



Coimisiún na Scrúduithe Stáit State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2011

SCIENCE – ORDINARY LEVEL

THURSDAY, 16 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

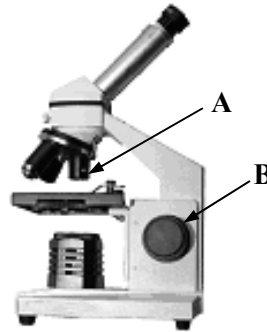
(52)

For examiner use only

(a) The diagram shows a microscope.

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

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



	Magnifying
	Focusing

(1) (2)

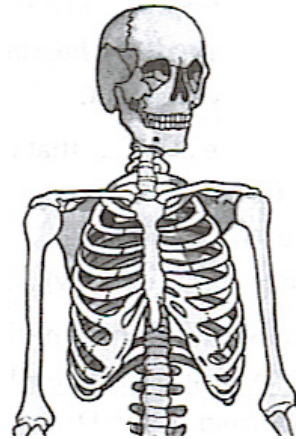
(b) The human skeleton **protects** body organs.

Name one organ protected by the ribcage.

Organ _____

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

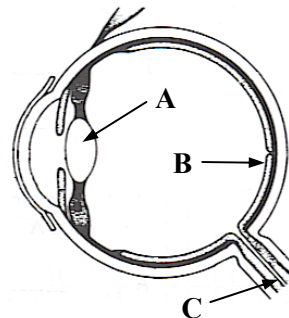
Function _____



(c) The diagram shows the human eye.

Name the part labelled **A**.

At which of the points **A**, **B** or **C** does the image form?



(d) The diagram shows the **male reproductive system**.

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

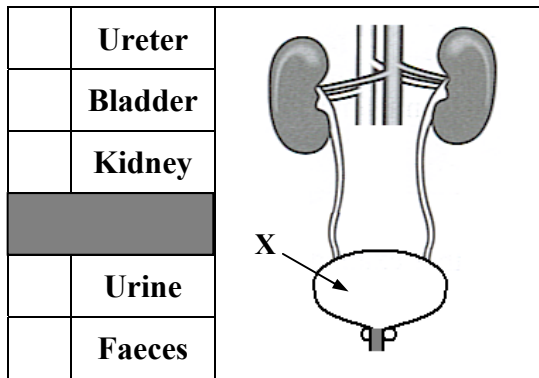
Write the letter **B** beside the name of the **gamete produced** by **B**.

	Penis	
	Ovary	
	Sperm	
	Egg	

(e) The diagram shows the urinary system.

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

Write the letter **W** beside the name of the **waste** stored by **X**.



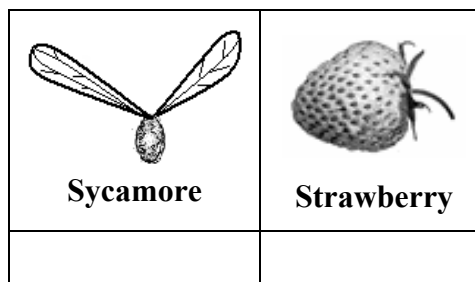
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(1) (2)

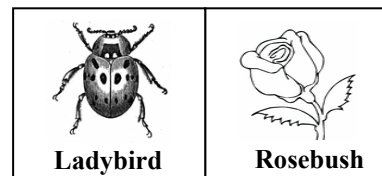
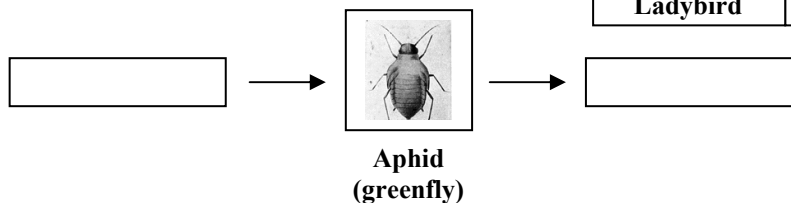
(f) Seeds are dispersed in different ways.

Write the letter **A** below the example on the right whose seeds are dispersed by **animals**.

Write the letter **W** below the example on the right whose seeds are dispersed by **wind**.



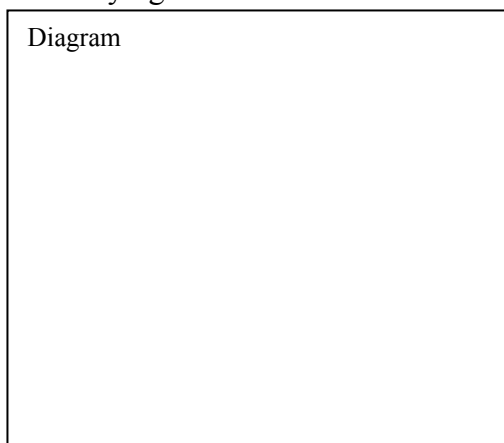
(g) Choose the correct organism from the list on the right to complete the food chain below.



(h) Draw a diagram of a piece of equipment used by you to collect or trap insects or small animals when you were studying a habitat.

Name the piece of equipment.

Explain how it was set up or used.

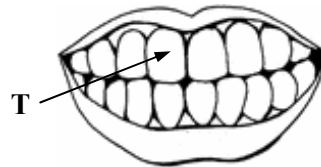


(7 × 6 + 1 × 10)

Question 2

(39)

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



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

Write the letter **F** beside the **function** of this type of tooth. (6)

	Incisor
	Molar
	Chewing
	Biting

(b) The diagram shows the **human digestive system**.

Examine the diagram and answer the questions below. (9)

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**.

	Intestine	
	Mouth	
	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 **S** beside a good source of **starch**.

(iii) Write the letter **C** beside the chemical used to test for **starch**.

	Potatoes	
	Chicken	
	Cheese	

	Iodine solution
	Benedict's solution

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(1) (2)

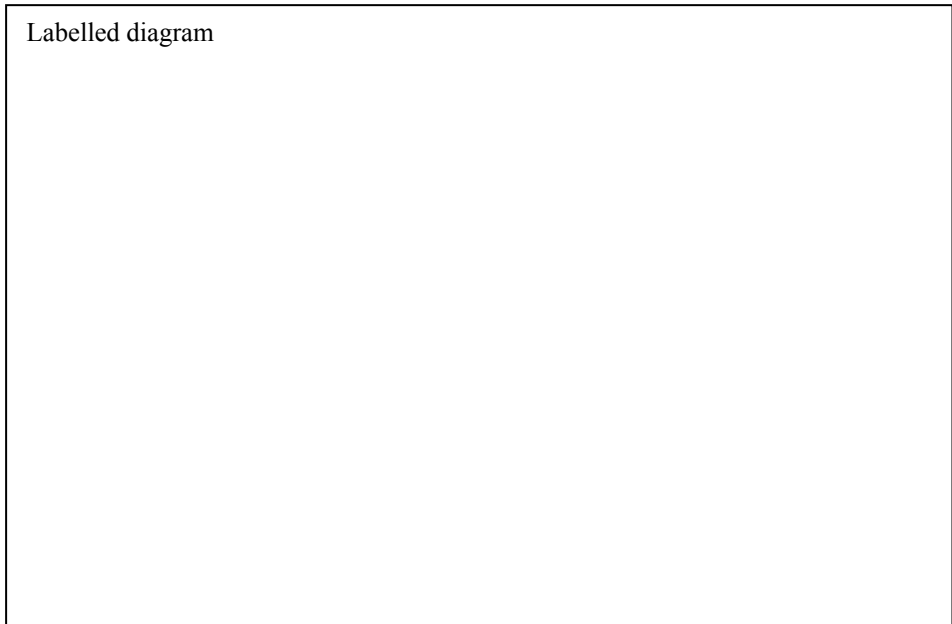
- (d) Food (e.g. a peanut or crisps) is a store of chemical energy.
Describe, with the help of a labelled diagram, an investigation to
show the conversion of chemical energy in a food to heat energy. (12)
The headings below may be helpful.

Equipment: _____

Procedure: _____

Result: _____

Labelled diagram



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use only

(1) | (2)

Question 3

(39)

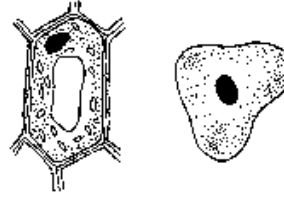
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(a) Cells are an important structure in living things.

A list of the parts of cells is given below.

Answer the following questions about plant and animal cells.

(15)



Which part forms the **outer part of plant cells**?

Which part forms the **outer part of animal cells**?

Name a part found in **plant cells only**.

Which part **controls the activities and reproduction** of the cell?

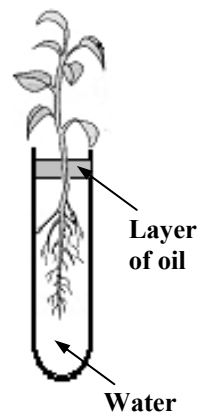
- CELL WALL
- CYTOPLASM
- VACUOLE
- NUCLEUS
- CELL MEMBRANE
- CHLOROPLAST

(b) The diagram shows an investigation to study water movement in plants. Answer the following questions.

(9)

What would you expect to happen to the level of water in the test tube after a few days?

Which part of the plant takes in the water?



Choose a word from the list on the right, to correctly complete the statement below.

The layer of oil is used to prevent

_____ of water from the test tube.

- Condensation
- Evaporation
- Contamination

(1) (2)

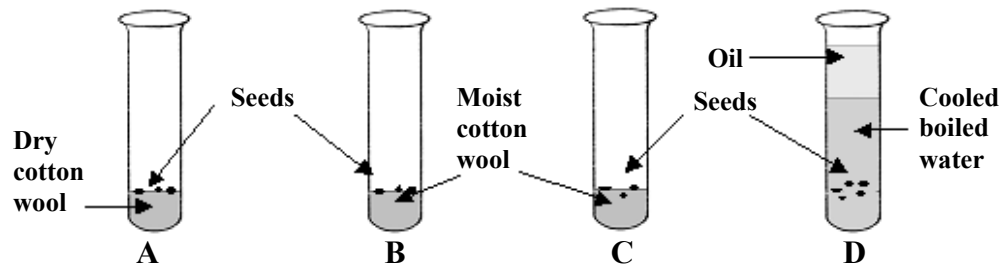
(c) A student investigated the conditions needed for germination.

Test tubes **A**, **B**, and **D** were kept in a warm place and test tube **C** was placed in a fridge.

The seeds in test tube **B** germinated after 3 days.
All of the other seeds failed to germinate.

Study the diagram and answer the questions below.

(15)



Why did the seeds in test tube **A** fail to germinate?

Why did the seeds in test tube **C** fail to germinate?

Why was cooled boiled water used in test tube **D**?

Give **two** of the three conditions necessary for seeds to germinate.

1 _____ 2 _____

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(1) (2)

Chemistry

Question 4

(52)

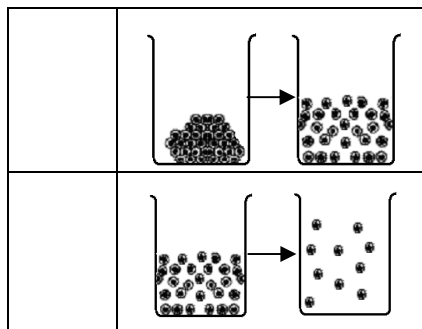
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- (a) The three states of matter are **solid, liquid** and **gas**.

The diagrams show the change in the arrangement of particles in the states of matter as they are heated.

In the table write the letter **M** beside the diagram which shows **melting**.

Write the letter **B** beside the diagram which shows **boiling (evaporation)**.



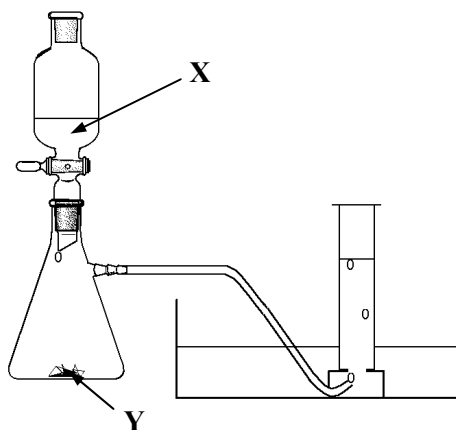
- (b) Write the letter **F** beside the name of a **fossil fuel** in the table.

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

	Nuclear
	Oil
	Oxygen
	Carbon dioxide

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

Name suitable substances for liquid **X** and solid **Y** (catalyst) from which oxygen can be made.



X _____

Y _____

- (d) Write the letter **E** beside the **element** and write the letter **C** beside the **compound** in the table on the right.

	Water
	Nitrogen

(1) (2)

- (e) From the list on the right choose the correct gas to complete the statement below.

Natural gas is mainly _____.

Butane
Methane
Hydrogen

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(1) | (2)

- (f) Complete the table below by correctly inserting the words **PROTON** and **ELECTRON**.

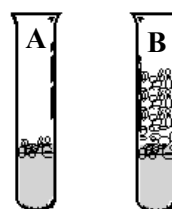
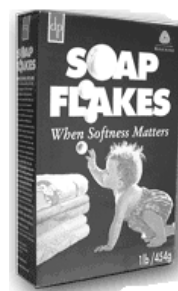
Particle	Relative mass	Relative charge	Location
NEUTRON	1	0	Inside nucleus
	1/1840	-1	Outside nucleus
	1	+1	Inside nucleus

- (g) Complete the following sentence using the correct word from the list on the right.

Bonding that involves the **sharing of electron pairs** is called _____.

Covalent
Ionic

- (h) A student investigated the **hardness** in two different water samples, **A** and **B**. She put the same amount of water into two test tubes and then she added the same number of soap flakes to each test tube. After shaking the mixtures she noticed that a lather formed in the test tube containing sample **B**. No lather formed in sample **A**.



- (i) Which test tube, **A** or **B**, contained the **harder water**? _____

- (ii) Name an **element** whose compounds cause hardness in water.

- (iii) How can hardness be removed from water?

(7 × 6 + 1 × 10)

Question 5

(39)

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use only

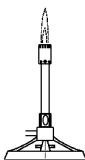
(a) Separation techniques are very important in chemistry.

A group of students carried out an experiment **to separate salt from rock salt** (impure salt containing sand and clay).

A number of the pieces of equipment they used are shown below.



A



B



C



D

Answer the following questions on this experiment.

(30)

(i) Which of the pieces of equipment **A**, **B**, **C** or **D** was used to grind up (crush) the rock salt at the beginning of the experiment? _____

The rock salt was placed in a container and hot water added. The mixture was then stirred to allow the salt dissolve.

(ii) Name the piece of equipment (container) in which the crushed rock salt was placed before the hot water was added.

(iii) Name the piece of equipment that was used to heat the water.

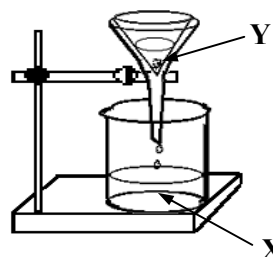
The salt and water was separated from the insoluble impurities (dirt) using the apparatus shown on the right.

(iv) What name is given to this separation technique?

Name _____

The salt and water was collected at **X**.

Explain why the insoluble impurities (dirt) were held at **Y**.



- (v) To get the salt from the mixture of salt and water the water was removed.

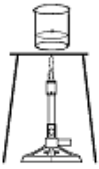
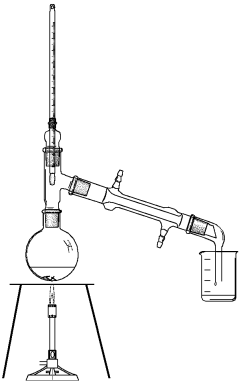
This could be done by either **evaporation** or **distillation**.

The apparatus used for these techniques is drawn below.

Write the name of each technique under the correct drawing.

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(1) (2)

Diagram of apparatus		
Technique		

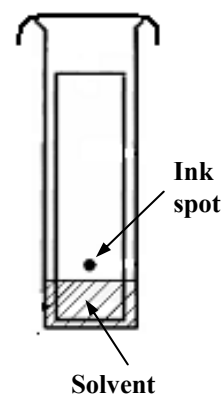
- (b) Paper chromatography can be used to separate the dyes in a sample of ink.

Study the diagram and answer the following questions.

(9)

- (i) Name a suitable solvent for this investigation.

- (ii) What would you expect to notice on the piece of chromatography paper after some time?



- (iii) The ink spot is placed on the chromatography paper just above the level of the solvent.

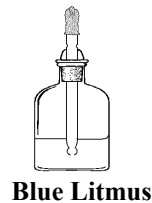
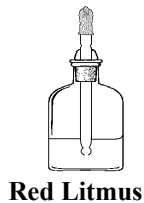
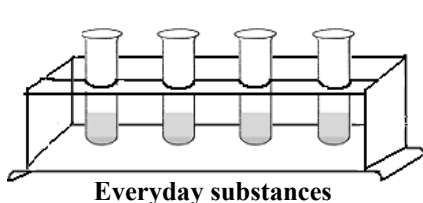
Why?

Question 6

(39)

(a) Acids and bases are important in everyday life.

A student used an acid-base indicator (e.g. litmus) to investigate a number of everyday substances to see if they were acids or bases.



For examiner use only

(1)

(2)

Answer the questions below about this investigation.

(18)

If you used an indicator other than litmus give its name.

(i) What is the colour of litmus (or your named indicator) in an acid?

(ii) What is the colour of litmus (or your named indicator) in a base?

(iii) Describe how you would test a sample of vinegar to show that it is an acid.

(iv) What word describes a substance that is neither an acid nor a base?

- (b) A student carried out a titration using hydrochloric acid and sodium hydroxide. The hydrochloric acid reacted with the sodium hydroxide to form **salt** and **water**.

Study the diagram and answer the questions that follow.

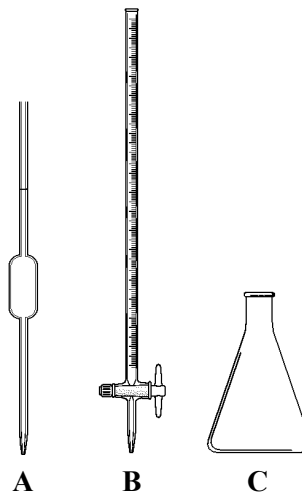
(21)

- (i) **Name** the pieces of equipment **A**, **B** and **C** shown in the diagram.

A _____

B _____

C _____



- (ii) Which piece of equipment **A**, **B** or **C** is usually used to measure out the hydrochloric acid during the titration? _____

- (iii) How does the use of an indicator tell you that enough hydrochloric acid has been added to react with all the sodium hydroxide?

- (iv) **Name** the **salt** formed when the sodium hydroxide reacts with hydrochloric acid. _____

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use only

(1)

(2)

Physics

Question 7

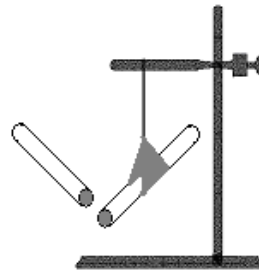
(52)

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(a) The diagram shows a freely suspended charged rod.

What happens when a similarly charged rod is brought close to the suspended rod?

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



(1) (2)

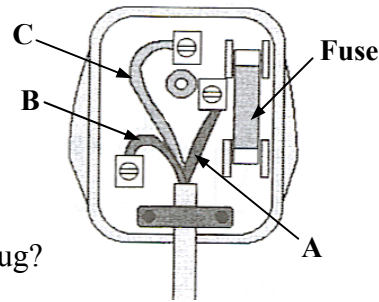
(b) The diagram shows a three-pin plug with the back removed.

Which of the labels **A**, **B** or **C** marks the live wire?

Which? _____

What is the function of a **fuse** in a three-pin plug?

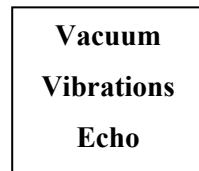
Function _____



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

Sound is produced by _____.

A reflected sound is called an _____.



(d) When one of the headlight bulbs blows (fails) in a car the other headlight stays lighting.

When one bulb blows (fails) in a set of Christmas lights none of the bulbs light.

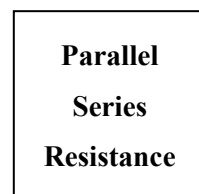
In each case choose a word from the list below to correctly complete the following statements.

The headlight bulbs in the car are connected in

_____.

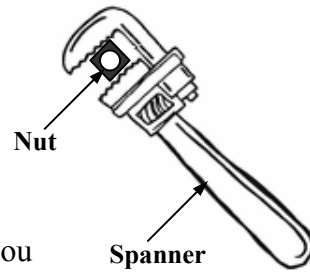
The Christmas tree light bulbs are connected in

_____.



(e) The diagram shows a spanner and a nut.

In each case complete the sentences below by inserting the correct word from the list on the right.



The further away from the fulcrum (turning point) you apply a _____ the easier it is to turn a nut.

The use of a spanner to turn a nut is an everyday example of using a _____.

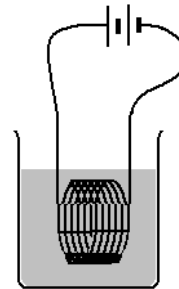
- | |
|----------|
| Lever |
| Force |
| Friction |

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

	Tidal
	Coal
	Solar
	Oil

(g) The diagram shows an electric current passing through a coil of wire in a beaker of water.

After 15 minutes, what effect would you expect the current passing through the coil to have on the water? _____



Name a household appliance that uses this effect of electric current.

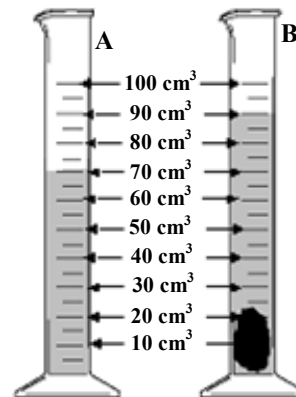
Appliance _____

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

When the stone was carefully dropped into the graduated cylinder containing water, **A**, arrangement **B** resulted.

Calculate the volume of the stone from the information shown.

Volume of stone _____ cm^3



If the mass of the stone was 40 g, calculate the density of the stone.

Density of stone _____ **Unit of density** _____

(7 × 6 + 1 × 10)

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(1) _____ (2) _____

Question 8

(39)

(a) A cyclist moved along a straight track. A student measured the time taken by the cyclist to travel various distances.

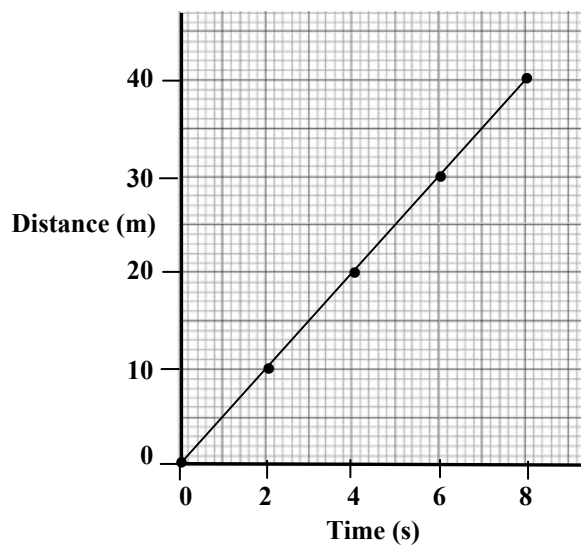
The data collected is shown in the table.

The student then drew the graph shown below.

Answer the questions that follow about this investigation.

(18)

Distance (m)	0	10	20	30	40
Time (s)	0	2	4	6	8



(i) **Name** an instrument used to measure the **distance** in this investigation.

Instrument _____

(ii) **Name** an instrument used to measure the **time** in this investigation.

Instrument _____

(iii) Use the graph to estimate the distance travelled by the cyclist in 5 seconds. _____

(iv) Calculate the **speed** of the cyclist in m s^{-1} (m / s).

(v) Is the cyclist **accelerating**? _____

Give a reason for your answer. _____

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(1)

(2)

(b) The diagram shows a bar magnet.



What does the letter **N** on the magnet

mean? _____

(3)

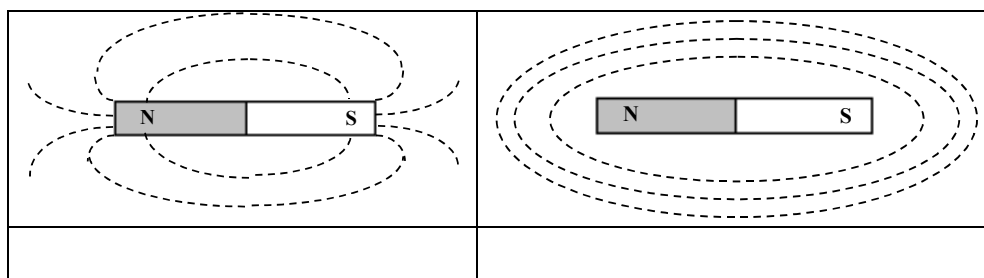
A student wanted to show the pattern of the magnetic field around a bar magnet.

Name a substance or a piece of equipment used in the laboratory to show the **pattern** of the magnetic field around a magnet.

(3)

Write the letter **P** below the pattern you would expect to get if you did this experiment.

(3)



(c) The diagram shows a **battery-powered radio**.



Complete the table below by writing the letter **R** beside the **three main energy-changes** that take place when the radio is in use.

(12)

	Electrical to heat
	Chemical to electrical
	Chemical to heat
	Electrical to sound
	Potential to kinetic

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use only

(1) | (2)

Question 9

(39)

For examiner use only

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



(1) | (2)

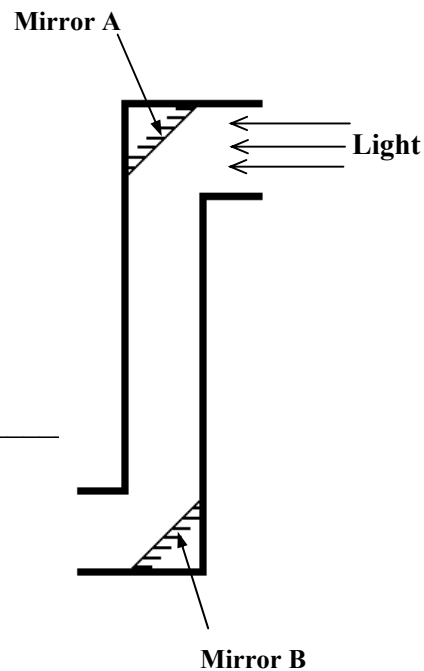
Complete the diagram to show what happens to the ray when it strikes the mirror. (6)

What word describes this? _____ (3)

A student set up the equipment shown in the diagram in an investigation on the use of mirrors.

Answer the questions below about this investigation. (12)

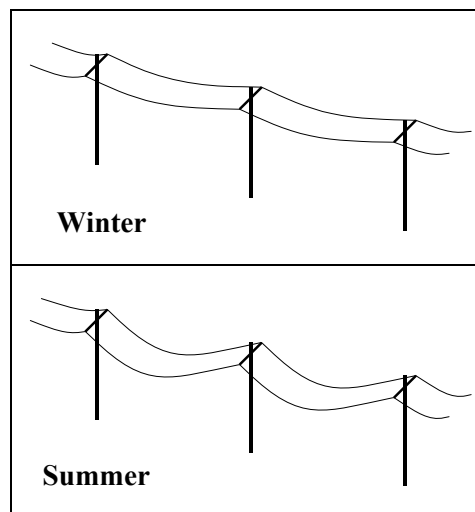
Name the piece of equipment the student has constructed.



What happens to the light rays when they shine on **mirror A**?

Give one **use** for the device made by the student.

(b) Electric cables made from copper sag or droop in summer as shown in the diagram.



What property of metals does this demonstrate? (6)

(c) Heat is transferred in different ways.

Choose the correct word from the list to describe how heat travels through solids. (3)

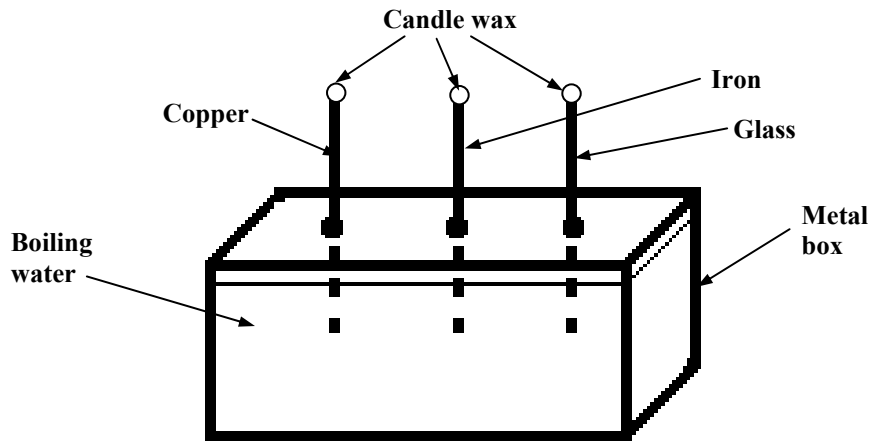
Conduction
Convection
Radiation

For examiner use only

(1)

(2)

A student set up the investigation shown in the diagram.



The apparatus consisted of a metal box that was filled with boiling water.

A copper rod, an iron rod and a glass rod were inserted into the boiling water through holes in the box.

A piece of candle wax was placed on the top end of each rod.

The piece of wax on top of the copper rod melted first and the piece of wax on top of the glass rod melted last.

Answer the following questions about this investigation. (9)

What does the result of this investigation tell us about copper, iron and glass?

Why was it important to use rods of the same length and thickness and that they dipped into the boiling water to the same depth?
