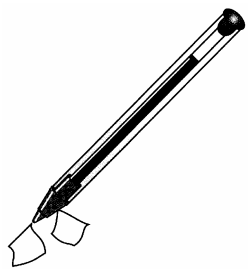
(*c*) The diagram shows a container with three spouts. The container is filled with water. Jets of water pour out of the spouts. Why does the ***jet of water from the bottom spout travel the furthest out from the container***?



Why? _____

_____

(*d*) A plastic pen when rubbed with a dry cloth can ***attract small pieces of paper*** which 'stick' to it.



(*i*) Why does this happen?

Why? _____

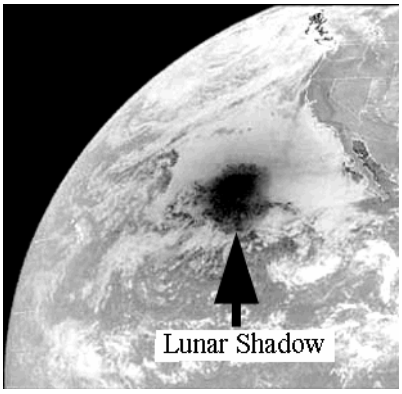
(*ii*) Explain why the ***pieces of paper fall*** from the pen after some time.

Explain _____

For Examiner use only

(1) (2)

(*e*) The photograph, taken from a satellite above the earth, shows the shadow of the moon on the earths surface.



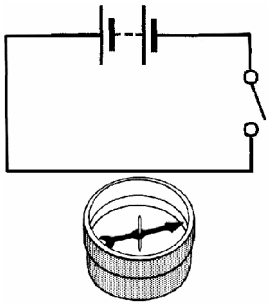
(*i*) Where does the ***light*** falling on the earths surface come from?

Where? _____

(*ii*) What ***property of light*** enables the formation of shadows?

What? _____

(*f*) The diagram shows a circuit with a wire over a compass.



(*i*) What ***happens to the compass needle*** when the switch is closed?

What? _____

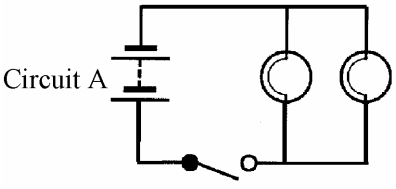
(*ii*) Which ***effect of electric current*** is demonstrated by this experiment?

Which? _____

(*g*) What causes an ***echo***?

What? _____

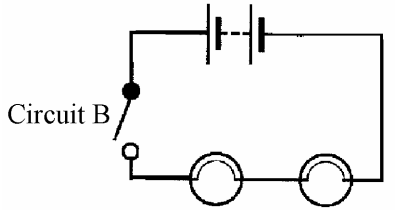
(*h*) (*i*) If a ***bulb 'blows'*** (fails) in ***circuit*** **A** does the ***second bulb stay on*** (glowing)? Give a ***reason*** for your answer.



Does? _____

Reason _____

(*ii*) If a ***bulb 'blows'*** (fails) in ***circuit*** **B** does the ***second bulb stay on*** (glowing)? Give a ***reason*** for your answer.



Does? _____

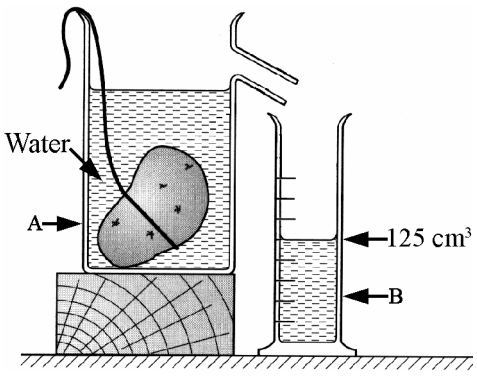
Reason _____

(7 × 6 + 1 × 10)

Question 8 (39)

For Examiner use only (1) (2)

(*a*) A pupil measured the volume of a potato using the items of laboratory equipment, labelled **A** and **B** as shown in the diagram. (6)



(*i*) Name ***the items labelled* A *and* B**.

A _____

B _____

(*ii*) The potato had mass 175 g and volume 125 cm^3.
Calculate the ***density*** of the potato.
Give the ***units of density*** with your answer. (6)

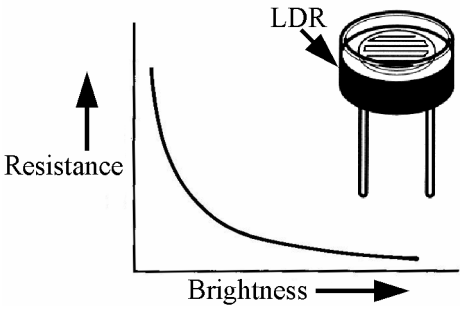
_____

_____

(*iii*) Why did the potato ***sink*** in the water? (3)

_____

(*b*) The diagram shows a light dependent resistor (LDR) and a graph of the resistance of the LDR against the brightness of light falling on it.



(*i*) Give an everyday use for an LDR. (3)

_____

(*ii*) Describe an experiment to ***measure the resistance of an LDR under varying degrees of brightness of light***. Draw the ***circuit diagram*** in the box provided. Explain how you would vary the brightness of the light. You do not have to state how the brightness of the light was measured. (9)

_____

_____

_____

_____

_____

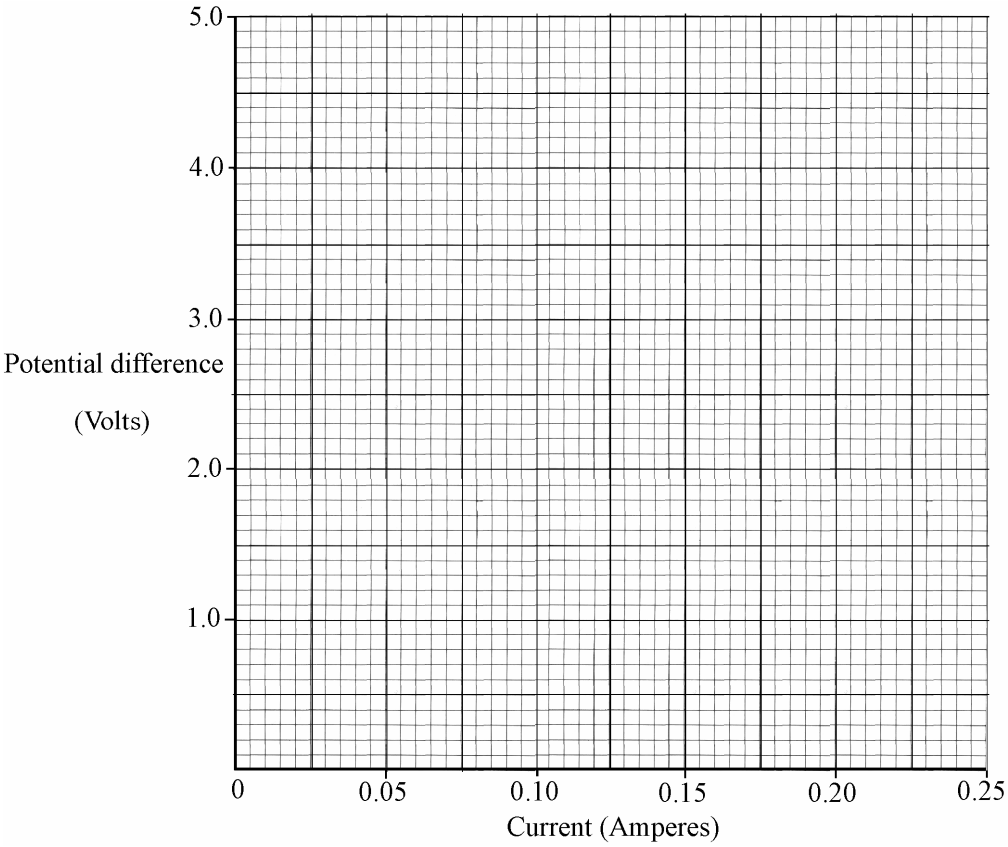
For Examiner use only

(1) | (2)

(*c*) A pupil performed an experiment on a resistor to ***investigate the relationship between potential difference*** (voltage) applied to the resistor and the ***current*** flowing through the resistor. The data from this experiment is in the table.

Potential difference (Volts)	0	1	2	3	4	5
Current (Amperes)	0.00	0.05	0.10	0.15	0.20	0.25

(*i*) Draw a ***graph*** of potential difference (voltage) on the y-axis against current on the x-axis in the grid below. (6)



(*ii*) Calculate the ***resistance*** of the resistor used in this experiment. (3)

Calculate _____

(*iii*) What is the evidence from the graph that potential difference (voltage) is ***directly proportional*** to current in this case? (3)

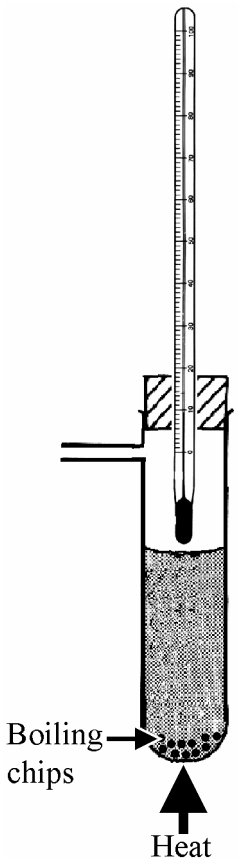
What? _____

Question 9 (39)

For Examiner use only

(1) (2)

(*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 _____

(*b*) The photograph shows a solar panel being installed. Water passing through the panel is heated by the sun.

(*i*) How does ***heat*** from the ***sun travel***, through the ***vacuum of space***, to the earth? (3)

How? _____

(*ii*) Give ***one advantage <u>or</u> one disadvantage*** of fitting solar panels to your home? (3)

Advantage _____

<u>Or</u>

Disadvantage _____

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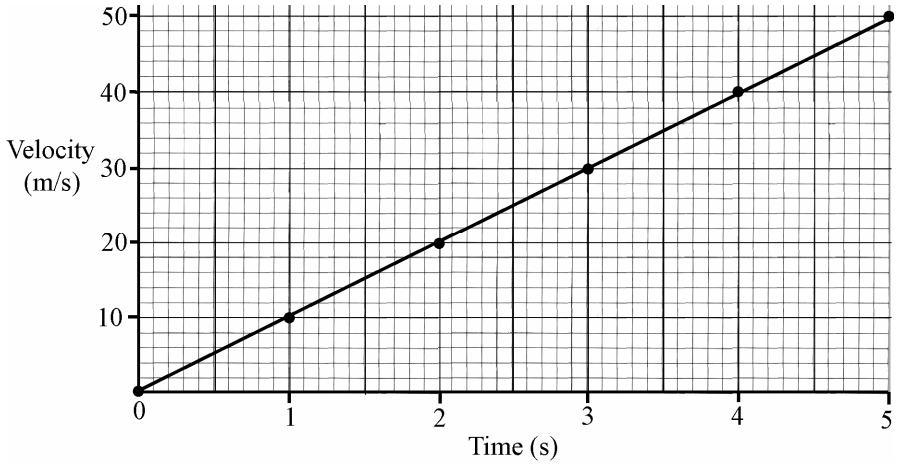
(1) (2)

(*c*) A stone was dropped from the top of a tall cliff. The stones approximate velocity was measured each second as it fell. The data collected during this experiment is given in the graph.



(*i*) Define ***velocity***. (6)

_____

_____

_____

(*ii*) Use data from the graph to ***estimate the acceleration of the stone*** as it fell. Give the ***units of acceleration*** with your answer. (6)

_____

_____

(*iii*) Name the ***force*** that caused the stone to fall. (3)

Name _____

(*iv*) The stone had a mass of 2 kg.
What was the ***weight*** of the stone on earth? Give the unit. (6)

_____