Coimisiún na Scrúduithe Stáit
State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2009

SCIENCE (REVISED SYLLABUS) – ORDINARY LEVEL

THURSDAY, 11 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, there is a blank page 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)	

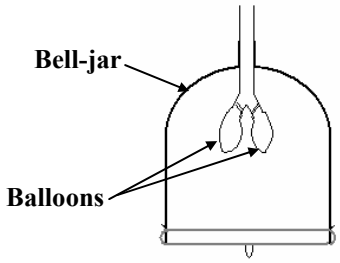
Biology

Question 1 (52)

For examiner use only

(1) | (2)

(*a*) The diagram shows a model of the human breathing system.



Name the part of the breathing system represented by the balloons.

_____

Choose from the list on the right the correct word to complete the sentence below.

Rib cage
Diaphragm

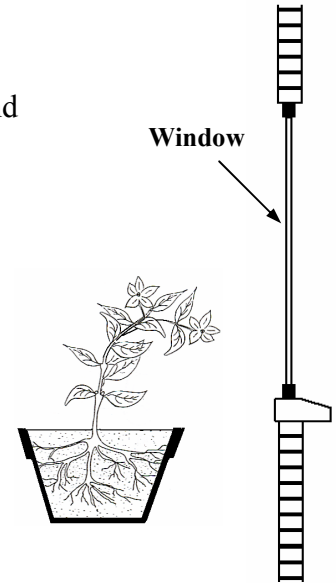
The part of the breathing system represented by the bell-jar is the _____.

(*b*) **Inheritable characteristics** are controlled by genes.

Write the letter **I** beside **two** inheritable characteristics in the table.

	Ability to drive
	Freckled skin
	Tongue rolling
	Ability to knit

(*c*) The diagram shows a plant which was left stand inside a window for a long period.



What caused the plant to grow towards the window?

_____

Name this growth response of plants.

_____

(*d*) In the table write the letter **L** beside the name of an **organ which detects light**.

Write the letter **S** beside the name of an **organ which detects sound**.

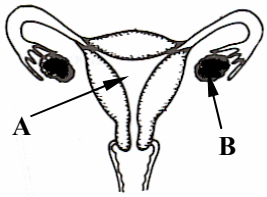
	Brain
	Eye
	Heart
	Ear

(*e*) The diagram shows the **female reproductive system**.

In the table write the letter **A** beside the **name** of the part labelled **A**.

Write the letter **B** beside the name of the **gamete produced** by **B**.

	Egg
	Ovary
	Sperm
	Womb



(*f*) Choose **one vertebrate** and **one invertebrate** from the list of animals on the right.

SNAIL
FROG
THRUSH
EARTHWORM

Invertebrate _____

Vertebrate _____

(*g*) Choose the correct temperature range of human body temperature from the list on the right.

36 – 37 °C

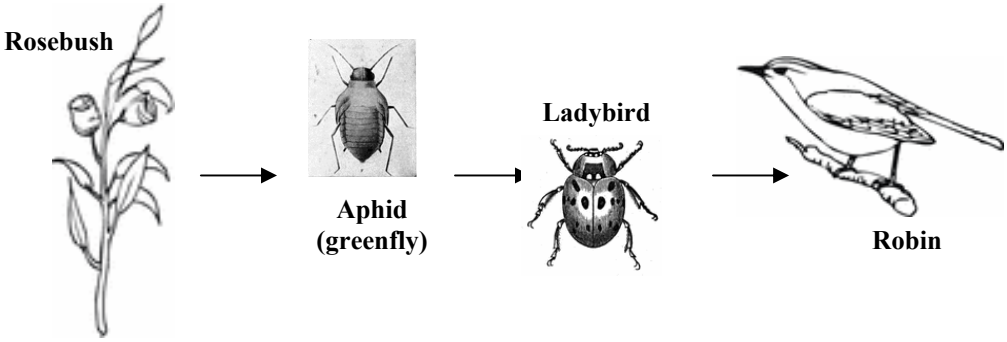
86 – 87 °C

Body temperature _____

Give **one reason** for a change in body temperature.

_____

(*h*) The food chain below relates to a garden habitat. Study it and answer the questions that follow.



Name a **producer** in this food chain. _____

Name a **consumer** in this food chain. _____

Explain how the removal of ladybirds would affect the greenfly population in this habitat?

_____

_____

(7 × 6 + 1 × 10)

For examiner use only

(1) (2)

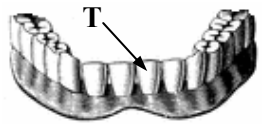
Question 2 (39)

For examiner use only

(1) (2)

(*a*) A tooth is labelled **T** in the diagram.

Write the letter **T** beside the type of **tooth** labelled **T**.



	Canine
	Incisor

Write the letter **F** beside the word on the right which describes the **function** of this type of tooth. (6)

	Chewing
	Biting

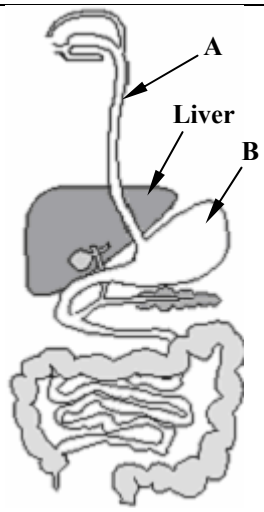
(*b*) The diagram shows the **human digestive system**.
Examine the diagram and answer the questions below.

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 **F** beside the **function** of the part labelled **B**. (9)

	Intestine
	Stomach
	Oesophagus
	Digestion
	Egestion
	Excretion



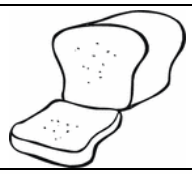
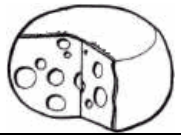
(*c*) Proteins, fats and carbohydrates form part of a balanced diet.

Answer the following questions about food types. (12)

(*i*) In the table write the letter **F** beside a good source of **fat**.

(*ii*) Write the letter **C** beside a good source of **carbohydrate**.

(*iii*) Give **one function** of **fibre** in the diet.

	Bread	
	Carrots	
	Cheese	
	Burger	

_____

_____

(*d*) Photosynthesis is a process by which green plants make food (starch).
Describe an investigation to **show that starch is produced by a photosynthesising plant**.
Use the headings below. (12)

Equipment: _____

_____

_____

_____

Procedure: _____

_____

_____

_____

_____

_____

_____

Result: _____

_____

_____

_____

Labelled diagram

For examiner use only

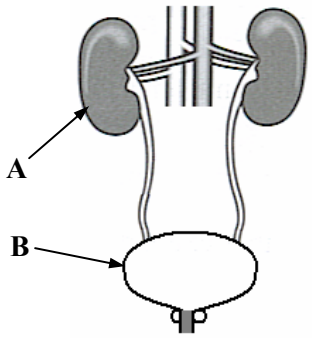
(1) (2)

Question 3 (39)

For examiner use only

(1) (2)

(*a*) The diagram shows part of the human urinary system.
Answer the following questions on the urinary system. (15)



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

Name of part **A** _____

Name of part **B** _____

Give one **function** of part **B**.

_____

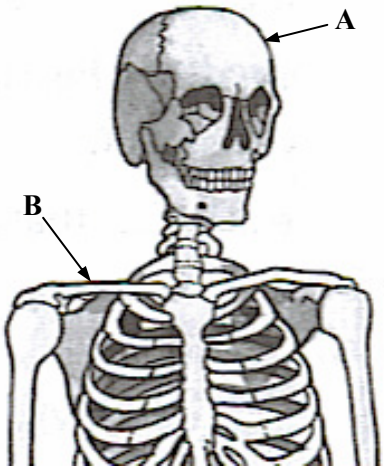
Name the **waste product** produced by part **A**. _____

Name one other **waste product** produced by the human body.

Waste product _____

(*b*) The diagram shows part of the human skeleton.

Answer the following questions on the human skeleton. (12)



Name the bones of the skeleton labelled **A** and **B** in the diagram.

Name of bone **A** _____

Name of bone **B** _____

Give any **two** functions of the human skeleton.

1 _____

2 _____

(*c*) The heart forms part of the circulatory system.

Answer the following questions on the heart and the circulatory system. (12)

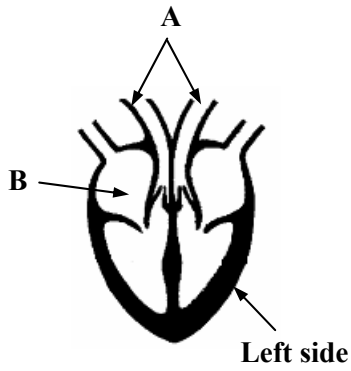
For examiner use only

(1) (2)

The blood vessels labelled **A** in the diagram carry blood **away** from the heart.

Name this type of **blood vessel**.

Name _____



Choose from the list on the right, the name of the small **chamber** of the heart labelled **B** in the diagram.

Ventricle
Atrium

Name _____

Why is the wall of the **left side** of the heart **thicker than** the wall of the **right side**? _____

_____

Chemistry

Question 4 (52)

For examiner use only	
(1)	(2)

(*a*) Write the letter **F** beside the name of a **fossil fuel** in the table.

Write the letter **P** beside a **product** formed when a fossil fuel is burned.

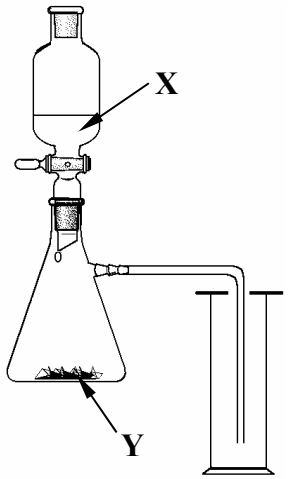
	Coal
	Nuclear
	Oxygen
	Water

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

Name suitable substances **X** and **Y** from which carbon dioxide can be made.

X _____

Y _____

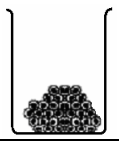
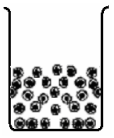
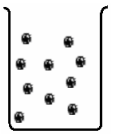


(*c*) The three states of matter are **solid**, **liquid** and **gas**.

The diagram shows the arrangement of particles in the three states of matter.

In the table write the letter **L** beside the arrangement of particles in a **liquid**.

Write the letter **G** beside the arrangement of particles in a **gas**.

(*d*) In each case write the **symbol** of the metallic element beside its name in the table on the right.

	Aluminium
	Copper

(*e*) In the table write the letter **G** beside the name of <u>each</u> of the **<u>two</u> gases** present in **unpolluted air**.

	Carbon dioxide
	Carbon monoxide
	Oxygen
	Sulphur dioxide

(*f*) Plastics are widely used to make bags, bottles, lunchboxes, crates etc.

From which **raw material** are most plastics manufactured?

_____

Plastics can be non-biodegradable i.e. they do not decompose.

Give **one reason** why this affects the environment.

_____

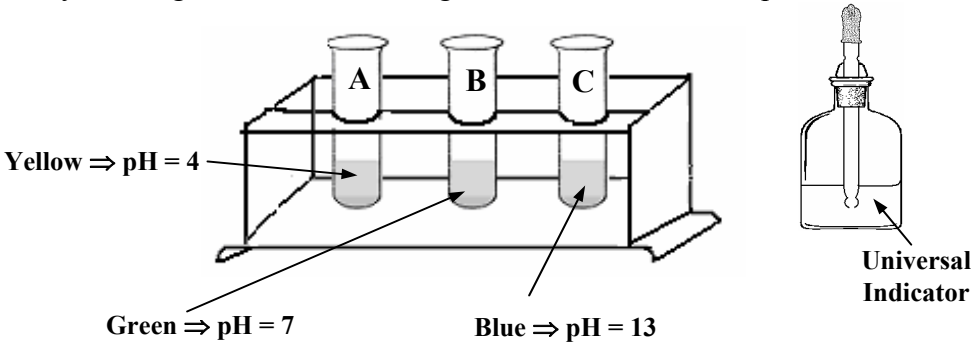
(*g*) Complete the following sentence using the words from the list on the right.

Water is an example of a _____ and

hydrogen is an _____ found in water.

Element
Compound

(*h*) The diagram shows the apparatus set up by a student to investigate **the pH of three different liquids A, B** and **C**.
A few drops of **universal indicator** were added to each liquid in a test tube.
Study the diagram and the results given. Then answer the questions below.



(*i*) Which test tube, **A**, **B** or **C**, contained **distilled water**? _____

(*ii*) Which test tube, **A**, **B** or **C**, contained an **acid**? _____

Give a **reason** for your answer.

_____

_____

(7 × 6 + 1 × 10)

For examiner use only

(1) (2)

Question 5 (39)

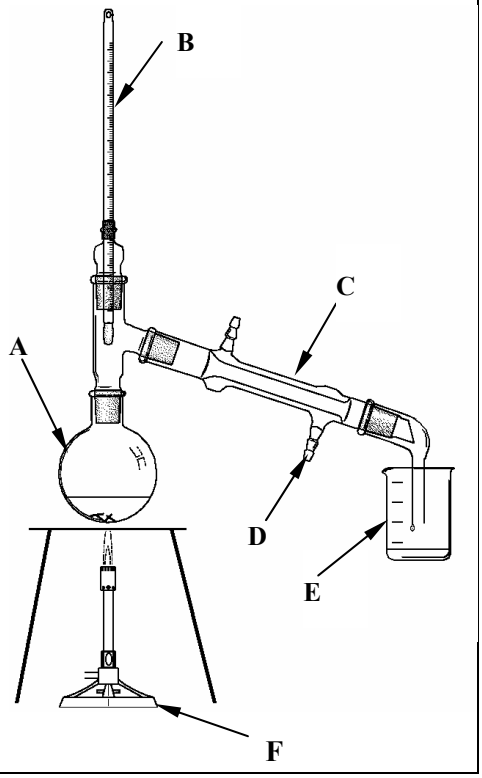
For examiner use only

(1) (2)

(*a*) Separation techniques are very important in chemistry.
The apparatus in the diagram below was used to separate a mixture of **water and a dissolved dye**. Study the diagram.

Complete the table correctly **matching** the labels **A – F** in the diagram with words/phrases in the table. (18)

	Bunsen
	Cold water in
	Condenser
	Beaker
	Thermometer
	Round bottomed flask



What is the **name** given to the separation technique shown in the diagram above? (6)

Technique _____

A colourless liquid was collected in container **E** during the separation.

Name a **substance** you could use to show that this liquid was **water**.

_____ (3)

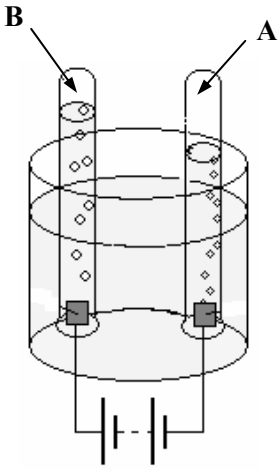
What **colour change** is observed in this test to show that water is present?

_____ (3)

For examiner use only

(1) (2)

(*b*) The apparatus on the right can be used to decompose water by **electrolysis**.



Acid is added to the water to allow an electric current to flow through the water.

Answer the following questions about the electrolysis of water. (9)

Hydrogen gas is collected at **A**.

What **test** could you carry out in the laboratory to show that this gas is **hydrogen**?

_____

_____

Name the gas collected at **B**.

Name _____

Question 6 (39)

For examiner use only

(1) (2)

(*a*) (*i*) Atoms are composed of tiny particles.

Choose the correct **particles** from the list on the right to complete each statement below. (12)

Protons
Electrons
Neutrons

The particles located **outside the nucleus** are the _____.

The particles that have **no electric charge** are the _____.

The particles that have a **positive charge** are the _____.

The particles **lost**, **gained** or **shared** when atoms form bonds are the _____.

(*ii*) Different types of bond can be formed when atoms combine.

What **name** is given to the bond that involves an **attraction between positive and negative ions**? (3)

_____

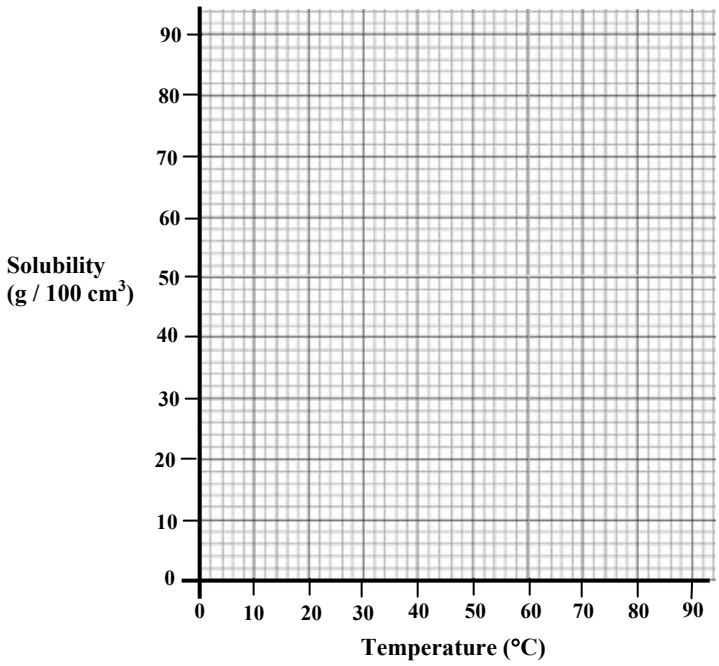
(*b*) In a school laboratory, a student **investigated the solubility of a salt** in water. The amount of salt which dissolved in water at different temperatures was measured. The data collected is presented in the table below.

For examiner use only

(1) (2)

Temperature °C	20	30	40	70	90
Solubility g per 100 cm^3 of water	10	20	30	60	80

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



(*ii*) Use the graph to estimate the solubility at 60 °C. (6)

Solubility at 60 °C _____

(*iii*) What can you **conclude** about the solubility of the salt in water from the graph? _____ (6)

_____

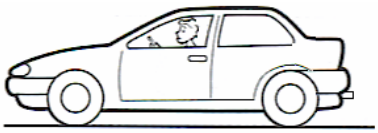
Physics

Question 7 (52)

For examiner use only

(1) (2)

(*a*) Friction can be useful when driving a car.
Name one way in which **friction is useful** when driving a car.



_____

Name one possible way to **reduce friction**.

_____

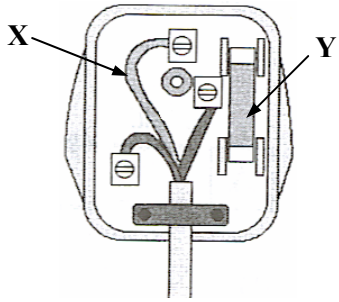
(*b*) The diagram shows a three-pin plug with the back removed.

Name the **green and yellow wire** labelled **X** in the diagram.

Name _____

Name the **device** labelled **Y**.

Name _____



(*c*) A cyclist moves **20 metres** along a track in **4 seconds**.

In the table write the letter **S** beside the **speed** of the cyclist.

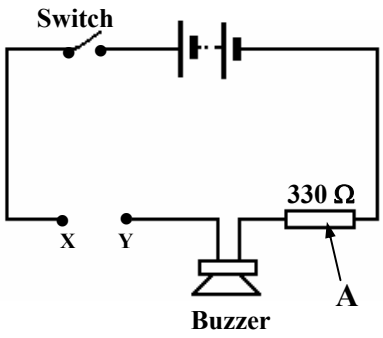
Write the letter **D** beside the **distance** the cyclist will travel in 2 seconds.

	5 m/s
	80 m/s
	10 m
	40 m

(*d*) **Choose** the correct material from the list on the right **to insert in the circuit** between **X** and **Y** so that the buzzer would sound if the switch were closed. _____

Name the component labelled **A** in the circuit. _____

Copper
Wood



For examiner use only

(1) | (2)

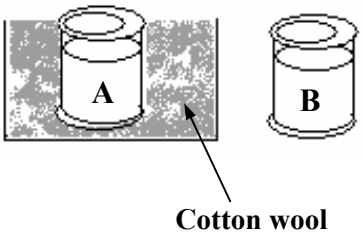
(*e*) The diagram shows a bar magnet.

Draw the **pattern** of the magnetic field you would notice if iron filings or plotting compasses were placed around the bar magnet.

(*f*) In the table write the letter **N** beside **two** forms of **non-renewable energy**.

	Coal
	Oil
	Solar
	Tidal

(*g*) The diagram shows two metal cans equal in size and filled with the same amount of water at 100 °C. Can **A** is wrapped in cotton wool and can **B** has no wrapping.

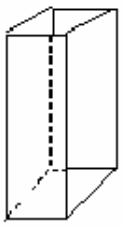


After 15 minutes, which can, **A** or **B**, would you expect to have the **higher** temperature? _____

Give a **reason** for your answer.

_____

(*h*) The mass of a metal block is 14.7 g. It has a volume of 7 cm^3.



Name the instrument you would use in the laboratory to find the **mass** of the block.

Instrument _____

Write the letter **D** beside the value of of the **density** of the block.

Write the letter **U** beside the **unit** used to measure the density.

	2.1
	102.9
	cm^3
	g/cm^3

(7 × 6 + 1 × 10)

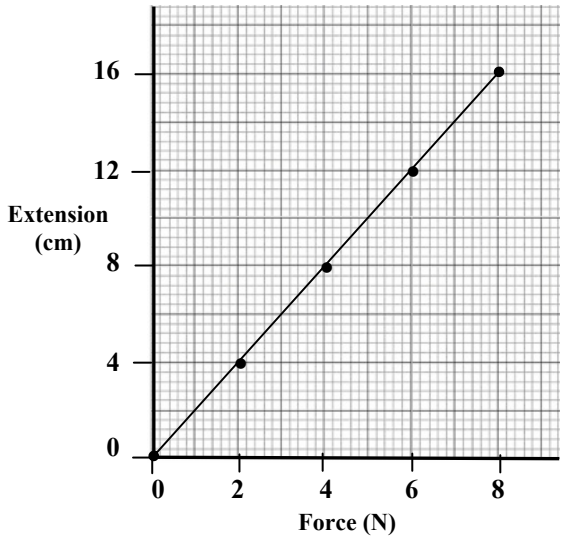
Question 8 (39)

For examiner use only

(1) | (2)

(*a*) A student investigated the **relationship between the extension of a spring and the force applied to it**.
The equipment shown in the diagram was used.
The data collected is shown in the table.
The student then drew the graph shown below.
Answer the questions that follow about this investigation. (18)

Force (N)	0	2	4	6	8
Extension (cm)	0	4	8	12	16



Name an instrument used to measure the force in this investigation.

_____

Describe how the student could have measured the extension of the spring.

_____

_____

_____

What **conclusion** would you draw from this investigation?

_____

_____

For examiner use only

(1) (2)

(*b*) A student set up the apparatus drawn below to **investigate how sound travels through air**.

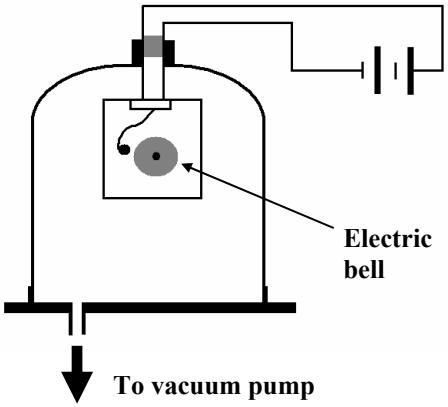
An electric bell was placed inside a bell-jar as shown in the diagram.

The bell rang and it could be heard clearly.

The vacuum pump was then switched on.

The bell could be seen ringing but it made less noise as time passed.

After 5 minutes the bell could no longer be heard but it could still be seen ringing.



(*i*) What **conclusion** could be drawn from these observations? (6)

_____

_____

(*ii*) Even though the bell could still be seen ringing it could not be heard.

What **difference** between light and sound does this show? (6)

_____

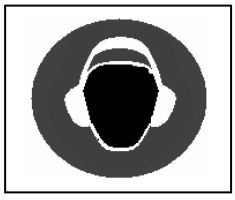
_____

(*c*) The soldier in the diagram has **safety goggles** on his hat.

Give **one reason** why safety goggles should be used in the laboratory. (3)

_____

The sign on the right is found displayed at shooting ranges and in many factories.



What **instruction** does this sign give? (3)

_____

Why is it important to obey the instruction given by this sign? (3)

_____

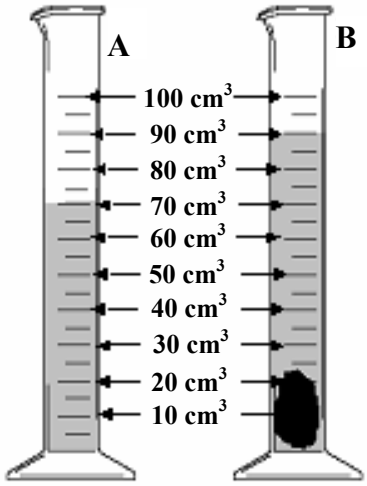
Question 9 (39)

For examiner use only

(1) (2)

(*a*) A student set up the equipment shown to **measure the volume of an irregular shaped object** e.g. a stone.

Answer the questions below about this experiment. (9)



Name the piece of glassware **A** drawn in the diagram.

_____

Study the diagram. When the stone was carefully dropped into **A** arrangement **B** resulted.
Calculate the volume of the stone from the information shown.

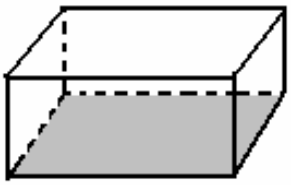
Volume of stone _____ cm^3

(*b*) Answer the following questions about pressure. (9)

(*i*) **Complete** the equation in the box below using the words on the right.

Pressure = _____	**Area** **Force**

(*ii*) If a metal block applies a force of 20 N on an area of 5 cm^2, find the pressure being applied by the block.



Pressure = _____ N / cm^2

(*c*) An electric kettle has a power rating of 2 kW.

The kettle is used for a total of 2 hours each day.

How many **units** of electricity (kWh) are used each day? _____

If electricity costs **12 cent** per unit how much does this cost? (9)

_____ cent

(*d*) Describe, with the help of a labelled diagram, how you could carry out an **experiment** to show that **metals expand when heated**.

Use the headings below. (12)

Equipment: _____

_____

_____

_____

Procedure: _____

_____

_____

_____

_____

_____

_____

Result: _____

_____

_____

_____

Labelled diagram

For examiner use only

(1) | (2)

EXTRA WORK SPACE

Indicate clearly the number and part of the question(s) you are answering.

For examiner use only	
(1)	(2)