Coimisiún na Scrúduithe Stáit
State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2014

SCIENCE – ORDINARY LEVEL

THURSDAY, 12 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.
4. The use of the *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**
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)	
Bonus for Irish	
Grand Total (Paper) (390)	
Coursework A (60)	
Coursework B (150)	
Grand Total (600)	

Biology

For examiner use only	
(1)	(2)

Question 1 (52)

(*a*) The picture shows the teeth of a fox.

Name the **large pointed teeth** at the front of the fox's mouth.

Name _____

What is the function of this type of tooth?

Function _____

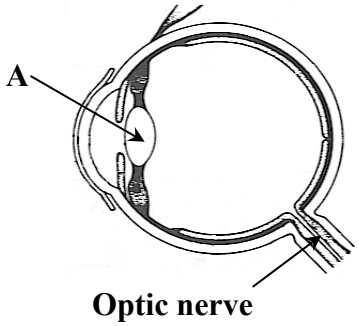
(*b*) Blood contains white blood cells, red blood cells and platelets.

In the table write the letter **O** beside the part of the blood that **carries oxygen**.

Write the letter **F** beside the part of the part of the blood that **fights infection**.

	Red blood cells
	Platelets
	White blood cells

(*c*) The diagram shows the structure of the eye.



Name the part labelled **A**.

Name _____

What is the function of the **optic nerve**?

_____

(*d*) Starch is a carbohydrate found in many foods.

In the table write the letter **S** beside the **names** of two foods that contain a lot of starch.

	Milk
	Bread
	Chicken
	Potato

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(1) (2)

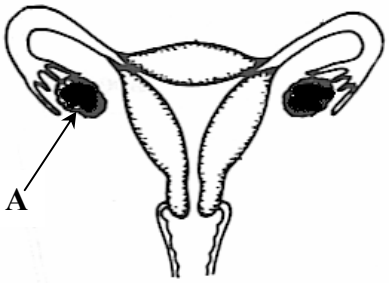
(*e*) The picture shows an agar plate containing micro-organisms.

Give **two examples** of micro-organisms.

1 _____

2 _____

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



Name the part labelled **A**.

Name _____

Name the **female gamete** (sex cell) produced here.

Name _____

(*g*) Plants disperse their seeds in different ways.

Name one plant that disperses its seeds using **wind**. _____

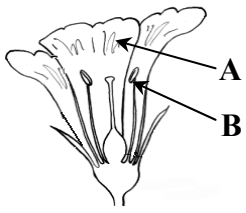
Name **one other method** of seed dispersal. _____

(*h*) The diagram shows the parts of a flower.

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

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

	Petal
	Stamen
	Carpel



State one **function** of the part labelled **B** in the diagram.

_____

(7 × 6 + 1 × 10)

Question 2 (39)

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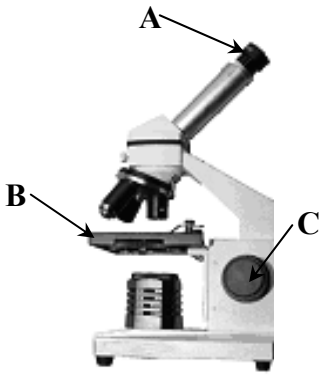
(1) (2)

(*a*) A student was asked to look at some onion cells using a light microscope. (18)

Name the part labelled **A** that you look through.
Name _____



On which labelled part would you place the slide? _____

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

_____

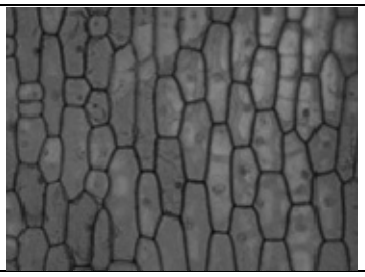
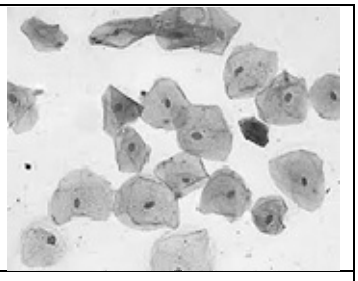
Part **A** has a magnification of **10** and the objective lens has a magnification of **40**.

In the table write the letter **T** beside the **total magnification**.

	50
	400

The images below show two different types of cell as seen using a light microscope.

Write the letter **P** below the image of the plant cells.

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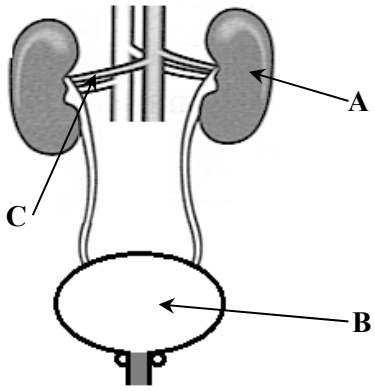
(1) (2)

(*b*) The diagram shows the urinary system. (12)



Choose the correct word from the list on the right for the parts labelled **A** and **B**.

Lung
Kidney
Bladder
Liver

A _____

B _____

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

Function _____

Choose the correct word from the list on the right to name the artery labelled **C** in the diagram.

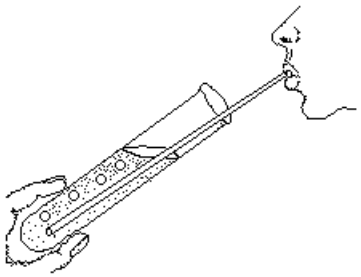
C is the _____ artery.

Renal
Pulmonary

(*c*) Carbon dioxide is released from our excretory system. (9)

Name the liquid solution you would use to show that carbon dioxide is present in exhaled air.

Name _____



What happens to the colour of this liquid if carbon dioxide is bubbled through it as shown in the diagram?

_____

_____

Question 3 (39)

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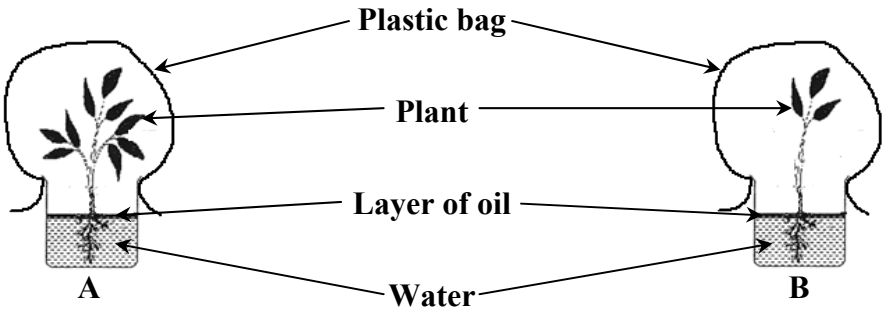
(1) (2)

(*a*) Water evaporates from the surface of a leaf during **transpiration**. A student set up the experiment shown to investigate transpiration. (12)



What will happen to the level of water if transpiration occurs?

_____

Why is a layer of oil added?

_____

In which plant, **A** *or* **B**, would you expect more transpiration to occur? Give a reason for your answer.

Answer _____

Reason _____

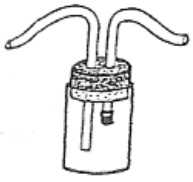
(*b*) The diagram shows a pooter that can be used in the study of a habitat. (9)

Explain how you would use a pooter in the study of a habitat.

_____

_____

_____



Pooter

Name one other piece of equipment that can be used in the study of a habitat.

_____

(*c*) The diagram shows part of the human skeleton. (18)

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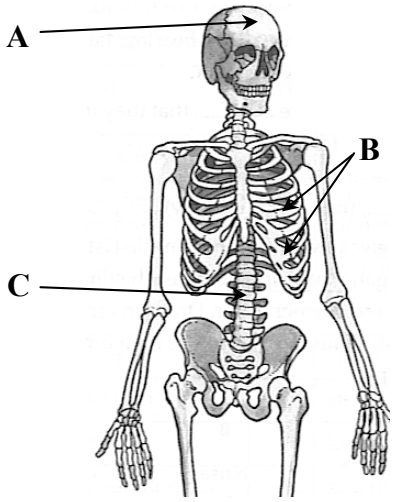
(1) (2)

(*i*) Name the parts labelled **A**, **B** and **C**.



A _____

B _____

C _____

(*ii*) One of the main functions of the skeleton is protection.

Name the part of the body that is protected by part **A** of the skeleton. _____

State one other **function** of the skeleton.

_____

_____

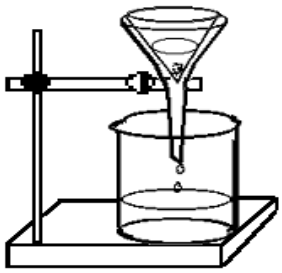
Chemistry

For examiner use only

(1) (2)

Question 4 (52)

(*a*) Name the method of separation shown on the right.



Name _____

Name a mixture that could be separated using this method.

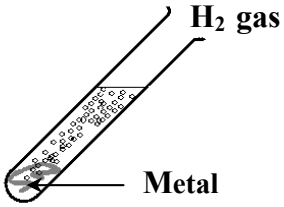
Mixture _____

(*b*) This carrier bag is made of plastic. Give one **advantage** and one **disadvantage** of plastic.

Advantage _____

Disadvantage _____

(*c*) The diagram shows the reaction of a metal in hydrochloric acid.



Name a **metal** which will react with the acid to produce hydrogen gas (H_2).

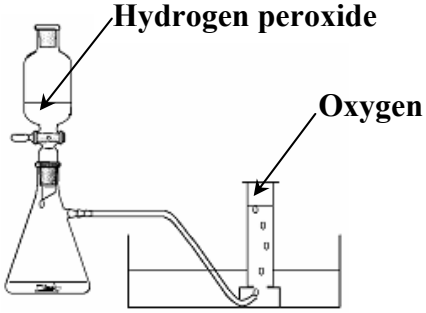
Metal _____

What is the test for hydrogen gas? _____

_____

(*d*) Oxygen gas can be made in the laboratory.

Hydrogen peroxide is dropped onto a black solid which acts as a **catalyst**.



In the table below write the letter **C** beside the **catalyst** used to prepare oxygen.

	Sodium chloride
	Manganese dioxide

For examiner use only

(1) (2)

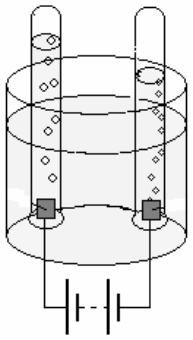
(*e*) Which gas listed in the table on the right is the main component of **natural gas**? _____

Nitrogen
Methane

Which gas listed in the table on the right is an **element**?

_____

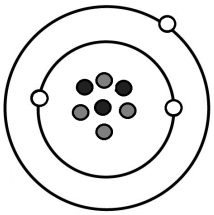
(*f*) The diagram shows the breakdown of water by **electrolysis**. Two gases are produced, hydrogen and oxygen.



What is the **chemical formula** for water? _____

Which gas, **hydrogen** *or* **oxygen**, is produced in a greater volume in this experiment? _____

(*g*) The atom on the right contains three types of particle: protons, neutrons and electrons.



Name the particle in the atom that is found **outside** the nucleus. _____

Name the particle in the atom that has **no charge**.

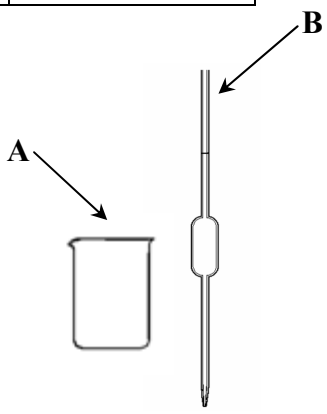
_____

(*h*) The pieces of equipment below can be used to measure the volume of liquids in the laboratory.

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

Write the letter **B** beside the name of the piece of equipment labelled **B**.

	Beaker
	Burette
	Pipette



Which piece of equipment, **A** *or* **B**, will give the most accurate volume of liquid? _____

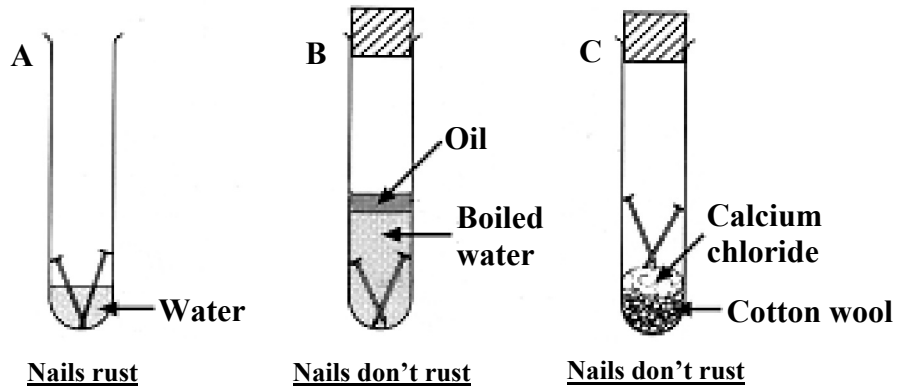
($7 \times 6 + 1 \times 10$)

Question 5 (39)

For examiner use only

(1) (2)

(*a*) In a school laboratory a student investigated the rusting of iron nails as shown in the diagram. Study the diagram and answer the questions that follow. (21)



Nails rust | Nails don't rust | Nails don't rust

	Al
	Fe
	Au

(*i*) In the table write the letter **I** beside the symbol for iron.

(*ii*) What is the purpose of the **calcium chloride** in test tube **C**?

_____

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

_____

Why is **boiled water** used in test tube **B**?

_____

The nails in test tube **A** rusted after a few days. Explain why.

_____

_____

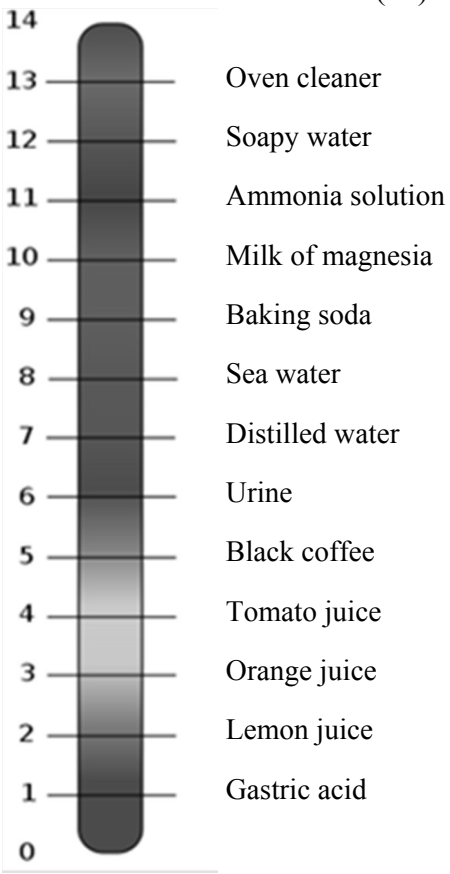
(*iii*) Name one **method** of preventing the rusting of the iron gate shown in the picture.

_____

For examiner use only

(1) (2)

(*b*) The diagram shows the pH of a number of everyday liquids. Study the diagram and answer the questions below. (18)



(*i*) Which liquid, **black coffee** *or* **ammonia solution** is more acidic?

_____

(*ii*) Name a liquid shown in the diagram which is a **base**.

_____

(*iii*) Name the **neutral** liquid shown in the diagram.

_____

(*iv*) Heartburn is caused by gastric acid found in the stomach. Milk of magnesia is a medicine that can be taken to relieve heartburn.

In the table write the letter **R** beside the type of chemical reaction which occurs between the milk of magnesia and the gastric acid.

	Distillation
	Neutralisation

(*v*) Acids are corrosive substances. Write down one safety **precaution** that should be taken when dealing with acids in the laboratory.

Precaution _____

_____

Question 6 (39)

For examiner use only

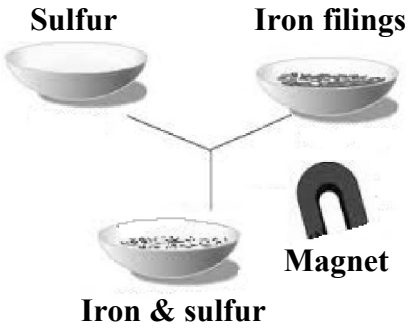
(1) (2)

(*a*) Sulfur is an element in the periodic table. (15)

(*i*) Is sulfur a **metal** or a **non-metal**? _____

(*ii*) What **colour** is sulfur? _____

(*iii*) When sulfur is mixed with iron filings, a mixture is formed. What would happen if you brought a **magnet** close to the **mixture**?



_____

_____

_____

(*iv*) When the mixture of iron filings and sulfur is heated, a chemical reaction occurs and a new compound is formed.
What would happen if you brought a **magnet** close to the **compound**?

_____

_____

(*b*) Water is treated for domestic use. (12)

Choose from the list on the right the substance which is added to water to help prevent tooth decay.

Oxide
Fluoride
Sulfide

Substance _____

What is the purpose of adding chlorine to water?

Purpose _____

Name an element of Group 2 whose compounds cause hardness in water.

Name _____

(*c*) Describe, with the aid of a labelled diagram, how you would **use the soap test to find out which of two samples of water has more hardness**. (12)

Labelled diagram

Equipment: _____

_____

_____

_____

Procedure: _____

_____

_____

_____

_____

_____

_____

Result: _____

_____

_____

_____

For examiner use only

(1) (2)

Physics

For examiner use only

(1) (2)

Question 7 (52)

(*a*) Choose the correct words from the list on the right to complete the following formula.

Time
Mass
Distance

Speed = [ ] ÷ [ ]

(*b*) A man measured a room for a new carpet. The room measured **5 m** long and **4 m** wide.

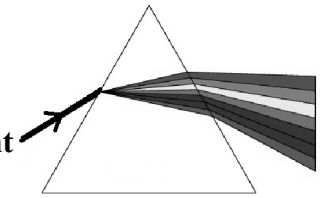
Name an instrument the man could have used to measure the length and the width of the room.

Instrument _____

Calculate the area of the room in m^2.

Area _____ m^2

(*c*) A beam of white light is passed through a triangular block of glass and produces a spectrum of colours as shown in the diagram.



Name this triangular block of glass.

Name _____

What does this experiment tell you about white light?

_____

(*d*) The instrument in the picture on the right is used to measure temperature. **Name** this instrument.

_____

From the list on the right, choose the temperature at which water boils.

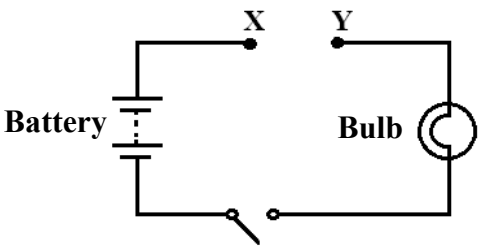
0 °C
100 °C
200 °C

_____

For examiner use only

(1) (2)

(*e*) A circuit was set up to test for materials that conduct electricity. Different materials were placed between **X** and **Y** in the circuit shown and the switch was closed.



How would you know that a substance conducted electricity?

_____

Name a material that conducts electricity.

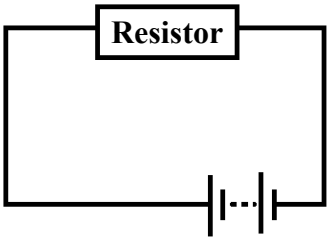
Name _____

(*f*) Fossil fuels are non-renewable sources of energy. **Name** two fossil fuels.

Fossil Fuel 1 _____

Fossil Fuel 2 _____

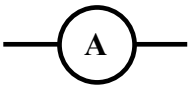
(*g*) A current of **6 A** flows through a resistor when a **12 V** battery is placed across it.



Calculate the resistance of the resistor.

Resistance _____ Ω

Name the instrument that is often given the symbol on the right and that is used to measure electric current.

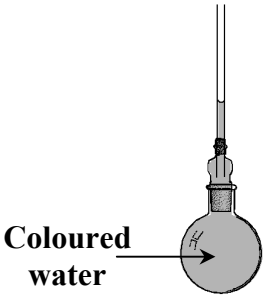


Name _____

(*h*) The diagram shows a flask of coloured water with a glass tube. Name an instrument you would use in the laboratory to heat the flask gently.

Instrument _____

What would you expect to notice about the **level of water** in the glass tube after the flask has been heated gently for 5 minutes?



Observation _____

What can you conclude from this experiment?

Conclusion _____

(7 × 6 + 1 × 10)

Question 8 (39)

For examiner use only

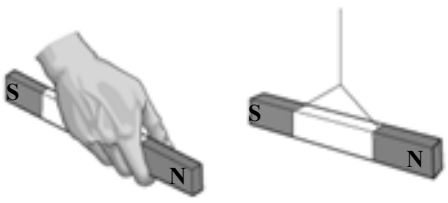
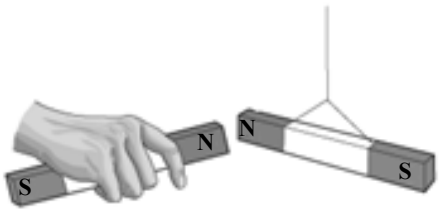
(1) (2)

(*a*) The diagram shows a magnet hanging from a wooden stand. The magnet is free to turn. (9)

(*i*) Why is a wooden stand used?

_____

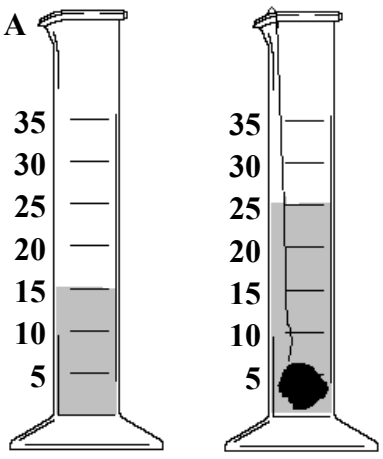
(*ii*) A second magnet was brought close to the hanging magnet, as shown below.

In the table above write the letter **R** under the picture where the hanging magnet will be **repelled**.

Write the letter **A** under the picture where the hanging magnet will be **attracted**.

(*b*) The diagram shows the pieces of equipment used to measure the volume of a stone which has a mass of **20 g**. (12)



(*i*) Name the piece of equipment labelled **A**.

Name _____

(*ii*) What is the volume of the stone?

Volume = _____ cm^3

(*iii*) Calculate the density of the stone in g/cm^3.

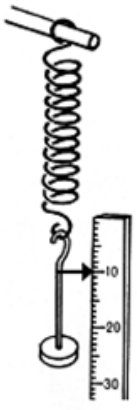
Calculation

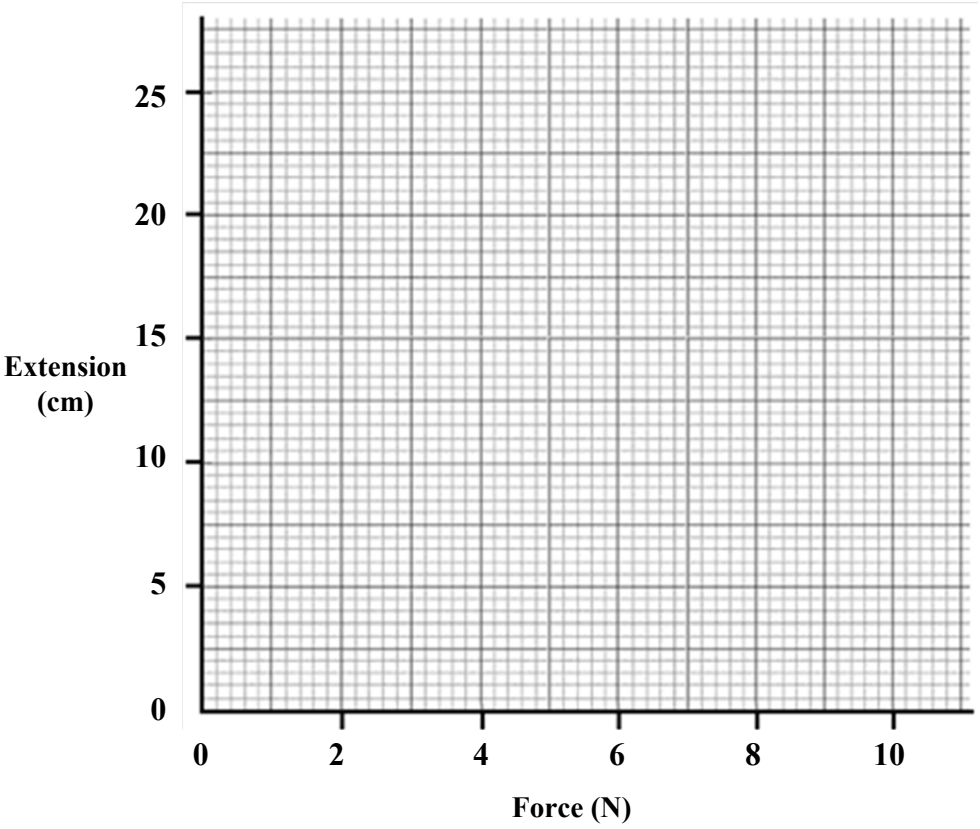
For examiner use only

(1) | (2)

(*c*) The equipment shown was set up and used to investigate the **relationship between the extension of a spring and the force applied to it**.
The data collected are presented in the table below. (18)

Force (N)	2	4	6	8	10
Extension (cm)	5	10	15	20	25





(*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 the extension if a force of 3 N is applied to the spring.

Extension _____ cm

(*iii*) What would happen if too large a force is applied to the spring?

_____

_____

Question 9 (39)

For examiner use only

(1) | (2)

(*a*) Felix Baumgartner set the world record for skydiving when he jumped from an altitude of 39 km above the Earth. (15)

(*i*) Name the force which caused him to fall to Earth.

Force _____

(*ii*) Choose the correct words from the list on the right to complete the following statement.

As Felix was falling _____ energy was being converted into _____ energy.

Kinetic
Chemical
Potential
Nuclear

(*iii*) Does Felix expect the atmospheric pressure to **increase** *or* **decrease** as he is falling to Earth? _____

(*b*) Electricity is available in alternating current (**a.c.**) and direct current (**d.c.**). (9)

(*i*) Does the toaster draw **a.c.** *or* **d.c.** when it is plugged in and switched on?

_____

(*ii*) The three-pin plug of a toaster contains a fuse. Write the letter **F** beside the name of the wire that contains a fuse.

	Live
	Earth
	Neutral

(*iii*) Write the letter **V** beside the voltage of the mains electricity supply.

	12 V
	230 V

For examiner use only

(1) (2)

(*c*) Sound is a form of energy. Answer the following questions about sound. (15)

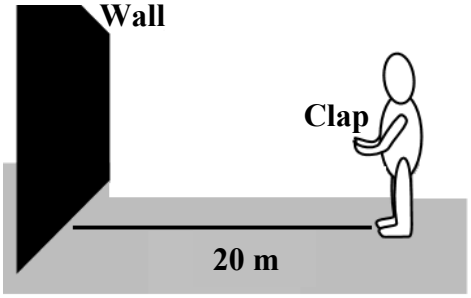
(*i*) During a hurling match a player hit the sliotar (ball). From a distance, there is a delay between **seeing the strike** and **hearing the sound**.

What does this tell you about the **difference** between light and sound?

_____

_____

(*ii*) Study the diagram shown and explain how an echo is produced from the clap.



_____

_____

(*iii*) When a guitar is played sound is produced.

In the table write the letter **M** beside the word which describes the movement of the guitar strings.

	Distillation
	Vibration
	Convection

(*iv*) What effect can exposure to loud music have on a person's hearing?

Effect _____

_____

EXTRA WORK SPACE

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

For examiner use only	
(1)	(2)