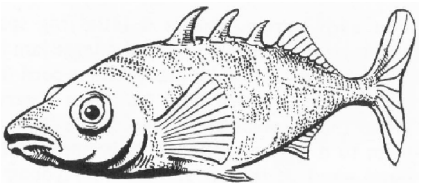
Biology

For Examiner use only

Question 1 (52)

(1) (2)

(*a*) The diagram shows a stickleback, a small fish, that lives in our fresh water habitats. Give **two *adaptations*** that fish have to help them to live in water.



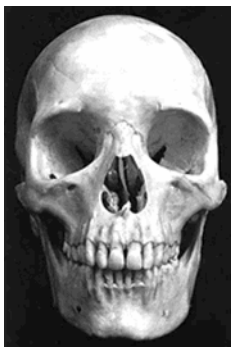
One _____

Two _____

(*b*) Name **two *waste products*** that are excreted by our kidneys.

One _____

Two _____

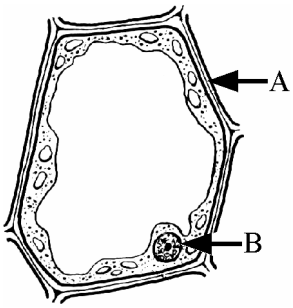


(*c*) Name **two *organs*** that the human skull protects.

One _____

Two _____

(*d*) The diagram shows a plant cell.
Name **the *parts*** of the cell labelled **A** and **B**.



A _____

B _____

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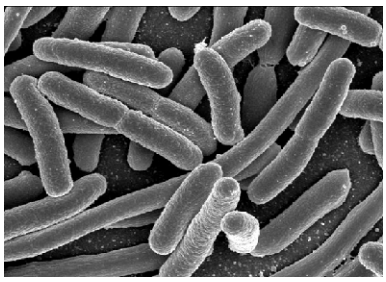
(1) (2)

(*e*) The image shown was produced using a scanning electron microscope. It shows the bacteria Escherichia Coli.



Give **one *beneficial*** and **one *harmful effect*** of bacteria.

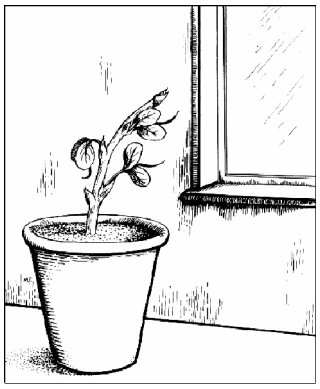
Beneficial _____

Harmful _____

(*f*) Name the **two *principal substances*** that chromosomes are composed of.

One _____Two _____

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



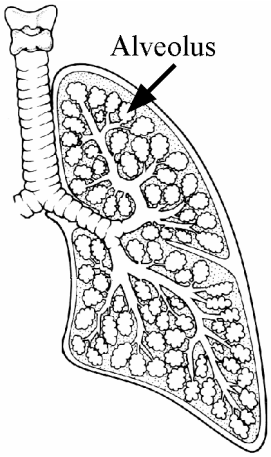
(*i*) What is the ***growth response*** of a ***plant to light*** called?

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

Describe _____

_____

_____

_____

_____

(7 × 6 + 1 × 10)

For Examiner use only

(1) (2)

Question 2 (39)

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

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

What? _____

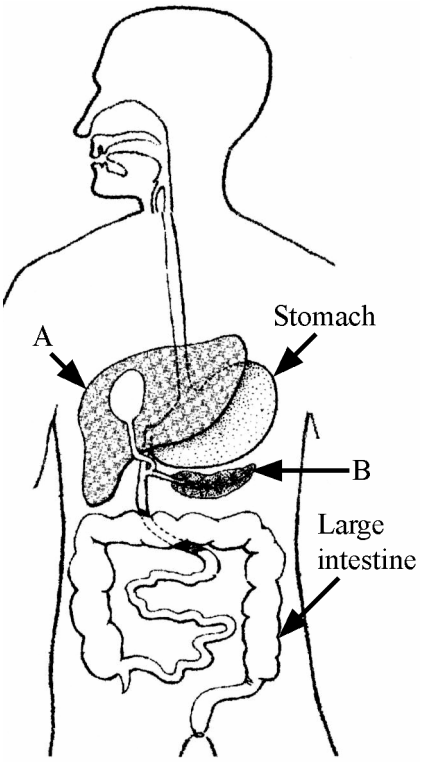
(*ii*) Why is ***digestion necessary***? (3)

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 _____

_____

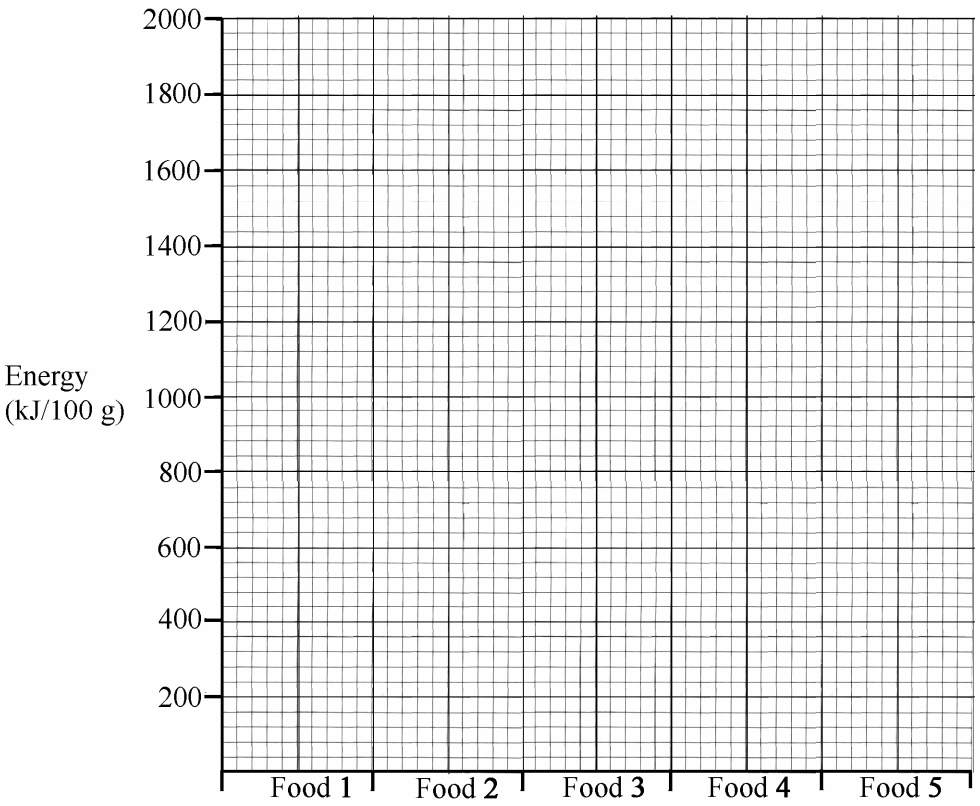
(*b*) Protein, carbohydrate and fat can all be used to provide energy in our bodies. The table gives the amount of these food constituents, in grams per 100 grams for five common foods. The energy content per 100 g of each food has also been given. The energy values have been rounded off to the nearest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

For Examiner use only

(1) | (2)

(*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)

_____

_____

_____

_____

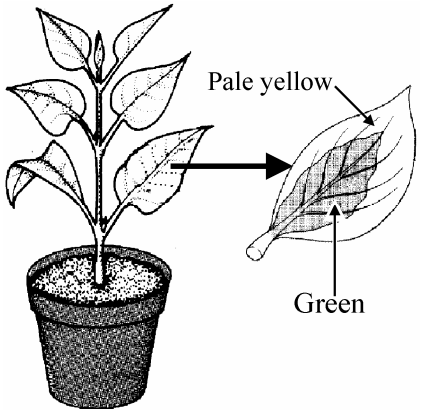
_____

Question 3 (39)

For Examiner use only

(1) | (2)

(*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 _____

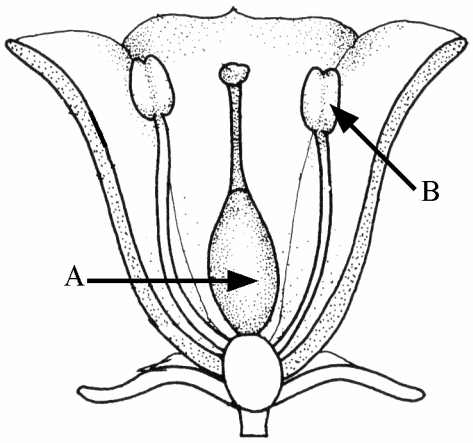
(*v*) Suggest a reason why the leaf margins did not turn blue-black. (3)

Suggest _____

For Examiner use only
(1) (2)

(*b*) The female part of the flower is called the carpel and the male part is called the stamen. The diagram is a cross section through a flower.

(*i*) Name ***part*** A of the carpel and give its ***role*** in the sexual reproduction of plants. (6)



Name _____

Role _____

_____

(*ii*) Name ***part*** B of the stamen and give its ***role*** in the sexual reproduction of plants. (6)

Name _____

Role _____

_____

(*iii*) Give a ***way*** in which the pollen from the flower of one plant can be transferred to the flower of another plant. (3)

Give _____

(*iv*) Name the ***cell*** that is formed when a male gamete (sperm) and a female gamete (egg) combine. (3)

Name _____

(*v*) What does the ***cell*** formed by the fusion of the male and female gametes of a flowering plant ***grow and develop*** into? (3)

What? _____

Chemistry

For Examiner use only

Question 4 (52)

(1) | (2)

(*a*) Give **two *different properties*** of the element magnesium compared to the compound magnesium oxide.

One _____

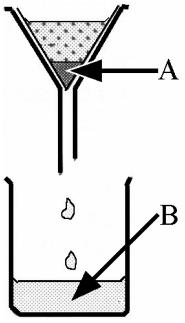
Two _____

(*b*) What ***effect*** has acid rain on limestone? Explain this ***effect***.

What? _____

Explain _____

(*c*) A mixture of sand and salt was stirred up with water and then filtered as shown in the diagram.



(*i*) Substance **A** was retained by the filter paper. Name **A**.

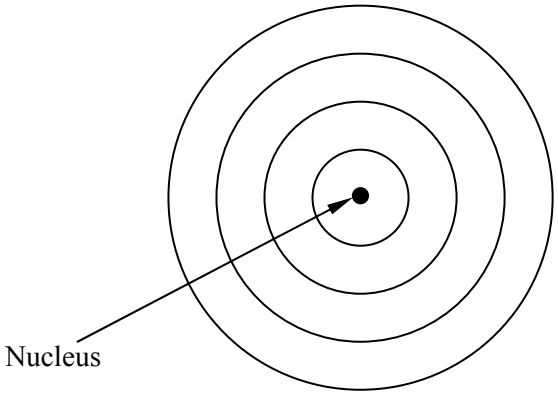
A _____

(*ii*) Substance **B** was passed through the filter paper. Name **one *constituent*** of **B**.

B _____

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

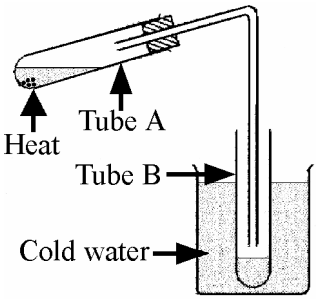
Complete the diagram using dots or crosses to clearly show the arrangement of electrons in the potassium atom.



For Examiner use only

(1) | (2)

(*e*) Hard water in test tube A was heated and some water evaporated from it and condensed in test tube B. Is the water in test tube B ***hard or soft***? Give a ***reason*** for your answer,



Is? _____

Reason _____

(*f*) Name **two *processes*** used in the treatment of water for safe use in our homes.

Process one _____

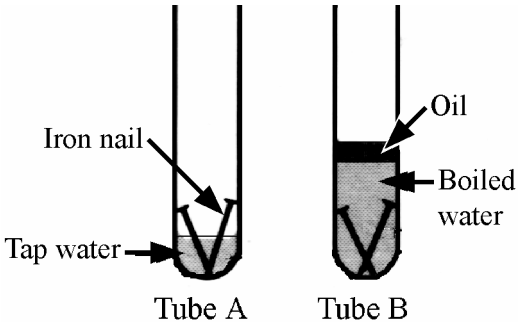
Process two _____

(*g*) Metals conduct two forms of energy very well. Name the **two *forms of energy***.

Energy one _____

Energy two _____

(*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? _____

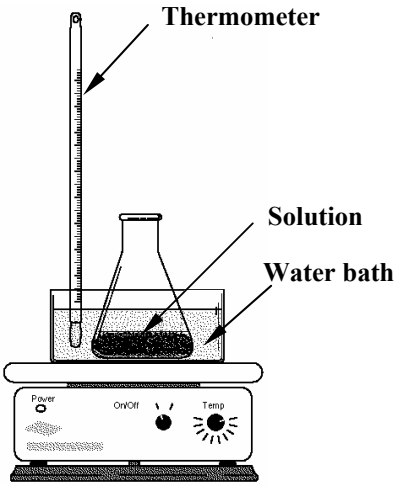
(7 × 6 + 1 × 10)

Question 5 (39)

For Examiner use only

(1) (2)

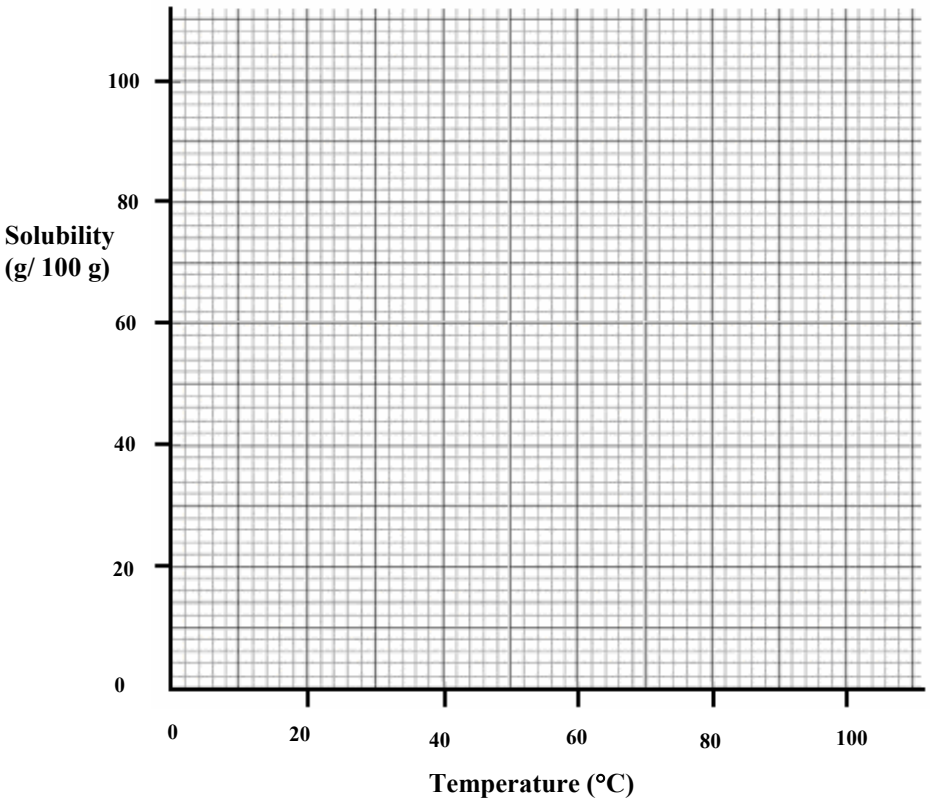
(*a*) A pupil used the apparatus shown in the diagram to quantitatively investigate the effect of temperature on the solubility of copper sulfate crystals in water.
100 g of water in the conical flask was brought to the required temperature using the water bath.
Copper sulfate crystals were added to the water until no more would dissolve. The mass of the copper sulfate crystals that dissolved was noted.



The data was recorded and is given the table.

Temperature (°C)	0	20	40	60	80	100
Mass of copper sulfate crystals dissolved (g/ 100 g)	14	21	29	40	55	75

(*i*) Draw a ***graph*** of mass of copper sulfate crystals dissolved (solubility) against temperature in the grid below. A ***smooth curve*** through the plotted points is required. (9)



For Examiner use only

(1) (2)

(*ii*) Use your graph to ***estimate the solubility*** of copper sulfate crystals at 10 °C. (3)

_____

(*iii*) Describe, using an appropriate labelled diagram in the box provided, how to ***grow and collect crystals*** of copper sulfate from the solution produced at 100 °C. (12)

_____

_____

_____

_____

_____

_____

_____

_____

(*b*) (*i*) What is the ***pH scale***? How can ***pH be measured***? (9)

What? _____

_____

How? _____

(*ii*) Look at the table and name a ***strong acid*** and a ***weak alkali*** from it. (6)

Substance	Pure water	Household ammonia	Urine	Gastric juice (stomach)	Blood
Ph	7	12	6	1.4	7.4

Strong acid _____

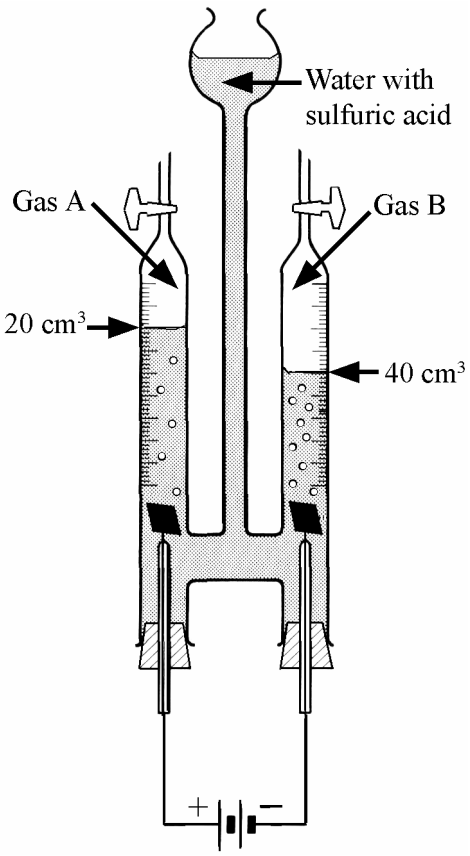
Weak alkali _____

Question 6 (39)

For Examiner use only

(1) | (2)

(*a*) The diagram shows an apparatus used to decompose water by passing an electric current through it. The volumes of gases released by this process can be measured as shown.



(*i*) Name the ***process*** which decomposes a substance when electric current is passed through it. (3)

Name _____

(*ii*) Why is a small amount of ***sulfuric acid added*** to the water? (3)

Why? _____

_____

(*iii*) Name ***gas*** **A** and give a ***test*** to confirm your answer. (6)

Name _____

Test for gas **A** _____

(*iv*) Name ***gas*** **B** and give a ***test*** to confirm your answer. (6)

Name _____

Test for gas **B** _____

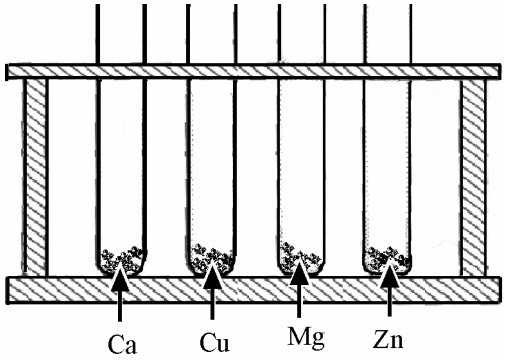
(*v*) Water is a compound formed by the chemical combination of elements **A** and **B**. In what ***proportion*** do **A** and **B** ***combine*** to form water? (3)

What? _____

For Examiner use only

(1) (2)

(*b*) 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 _____

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

Give _____

_____

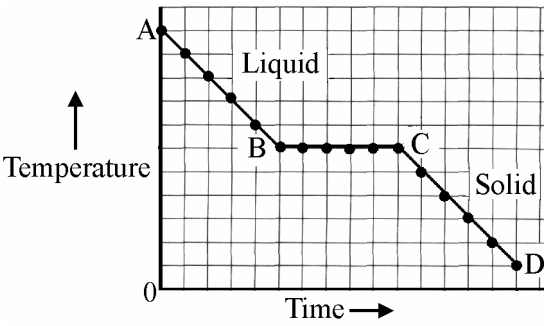
Physics

For Examiner use only

(1) | (2)

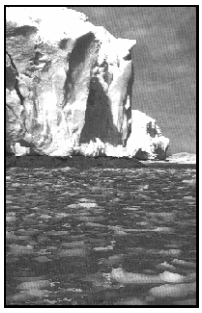
Question 7 (52)

(*a*) A substance that is a solid at room temperature was heated above its melting point and then allowed to cool at a steady rate. The temperature was taken at regular intervals. The data is in the graph. Why is ***there no drop in temperature*** between B and C?



Why? _____

(*b*) Why do icebergs ***float*** on water?

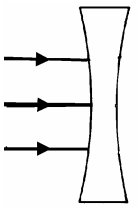


Why? _____

_____

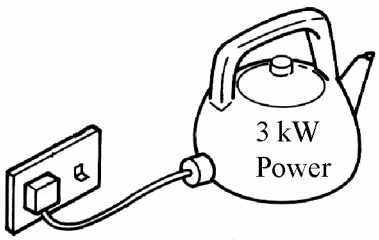
_____

(*c*) The diagram shows three narrow beams of light (rays) hitting a lens. Draw **one *ray*** that passes through the lens ***without refraction*** and **one *ray that is refracted*** by the lens in the diagram.



(*d*) Name the ***unit of electrical energy*** that companies supplying electricity use to bill their consumers.

Name _____



Calculate the ***cost*** of using of using the electric kettle, shown in the diagram, for ten hours if a unit of electricity costs 15 cent.

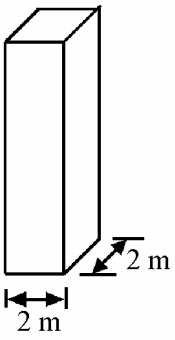
Calculate _____

_____

For Examiner use only

(1) | (2)

(*e*) The diagram shows a tank full of water. The mass of the water in the tank is 48 000 kg. Calculate the ***approximate pressure*** that it exerts on the base of the tank. Give the ***units*** of pressure with your answer.



Calculate _____

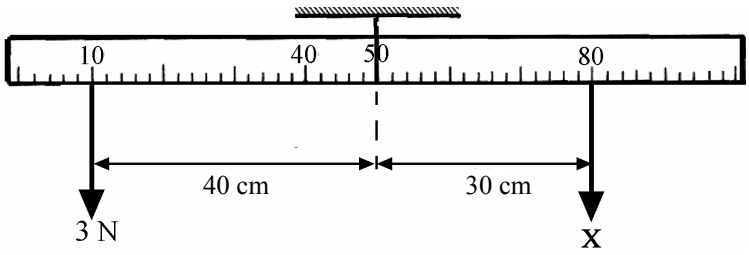
_____

(*f*) Give **two *differences*** between heat and temperature.

One _____

Two _____

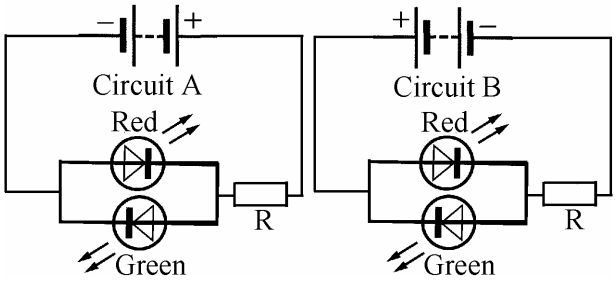
(*g*)



A uniform metre stick, suspended at its mid-point is balanced as shown. Calculate ***force*** X.

Calculate _____

(*h*) Look carefully at circuits A and B, then answer the questions.



(*i*) In ***which circuit*** does the red LED light up?

Which? _____

(*ii*) Give a ***reason*** for your answer to (*i*) above.

Reason _____

(*iii*) Why is the ***resistor*** 'R' ***needed*** in ***both*** circuits?

Why? _____

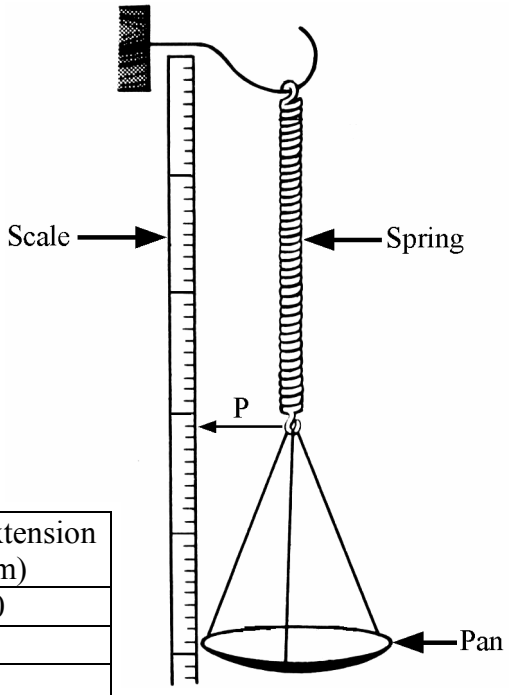
(7 × 6 + 1 × 10)

Question 8 (39)

For Examiner use only

(1) | (2)

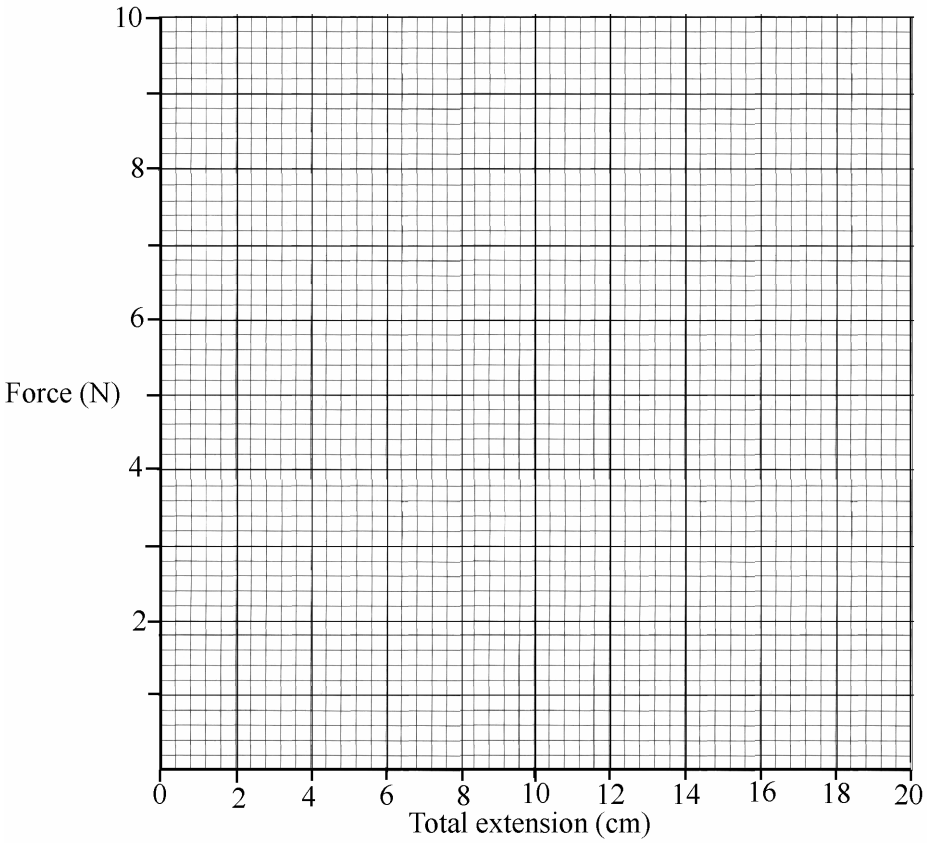
(*a*) A pupil used the apparatus shown in the diagram to investigate the relationship between the force applied and the extension produced in the spring by that force.
Pointer, P, was used to read the scale.
Weights were added to the pan to apply forces to the spring.
The data recorded is in the table.



(*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)



For Examiner use only

(1) | (2)

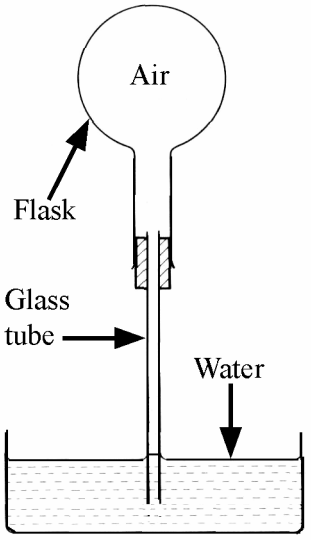
(*iii*) What ***conclusion*** can be drawn from the graph regarding the relationship between the force applied to the spring and the extension produced by it? (6)

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 _____

(*c*) Why is it that if you are viewing a fireworks display from a distance that you ***see the fireworks explode before you hear the sound*** of the explosions? (6)

_____

Question 9 (39)

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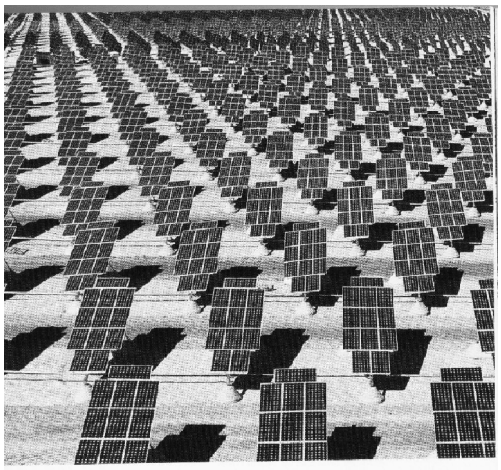
(1) (2)

(*a*) The photograph shows part of a very large array of photovoltaic cells that convert light, from the sun, directly into electrical energy.

Light, from the sun is a renewable source of energy.

Ireland only uses about 2% renewable sources to meet current energy needs.



(*i*) Name **two *renewable energy sources***, excluding sunlight, that are available in Ireland. (6)

Source one _____

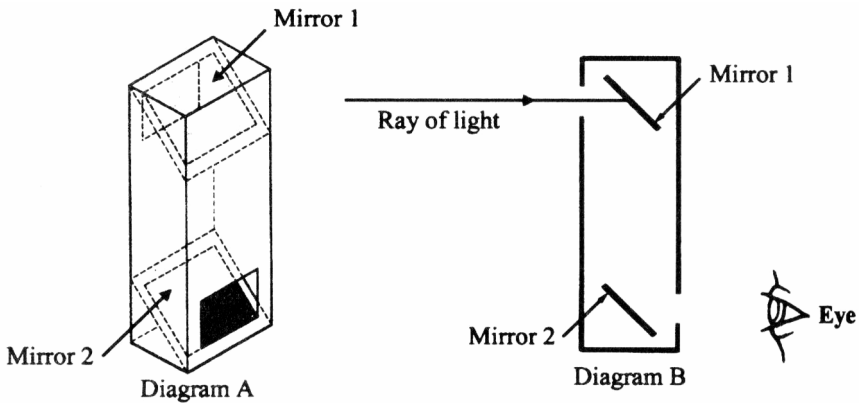
Source two _____

(*ii*) Give **two *benefits*** that Ireland would get from increasing the use of renewable energy sources to meet our energy requirements. (6)

Benefit one _____

Benefit two _____

(*b*) (*i*) Diagram A is of a simple periscope. Complete diagram B ***showing the reflections of the ray of light at both mirrors***. (6)



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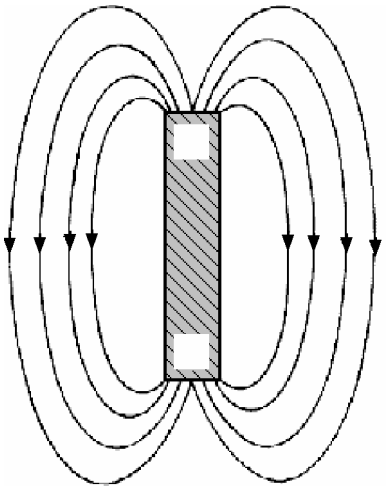
(1) (2)

(*ii*) Give **one *use*** for a periscope. (3)

Give _____

(*c*) The diagram shows a bar magnet with magnetic field lines on both sides.



(*i*) Label the ***north pole*** (N) ***or*** the ***south pole*** (S) of the magnet in the diagram. (3)

(*ii*) What information is given by the arrows on the magnetic field lines? (3)

What? _____

_____

(*iii*) Describe, using a labelled diagram in the box provided, a simple experiment to show that ***like magnetic poles repel each other***. (6)

_____

_____

_____

_____

_____

_____

(*iv*) Name a ***material*** that is attracted by magnets. (3)

Name _____

(*v*) How would you ***show*** that the Earth exerts ***magnetic forces***? (3)

How? _____