



Coimisiún na Scrúduithe Stáit State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2010

SCIENCE – ORDINARY LEVEL

Thursday, 17 JUNE – MORNING, 9.30 to 11.30

INSTRUCTIONS

1. Write your **Examination Number** in the box provided on this page.
2. Answer **all** questions.
3. Answer the questions in the spaces provided in this booklet. If you require extra space, an extra page is provided at the back of this booklet.

Centre Number

Examination Number

For examiner use only	
Section/Question	Mark
Biology	
Q.1 (52)	
Q.2 (39)	
Q.3 (39)	
Chemistry	
Q.4 (52)	
Q.5 (39)	
Q.6 (39)	
Physics	
Q.7 (52)	
Q.8 (39)	
Q.9 (39)	
Total (Paper) (390)	
Bonus for Irish	
Grand Total (Paper) (390)	
Coursework A (60)	
Coursework B (150)	
Grand Total (600)	

Biology

Question 1

(52)

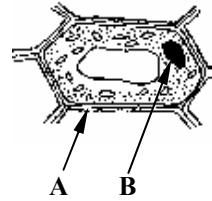
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(a) The diagram shows an onion cell.

Name the parts of the cell labelled A and B.

Name A _____

Name B _____



(1) | (2)

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

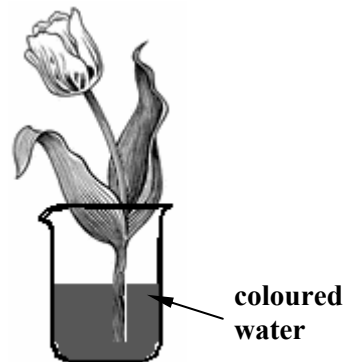
Complete the following statement using the correct words from the list on the right.

Seeds need warmth, _____
and _____ to germinate.

Carbon dioxide
Water
Oxygen

(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?



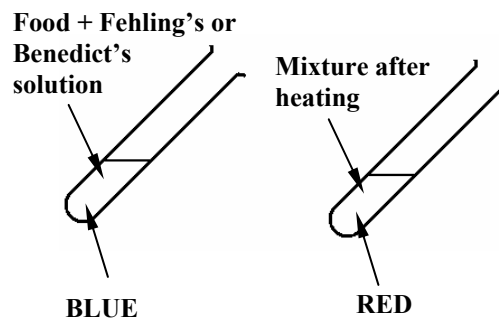
What conclusion can be drawn about the movement of water in plants?

(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?



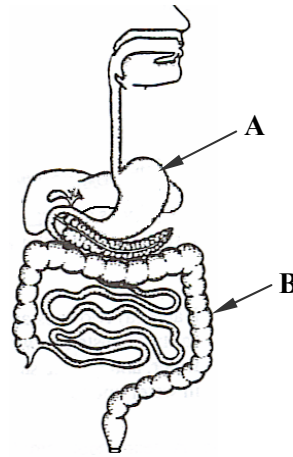
What is the **function** of this food type in the body?

(e) The diagram shows part of the human digestive system.

Name the part labelled **A** in the diagram.

Name _____

What is the function of part **B**?



(f) From the list on the right identify the correct word needed to replace each of the numbers **1** and **2** in the **enzyme action** given below.

<p>Amylase</p> <p>Maltose</p>

During digestion 1 acts on **starch** found in our food and breaks it down to form 2.

1 _____ **2** _____

(g) The excretory system gets rid of wastes from the body.

Name a waste product released from the kidney.

Waste _____

Name a waste product released from the lungs.

Waste _____

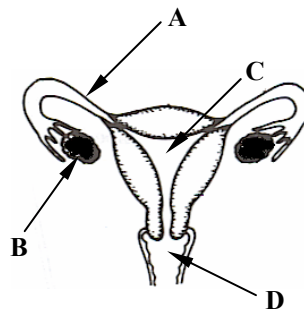
(h) The diagram shows part of the female reproductive system.

Study the diagram and answer the questions below.

An egg (female gamete) is released from the part labelled _____.

The **fusion** (joining) of the egg with the sperm usually takes place in the part labelled _____.

During **pregnancy** the baby develops in the part labelled _____.



(7 × 6 + 1 × 10)

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(1) | (2)

Question 2

(39)

(a) The diagram shows a flower. Examine the diagram and answer the questions that follow.

(9)

	Petal	
	Stigma	
	Stamen	
	Attract insects	
	Pollination	
	Seed dispersal	

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(1)	(2)
-----	-----

- (i) In the table write the letter **A** beside the name of the part labelled **A**.
- (ii) In the table write the letter **B** beside the name of the part labelled **B**.
- (iii) Write the letter **F** beside the function of the part labelled **B**.

(b) The following pieces of equipment can be used in a study of a habitat.

- (i) Name and give one use for the piece of equipment shown in diagram **A**. (6)



Diagram A

Name _____

Use _____

- (ii) Name and give one use for the piece of equipment shown in diagram **B**. (6)

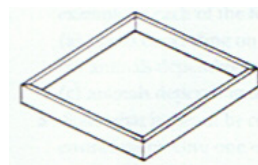


Diagram B

Name _____

Use _____

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

Answer the questions below.

(18)

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(1)

(2)

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

Name _____

(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 _____

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?

Question 3

(39)

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(a) Blood is found in the circulatory system. Blood consists of red corpuscles (cells), white cells and platelets in a liquid called plasma.

(1) (2)

Match each part of the blood with its function below.

(12)



red corpuscles (cells)



white cells



platelets

- (i) The _____ fight infection.
- (ii) The _____ carry oxygen around the body.
- (iii) The _____ clot the blood.

(b) The diagram shows part of the human breathing system.

(15)

(i) Name the parts labelled **A** and **B** in the diagram.

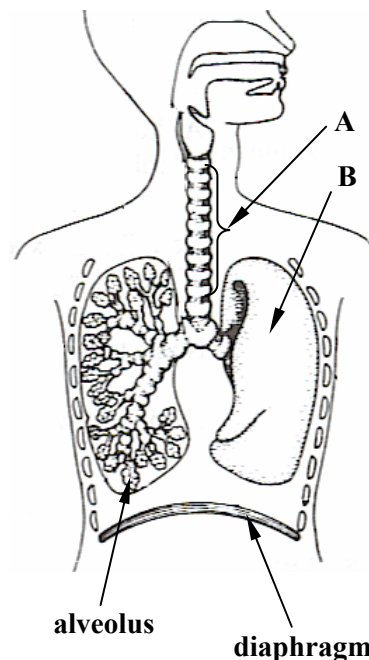
A _____

B _____

(ii) Part **A** has rings of cartilage.
What do the rings of cartilage do?

(iii) In which part of the breathing system does the gas exchange take place?

(iv) Why does exhaled air turn limewater milky?



(c) A person's pulse is often taken to measure the rate of heart beat.

Normal pulse rate is 70 beats per minute (bpm).

Exercise and rest have an effect on pulse rates.

Answer the following questions about exercise and healthy living.



(12)

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(1)

(2)

(i) In each case choose a word or words from the list on the right to correctly complete the statements below.

Increase
Decrease
Stay the same

Exercise causes a person's pulse rate to _____.

Rest causes a person's pulse rate to _____.

(ii) A balance of exercise and rest promotes good health.

Name **one** other action a person can take to **keep their heart healthy**.

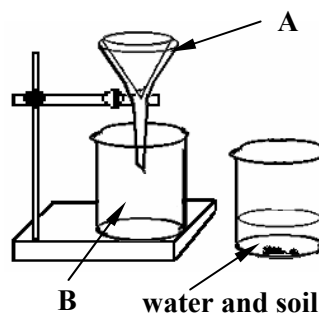
Chemistry

Question 4

(52)

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- (a) The apparatus used to separate soil and water is drawn on the right.



Name the piece of equipment labelled A.

Name of A _____

Would you expect to find the soil in A or B at the end of the experiment? _____

(1) (2)

- (b) Complete the table below by choosing the correct particle from the list on the right and matching it with the information in the table.

Proton
Electron
Neutron

Particle	Location	Relative charge	Relative Mass
	Inside nucleus	+1	1
	Outside nucleus	-1	1/1850

- (c) Water exists in the three states of **solid**, **liquid** and **gas**.

In the table write **S** opposite the solid.

	Steam
	Water
	Ice

What word describes the change of state from a solid to a liquid?

- (d) Choose an example of a **household acid** and a **household base** from the list on the right.

Acid _____

Base _____

Water
Vinegar
Baking Soda

(e) When **hydrochloric acid** and **sodium hydroxide** are mixed they react to neutralise each other.

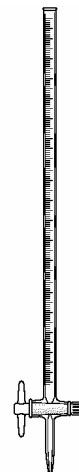
A salt and water are formed in the reaction.

Name the **salt** formed in this reaction.

Salt _____

Name the piece of **equipment** drawn on the right that is used in the experiment to make this salt.

Equipment _____



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(1) (2)

(f) Choose two **properties of metals** from the list on the right.

1 _____

2 _____

Dull in colour
Shiny
Can be stretched

(g) Choose an **alloy** from the list.

Alloy _____

Give one **use** for this alloy.

Use _____

Gold

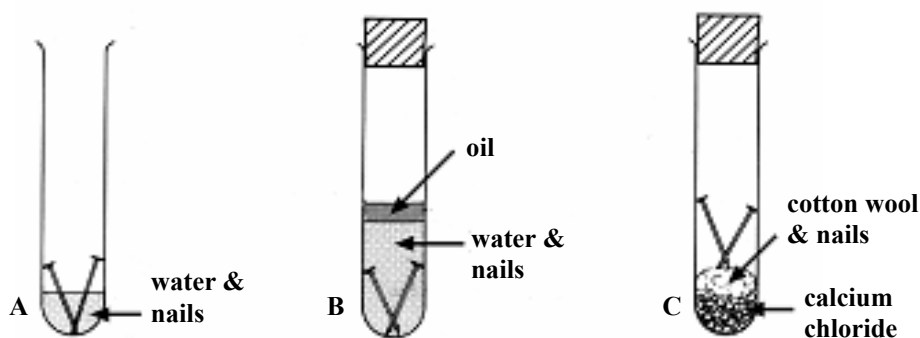
Bronze

Iron

Solder

(h) The diagram shows an apparatus set up by a student to investigate the rusting of iron nails.

Study the diagram and answer the questions that follow.



In which test tube **A**, **B** or **C** did the nails rust?

What is the purpose of the **layer of oil** in test tube **B**?

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

(7 × 6 + 1 × 10)

Question 5

(39)

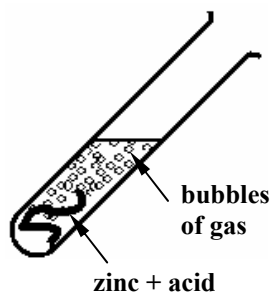
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(a) The diagram shows **zinc metal reacting with hydrochloric acid, HCl**.

Bubbles of gas are given off. Answer the following questions about this reaction. (9)

Name the gas given off. _____

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



(1) (2)

(b) The diagram shows the preparation of oxygen gas. Examine the diagram and answer the questions that follow. (18)

	Manganese dioxide	
	Hydrochloric acid	
	Hydrogen peroxide	
	Fire extinguisher	
	Respiration	
	Combustion	

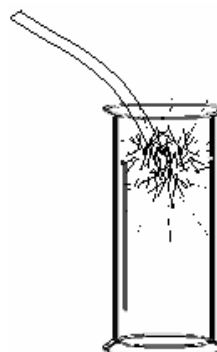
(i) In the table write the letter **S** opposite the name of the **solid** used in the preparation of oxygen.

Write the letter **L** opposite the name of the **liquid** used in preparation of oxygen.

Write the letter **U** beside **two uses** for oxygen gas.

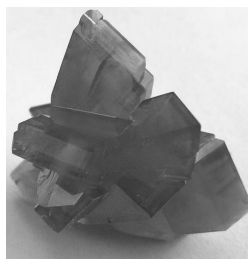
(ii) The diagram shows magnesium being burned in oxygen to form magnesium oxide (MgO).

What effect does this substance have on moist litmus paper?



(c) The growth of crystals can be investigated using either alum or copper sulfate. The experimental procedure is similar in each case.

When you carried out this investigation the first thing you had to do was to make up a hot saturated solution of either alum or copper sulfate.



crystals

Name the solvent in which the alum or copper sulfate was dissolved. (3)

Solvent _____

How was the solvent heated? (3)

What needed to be done to the hot saturated solution so that crystals formed? (3)

Other than the piece of equipment used to heat the solvent name one other piece of equipment used in this experiment. (3)

Name _____

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(1) | (2)

Question 6

(39)

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

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

(6)

(1) (2)

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)

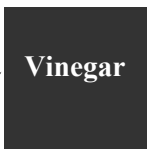
Germs and bacteria are killed by adding _____.

Floating materials are removed by _____.

- Fluoride**
- Chlorine**
- Ozone**
- Screening**

(d) You are given a bottle of vinegar as shown in the diagram.

Describe, with the aid of a labelled diagram, how you would **measure the pH** of the vinegar. (12)



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(1) (2)

Use the headings below.

Equipment: _____

Procedure: _____

Result: _____

Labelled diagram

Physics

Question 7

(52)

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

	m
	kg
	s

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

(1) (2)

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



stapler



wheelbarrow



traffic cone



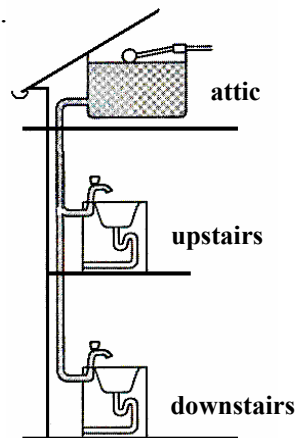
scissors

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.

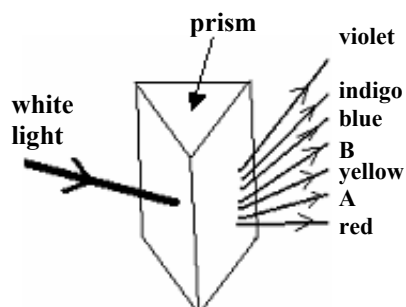


- (d) The diagram shows a ray of white light entering through a triangular glass prism. The light passes through the prism to form a band of colours.

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

A _____

B _____



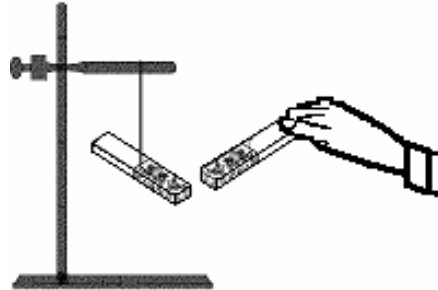
(e) Complete the statements below using words from the list on the right.
Sound is a form of _____ caused by vibrations.

- | |
|--------------------|
| Energy |
| Electricity |
| Noise |
| Echo |

A reflected sound is called an _____.

(1) | (2)

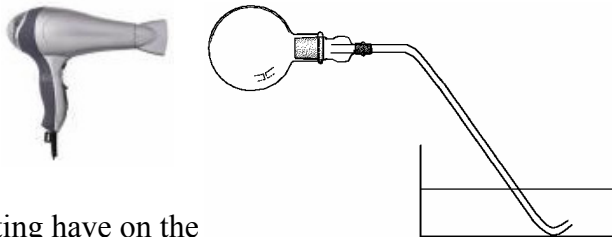
(f) The diagram shows the north pole of one magnet being brought up to the north pole of a freely suspended magnet.



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

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

(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 = _____

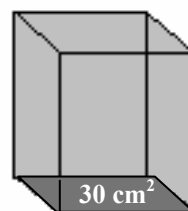
- | |
|--------------|
| Force |
| Area |

If the **area** of the face of a metal block is **30 cm²** and the **force (weight)** of the block is **90 N**, find the pressure being applied by the block.

Pressure = _____ N/cm²

Name the instrument used to measure pressure.

Instrument _____



(7 × 6 + 1 × 10)

Question 8

(39)

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(a) When each of the appliances below is used energy conversions take place.



Electric kettle



Bunsen burner

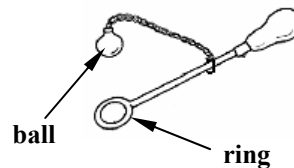


Battery powered radio

Correctly match an appliance with an energy conversion that takes place when it is used. [Note: An appliance may be used more than once.] (12)

Electrical to heat	
Electrical to sound	
Chemical to electrical	
Chemical to heat	

(b) The diagram shows a piece of equipment that can be used to investigate the effect of heat on a metal. The ball will pass through the ring when it is cold. When the ball is heated it will no longer pass through the ring.



Answer the following questions about this investigation. (12)

(i) Explain why the ball does not pass through the ring when it is heated.

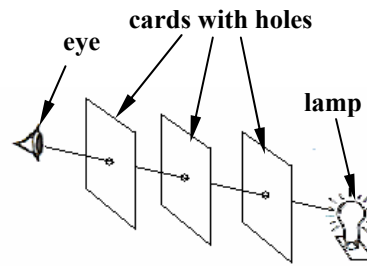
(ii) How would you get the ball to fit through again?

(iii) What does this investigation tell us about the **effect of heat** on metals?

(1) (2)

(c) An experiment on light was set up as shown.
Answer the questions that follow.

(9)



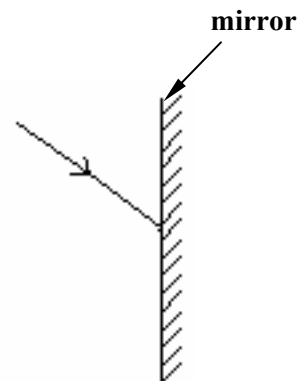
(i) What would a person see if the three cards were set up as shown?

(ii) What would a person see if the middle card was moved sideways?

(iii) What does this experiment tell us about light?

(d) The diagram shows a ray of light striking a plane mirror.

(6)



Complete the path taken by the reflected ray of light in the diagram.

Name an **instrument** that is based on the use of reflection of light from mirrors. _____

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(1) (2)

Question 9

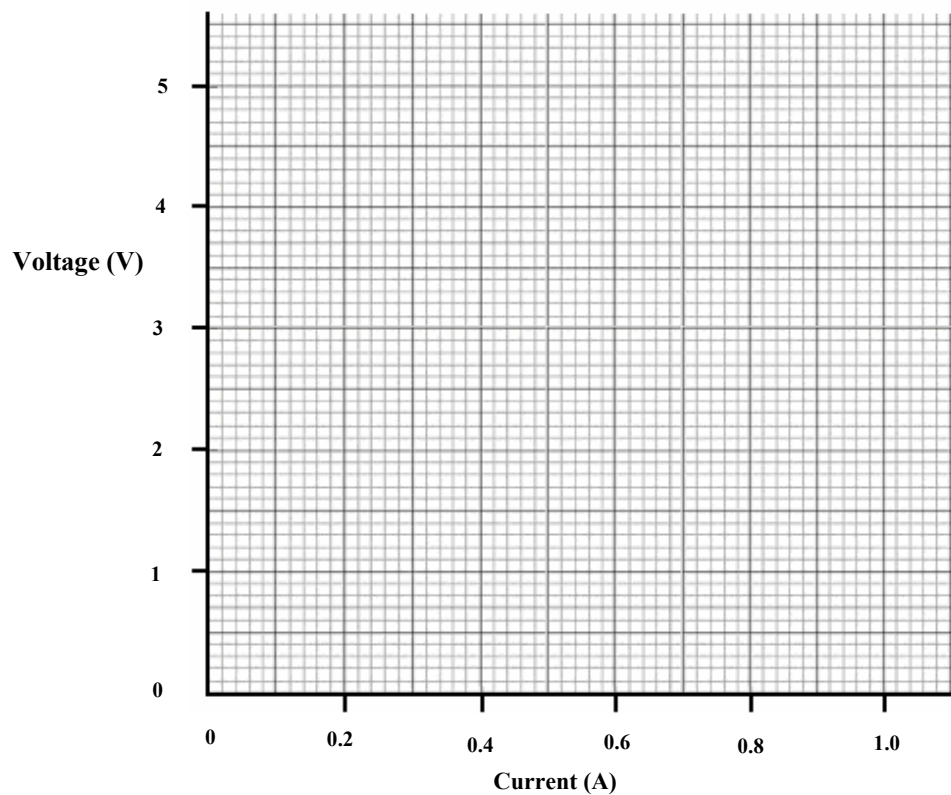
(39)

- (a) 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.

<u>Current</u> A	0.2	0.4	0.6	0.8	1.0
<u>Voltage</u> V	1	2	3	4	5

- (i) Use this data to draw a graph of voltage (*y*-axis) against current (*x*-axis) using the grid provided below. (12)



- (ii) Use the graph to estimate the **current** at **3.5 V**. _____ (3)

- (iii) **Name** the instrument used by students to measure voltage. (3)

Instrument _____

- (iv) **Name** the instrument used by students to vary the current. (3)

Instrument _____

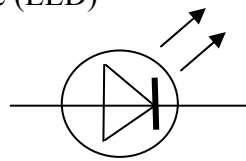
- (v) What is the relationship between voltage and current in this investigation? _____

_____ (6)

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(1) (2)

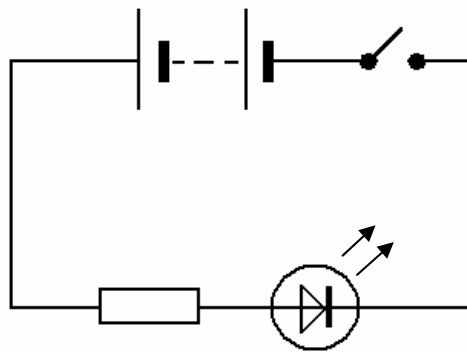
(b) The electrical circuit symbol for a light emitting diode (LED) is shown on the right. LEDs are used in some flashlights (torches).



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(1) (2)

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

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)
