



# Coimisiún na Scrúduithe Stáit State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2012

## SCIENCE – ORDINARY LEVEL

Thursday, 14 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.
4. The use of Formulae and Tables booklet approved for use in the State Examinations is permitted. A copy may be obtained from the examination superintendent.

**Centre Number**

**Examination Number**

\_\_\_\_\_

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

# Biology

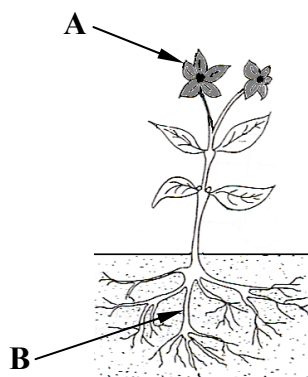
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(1) | (2)

## Question 1

(52)

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



Name **A** \_\_\_\_\_



Name **B** \_\_\_\_\_

- (b) Animals can be classified as **vertebrates** or **invertebrates**.

**Vertebrates** are animals with a

\_\_\_\_\_.

In the table write the letter **V** below  
the example of a **vertebrate**.

 <b>snail</b>	 <b>mouse</b>

- (c) All living organisms have common **characteristics** e.g. respiration.

Give two **other characteristics** of living organisms.

1 \_\_\_\_\_ 2 \_\_\_\_\_

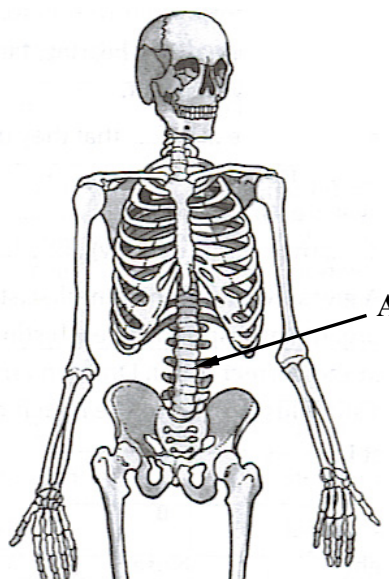
- (d) The diagram shows part of the human skeleton.

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

\_\_\_\_\_

Give one **function** of the skeleton  
in the human body.

\_\_\_\_\_



(e) Human characteristics can be **inheritable** or **non-inheritable**.

Choose a word or words from the table to complete the following statements.

**Inheritable** characteristics are controlled by

\_\_\_\_\_.

An example of an **inheritable** characteristic

is \_\_\_\_\_.

<b>Hormones</b>
<b>Genes</b>
<b>Eye colour</b>
<b>Ability to drive</b>

(f) **Blood** is part of the circulatory system.

Complete the following statements using the correct word(s) from the list on the right.

The **liquid part** of blood is known as

\_\_\_\_\_.

**Oxygen gas** is carried around the body by the

\_\_\_\_\_.

<b>Plasma</b>
<b>Red blood cells</b>
<b>White blood cells</b>
<b>Platelets</b>

(g) **Respiration** is the release of energy from digested food e.g. glucose.

Complete the word equation given below using words from the list on the right.

<b>Water</b>
<b>Oxygen</b>

**Glucose** + \_\_\_\_\_  $\longrightarrow$  **Energy** + **Carbon dioxide** + \_\_\_\_\_.

(h) Answer the following questions on **human reproduction**.

The **fusion** (joining) of the egg with the sperm is called

\_\_\_\_\_.

There are many **methods of contraception**. Name one method.

**Name** \_\_\_\_\_

The **menstrual cycle** lasts about \_\_\_\_\_ days.

(7 × 6 + 1 × 10)

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(1) | (2)

**Question 2**

(39)

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(a) The diagram shows a microscope. Examine the diagram and answer the questions below.

(18)

(1) (2)

	Lamp	
	Arm	
	Eyepiece	
	Focus wheel	
	Base	
	To magnify	
	To focus	
	To hold sample	

(i) In the table:

Write the letter **A** beside the **name** of the part labelled **A**.

Write the letter **B** beside the **name** of the part labelled **B**.

Write the letter **C** beside the **name** of the part labelled **C**.

Write the letter **F** beside the **function** of the part labelled **D**.

(ii) **Name** the part of the microscope that you would place the slide on for viewing.

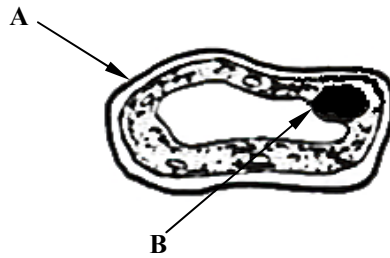
**Name** \_\_\_\_\_

(b) The diagram shows a plant cell.

(15)

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(1) (2)



(i) Name the part of the cell labelled **A** in the diagram.

Name \_\_\_\_\_

(ii) Name the part of the cell labelled **B** in the diagram.

Name \_\_\_\_\_

(iii) Name **one** part found in a plant cell which you would not expect to see in an animal cell.

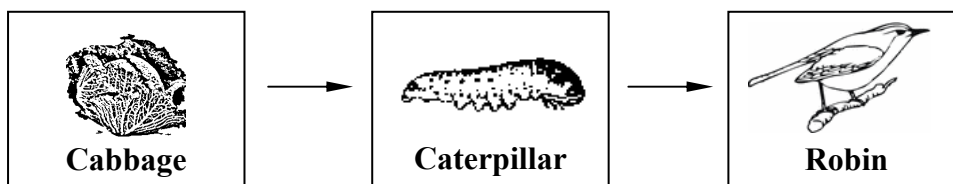
Name \_\_\_\_\_

(iv) Iodine stain is sometimes added to a piece of onion skin when preparing a slide of plant cells.

Why is the iodine used?

\_\_\_\_\_  
\_\_\_\_\_

(c)



Name the **producer** in the food chain shown above. \_\_\_\_\_ (3)

Give **one** example of competition between animals in the habitat that you have studied. (3)

**Example** \_\_\_\_\_

\_\_\_\_\_

**Question 3**

(39)

(a) Humans have five **sense organs**. Complete the table below using the correct word from the list on the right, in each case, so that senses and organs are matched.

One pair has been completed as an example (sight and eyes).

(12)

<b>Sense</b>	Sight	Hearing		Touch		<b>Smell</b> <b>Skin</b> <b>Ears</b> <b>Taste</b>
<b>Organ</b>	Eyes		Nose		Tongue	

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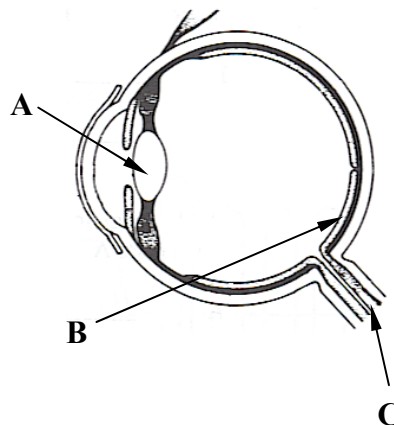
(1) (2)

(b) The diagram shows the **human eye**.

Answer the following questions about the eye.

(12)

**Name** the parts labelled **A** and **B** in the diagram.



**A** \_\_\_\_\_

**B** \_\_\_\_\_

What is the **function** of the part labelled **C** in the diagram?

\_\_\_\_\_

Name the **coloured part** of the eye which controls the amount of light entering the eye.

**Name** \_\_\_\_\_

(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?

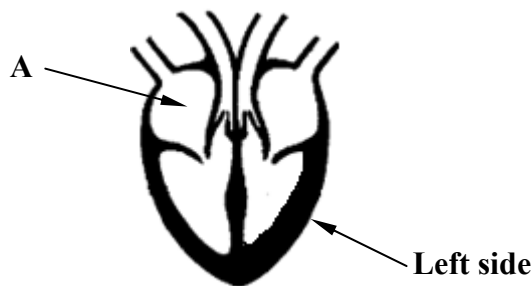
\_\_\_\_\_ beats per minute (bpm).

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)



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**?

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

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# Chemistry

## Question 4

(52)

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(1) (2)

- (a) Some elements are **non-metals**.

In the table write the letter **N**  
beside the names of **two non-metals**.

	<b>Copper</b>
	<b>Nitrogen</b>
	<b>Sulfur</b>
	<b>Magnesium</b>

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



**Name** these two elements.

1 \_\_\_\_\_ 2 \_\_\_\_\_

- (c) Choose an **element** from the list on the right  
whose compounds dissolve in water to cause  
hardness in water.

**Sodium**  
**Calcium**  
**Potassium**

**Element** \_\_\_\_\_

How can hardness be removed from water?

\_\_\_\_\_

- (d) When hydrochloric acid (**HCl**) and sodium hydroxide (**NaOH**) react  
in a neutralisation reaction, a salt and one other substance are formed.

**Name** the salt formed.

**Salt** \_\_\_\_\_

**Name** the other substance formed.

**Substance** \_\_\_\_\_



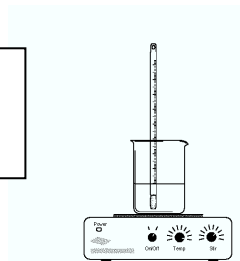


- (e) A student recorded that **30 g of a salt dissolved in 100 cm<sup>3</sup> of water at 40 °C**. Complete the following statement about solubility using a word from the list on the right.

At **80 °C** the solubility of the salt would

\_\_\_\_\_.

**Increase**  
**Decrease**



- (f) Air is a mixture of gases.

In the table write the letter **G** beside the names of **two gases** which are present in **unpolluted air**.

	<b>Oxygen</b>
	<b>Carbon monoxide</b>
	<b>Carbon dioxide</b>
	<b>Sulfur dioxide</b>

- (g) Choose the correct words from the list on the right, in each case, to complete the statements below about bonding.

**Ionic** bonding involves an attraction between positive and negative \_\_\_\_\_.

**Covalent** bonding involves the sharing of pairs of \_\_\_\_\_.

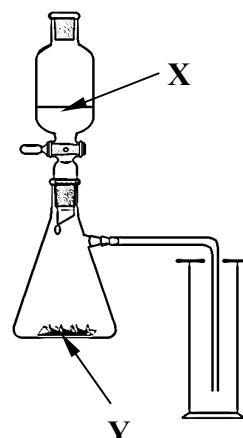
**Protons**  
**Ions**  
**Electrons**  
**Neutrons**

- (h) The diagram shows an arrangement of apparatus suitable for the preparation of **carbon dioxide gas** in a school laboratory.

**Name** a suitable substance for **liquid X** and **solid Y** from which carbon dioxide can be made.

**Liquid X** \_\_\_\_\_

**Solid Y** \_\_\_\_\_



**Limewater** is used to test for the presence of carbon dioxide gas. What happens to limewater when carbon dioxide gas is bubbled through it?

\_\_\_\_\_

(7 × 6 + 1 × 10)

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(1) | (2)

**Question 5**

(39)

(a) Substances can be classified as **elements**, **compounds** and **mixtures**.

(9)

In the table write the letter **C** beside the name of a **compound**.

Write the letter **M** beside the name of a **mixture**.

Write the letter **E** beside the name of an **element**.

	<b>Ink</b>
	<b>Carbon dioxide</b>
	<b>Iron</b>

(b) The diagram shows a separation technique used in the laboratory to separate a mixture of **water and a dissolved dye**.

Examine the diagram. Complete the table correctly **matching** the labels **A – D** in the diagram with the words in the table.

(18)

	<b>Thermometer</b>	
	<b>Round bottomed flask</b>	
	<b>Tripod</b>	
	<b>Bunsen</b>	
	<b>Condenser</b>	
	<b>Beaker</b>	

Name the separation technique shown in the diagram.

Name \_\_\_\_\_

In which labelled part would you expect to find **most of the dye** at the end of the experiment?

\_\_\_\_\_

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(1)

(2)

(c) Describe, with the aid of a labelled diagram, how you would **separate a mixture of sand and water**.

(12)

The headings below may be helpful.

Equipment: \_\_\_\_\_

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Procedure: \_\_\_\_\_

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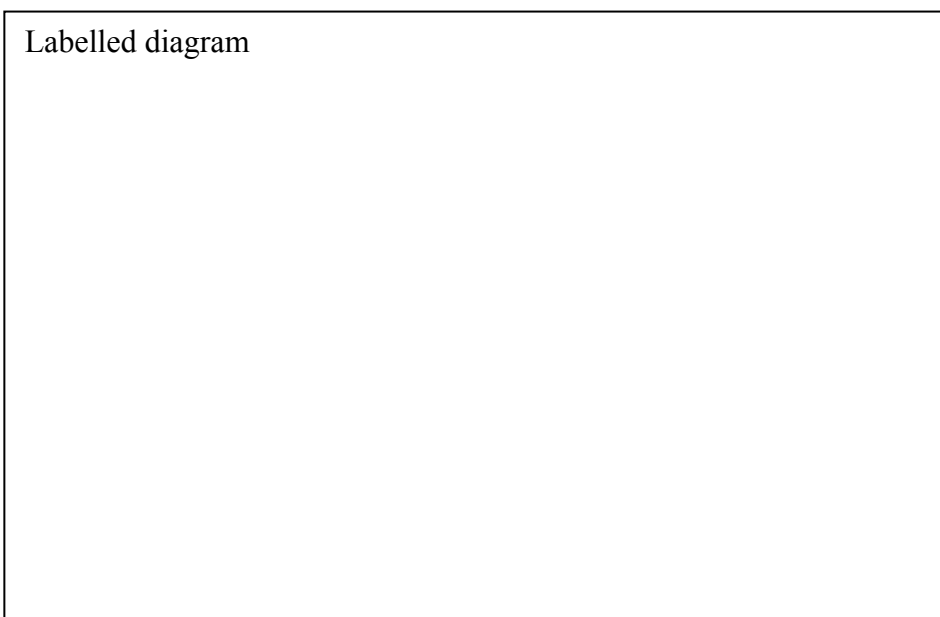
Result: \_\_\_\_\_

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Labelled diagram



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(1)

(2)

**Question 6**

(39)

- (a) **Fossil fuels** are sources of hydrocarbons and can be burned in air. (12)

List two examples of fossil fuels.

1 \_\_\_\_\_ 2 \_\_\_\_\_

Name the two products formed when fossil fuels are burned.

1 \_\_\_\_\_ 2 \_\_\_\_\_

- (b) **Plastics** have many uses in today's world. (6)

Complete the statement below about plastics using the correct word(s) from the list on the right.



Most plastics are made from \_\_\_\_\_.

- Alcohol
- Water
- Crude oil

Most plastics are **non-biodegradable**. What is meant by non-biodegradable?

**Non-biodegradable** \_\_\_\_\_

\_\_\_\_\_

- (c) **Calcium** is a member of the **Group II** elements in the Periodic Table.

- (i) What **name** is given to the Group II elements? (3)

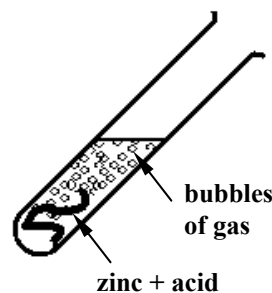
\_\_\_\_\_ metals

- (ii) 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. \_\_\_\_\_

\_\_\_\_\_



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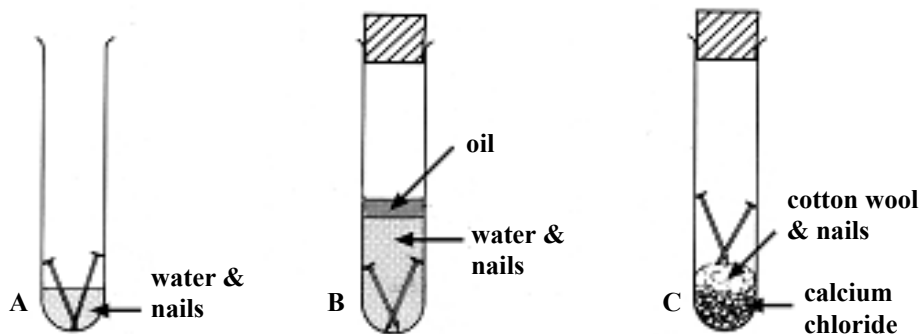
(1) (2)

(d) The diagram shows an apparatus set up by a student to investigate **the rusting of iron nails**. Nails were placed in the test tubes as shown.

After a number of days the nails in test tube **A** only, had a coating of rust.

Answer the following questions about rusting.

(9)



Name **two conditions** necessary for rusting of iron to occur.

1 \_\_\_\_\_ 2 \_\_\_\_\_

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

\_\_\_\_\_  
\_\_\_\_\_

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(1) (2)

# Physics

## Question 7

(52)

- (a) In the table write the letter **F** beside the temperature at which **water freezes**.

	37 °C
	0 °C
	100 °C

In the table write the letter **B** beside the temperature at which **water boils**.

- (b) The picture shows some fireworks.

When a firework is set off at a distance, which is detected **first**, the **sound** of the explosion or the burst of coloured **light** from the fireworks?



**Which?** \_\_\_\_\_

Give a **reason** for your answer.

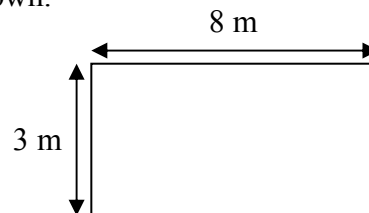
\_\_\_\_\_

- (c) Find the **area** of the rectangular shape shown.

**Area** \_\_\_\_\_

Give the **unit** that is used to measure the area.

**Unit** \_\_\_\_\_



- (d) Sources of energy are either **renewable** or **non-renewable**.

What is meant by **renewable** energy?

\_\_\_\_\_  
\_\_\_\_\_

In the table write the letter **R** below the example of a **renewable** energy source.


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(1) (2)

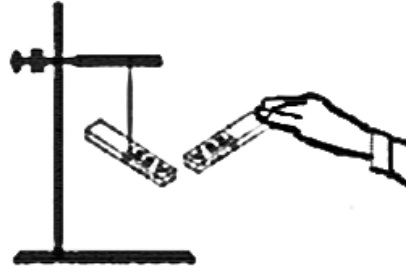
(e) A student brings the **South Pole** of a magnet close to the **South Pole** of a freely suspended magnet.

What happens to the freely suspended magnet?

\_\_\_\_\_

**Name** a metal which is attracted by a magnet.

**Name** \_\_\_\_\_



(f) The diagram shows a battery-powered torch.

**Complete** the two main energy conversions which take place when the torch is in use.



1 \_\_\_\_\_ energy **to** electrical energy.

2 Electrical energy **to** \_\_\_\_\_ energy.

(g) The picture shows a piece of equipment used in the laboratory for measurement.

**Name** the piece of equipment shown.

**Name** \_\_\_\_\_

What is it used to **measure**?

\_\_\_\_\_



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

**Pressure** = \_\_\_\_\_

- Area**  
**Force**

Is the atmospheric pressure at the top of Mount Everest **higher** or **lower** than the pressure at the bottom?

\_\_\_\_\_

**Name** the instrument used to measure pressure.

**Instrument** \_\_\_\_\_

(7 × 6 + 1 × 10)

**Question 8**

(39)

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

(9)

(1) (2)

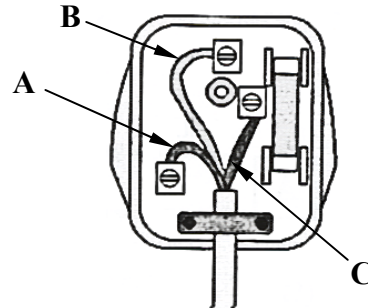
Which labelled wire, **A**, **B** or **C** is the earth wire? \_\_\_\_\_

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** \_\_\_\_\_



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

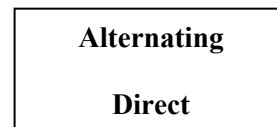
(6)

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

\_\_\_\_\_ current.

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

\_\_\_\_\_ current.



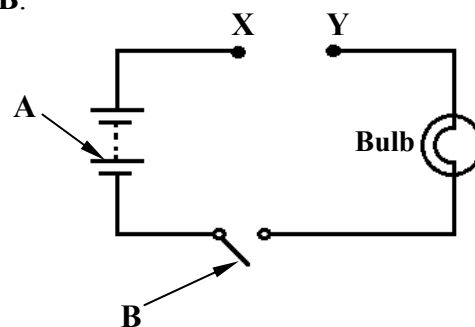
- (c) A student set up a simple electric circuit as shown.

(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** \_\_\_\_\_

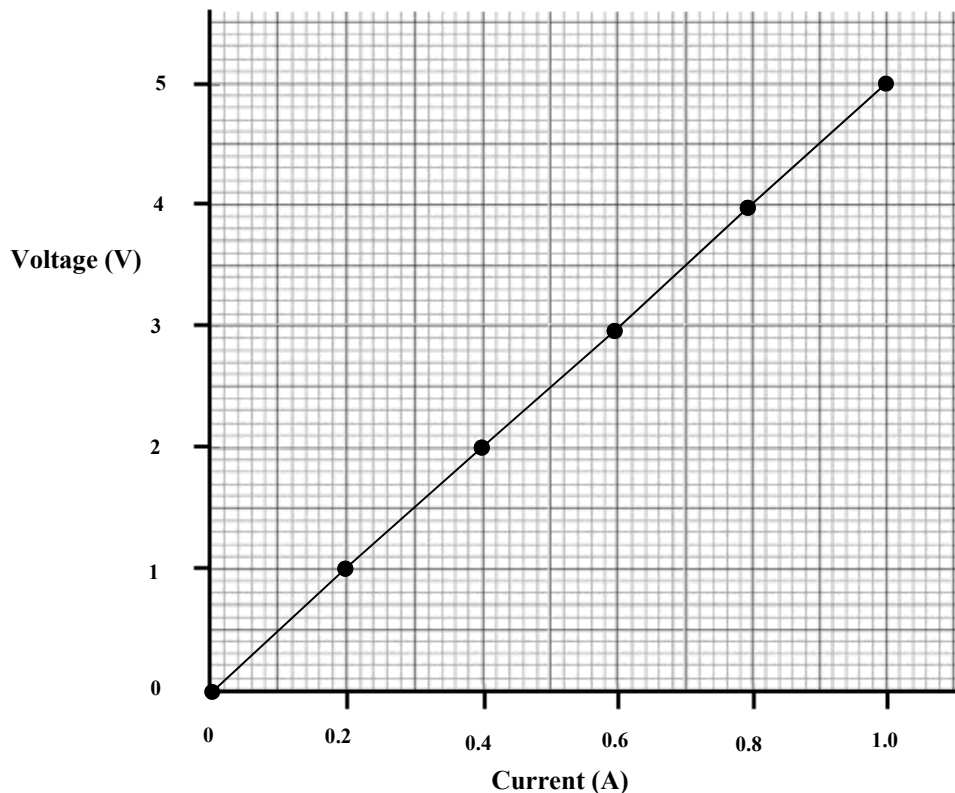


(d) A student carried out an investigation of the **relationship between current flowing through a wire resistor and the voltage across it.**

The data collected is presented in the table below.

<b>Current (A)</b>	0	0.2	0.4	0.6	0.8	1.0
<b>Voltage (V)</b>	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)

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(1) (2)

**Question 9**

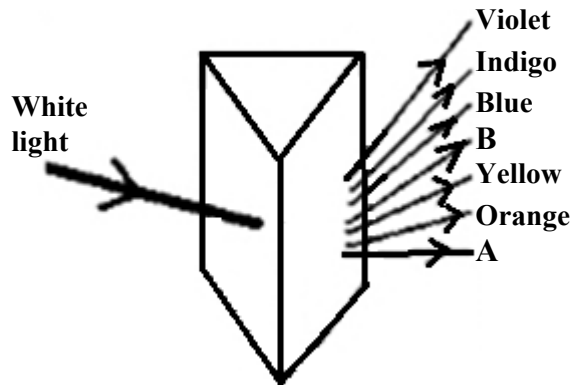
(39)

- (a) A student carried out an investigation to show that white light is composed of different colours. A beam of white light was passed through a prism as shown below.

(6)

(1) (2)

**Name** the colours labelled **A** and **B** in the band of colours formed.



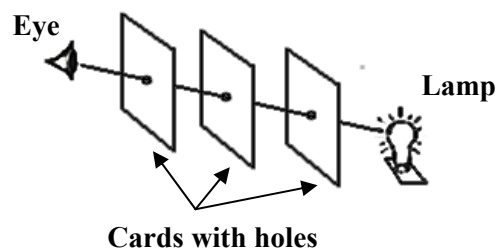
**Colour A** \_\_\_\_\_

**Colour B** \_\_\_\_\_

- (b) A student then carried out another experiment on light as shown in the diagram.

Answer the questions that follow. (6)

What would the student see if the card in the middle is moved sideways?



\_\_\_\_\_

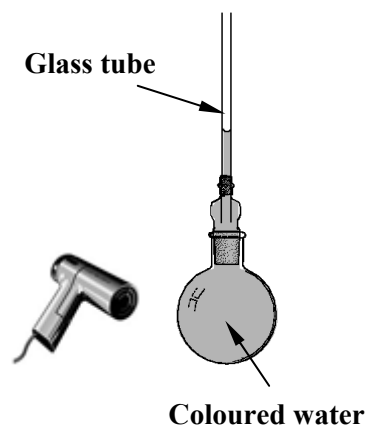
What does this experiment tell us about light?

\_\_\_\_\_

- (c) A student set up a flask full of coloured water as shown. The student heated the flask gently with a hairdryer.

Answer the questions that follow. (9)

What would you expect to notice if the flask is **heated** gently?



\_\_\_\_\_

Why is **coloured water** used in this investigation?

\_\_\_\_\_

A measuring instrument used in the laboratory is based on this behaviour of liquids.

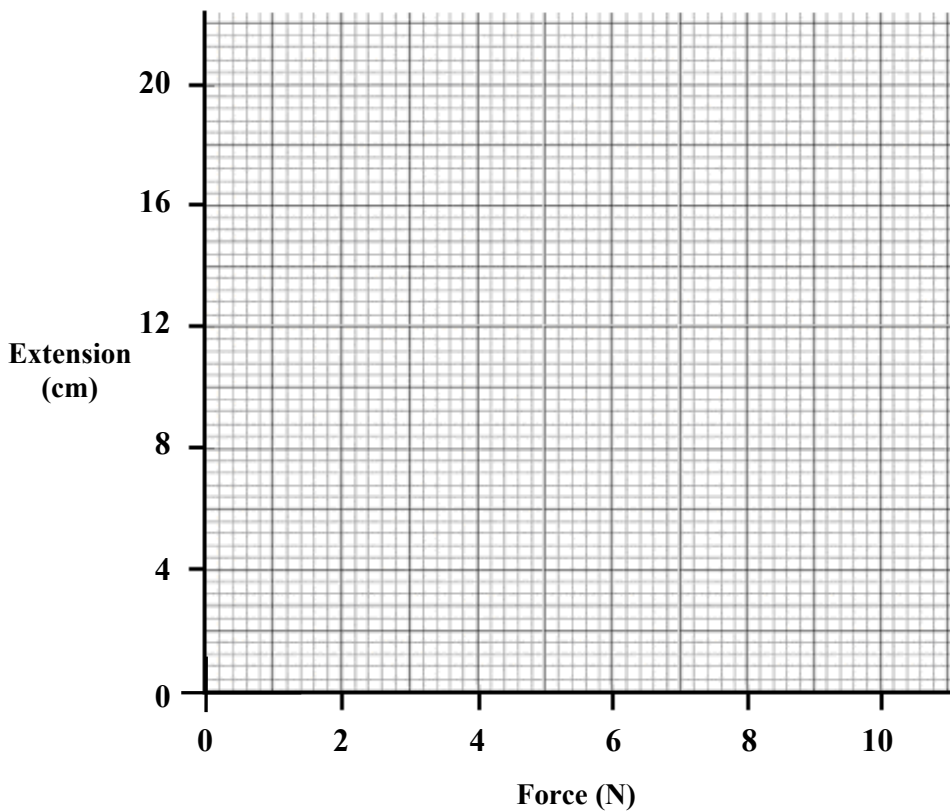
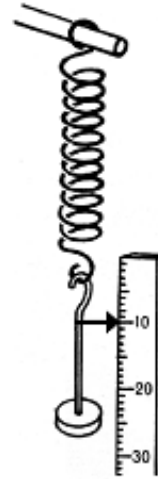
**Name** this instrument. \_\_\_\_\_

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- (d) An investigation was carried out on the **relationship between the extension of a spring and the force applied to it.**

The data collected is presented in the table below. (18)

<b>Force (N)</b>	0	2	4	6	8
<b>Extension (cm)</b>	0	4	8	12	16

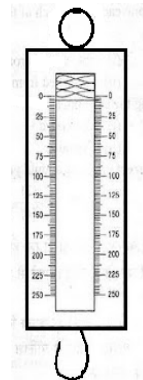


- (i) Use the data in the table to draw a graph of **Extension** ( $y$ -axis) against **Force** ( $x$ -axis) using the grid above.
- (ii) Use the graph to estimate what force results in a 14 cm extension of the spring.

**Force** \_\_\_\_\_ N

- (iii) **Name** the instrument shown on the right that can be used to measure force.

**Name** \_\_\_\_\_



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(1) (2)

