

Chemistry

Question 4

(52)

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- (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 CO₂Effect global warming

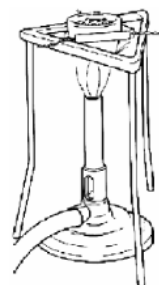
- (b) There are three states of matter: solid, liquid and gas.
(i) Give **one property** that liquids and gases **have in common**.

Give no fixed shape

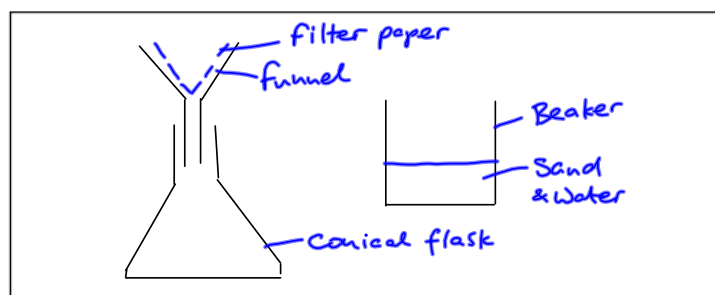
- (ii) Give **one property** in which liquids and gases **differ**.

Give liquid has fixed volume

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

Item one Bunsen burnerItem two Tripod

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



- (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? 13 - 6 = 7

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

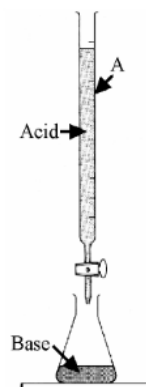
Carbon-12 and carbon-13 are isotopes of carbon.

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

What? Burette measures and controls acid dropped onto base

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

What? Neutralise forming water and salt.



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

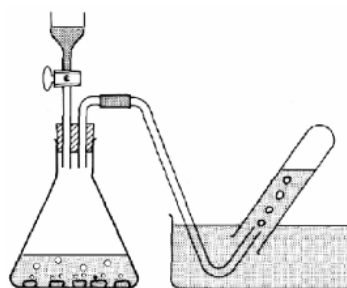
Use one Fizzy drinks

Use two Fire extinguishers
Photosynthesis

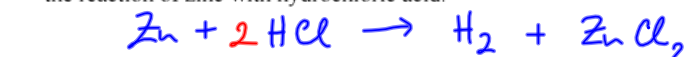
- (h) The apparatus shown in the diagram was used to investigate the reaction of zinc with hydrochloric acid. Hydrogen gas is produced.

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

Burns with a pop



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



(7 × 6 + 1 × 10)

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(1)	(2)

Physics

Question 7

(52)

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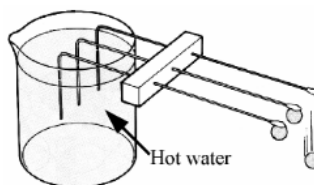
(1) (2)

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

- (i) Electrical \rightarrow Magnetic
(ii) Magnetic \rightarrow Kinetic

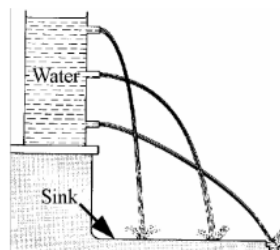


- (b) Copper, aluminium and iron rods are set-up as shown in the diagram. A metal ball is attached by wax to the end of each rod. Hot water is poured into the beaker. The ball falls from the copper rod first. What **conclusion** can be drawn from this observation?



Conclusion Cu is better conductor than Fe or Al.

- (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? pressure is greater at bottom

- (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?

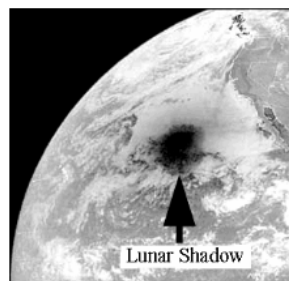
Why? Static electricity

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

Explain looses charge



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



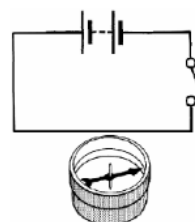
- (i) Where does the **light** falling on the earth's surface come from?

Where? Sun

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

What? Travels in straight lines

- (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? it moves

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

Which? magnetic effect

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

What? reflected sound

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

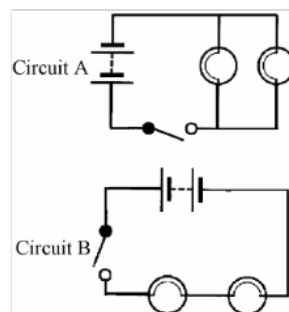
Does? Yes

Reason Parallel circuit

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

Does? No

Reason Series circuit



(7 × 6 + 1 × 10)

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(1) (2)

Question 8

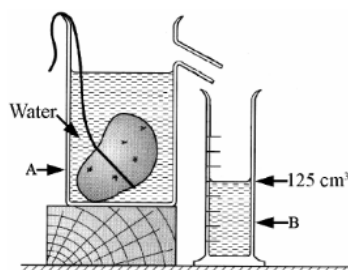
(39)

- (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 Overflow can

B Graduated cylinder



- (ii) The potato had mass 175 g and volume 125 cm³.

Calculate the *density* of the potato.

Give the *units of density* with your answer. (6)

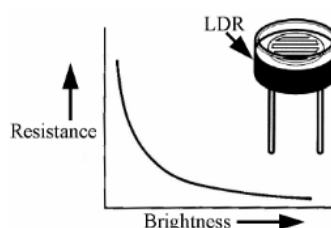
$$D = \frac{m}{V}$$

$$D = 175/125 = 1.4 \text{ g/cm}^3$$

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

More dense than water

- (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.

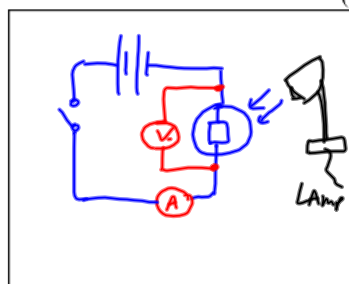


- (i) Give an everyday use for an LDR. (3)

Control street lights

- (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)

To change brightness
move lamp closer
or further away from
LDR



$$V = IR$$

$$R = \frac{V}{I}$$

Ohm's Law

$$V = IR$$

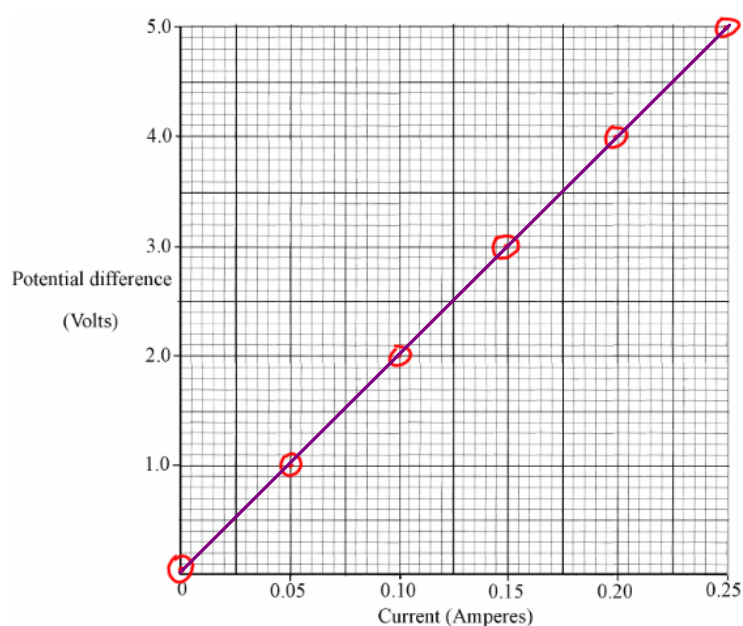
$$V \propto I$$

$$R = \frac{V}{I}$$

- (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 $R = V/I = 4/0.2 = 20 \Omega$

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

What? Straight line

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(1) (2)

Question 9

- (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? Stops boiling tube from breaking

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

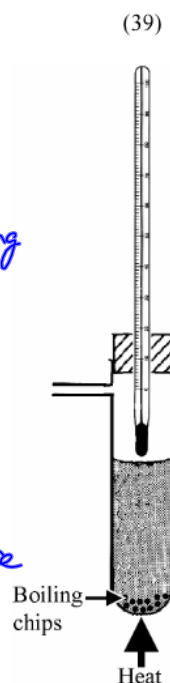
What? 100°C

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

Effect of raising pressure Increases temperature

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

Effect of lowering pressure lowers temperature



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(1) (2)

- (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? Radiation

- (ii) Give **one advantage or one disadvantage** of fitting solar panels to your home? (3)

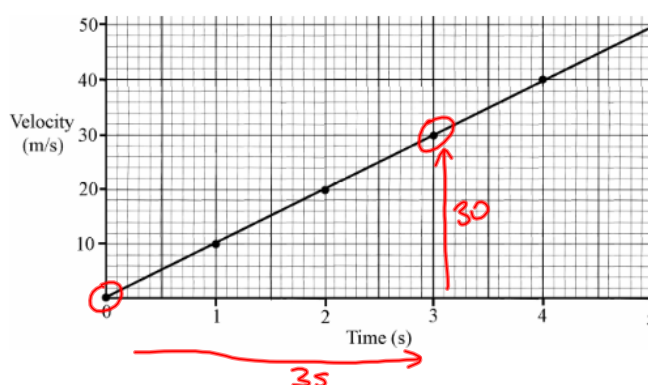
Advantage Renewable energy

Or

Disadvantage expensive



- (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)

velocity is speed in a direction.

- (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)

$$a = \frac{v-u}{t}$$

$$a = \frac{30}{3} = 10 \text{ m/s}^2$$

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

Name gravity

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

$$W = 10M$$

$$W = 2(10) = 20 \text{ N}$$

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(1) (2)