31514

S 36A

EXAMINATION NUMBER

WARNING

You must return this paper with your answerbook, otherwise marks will be lost.

AN ROINN OIDEACHAIS

JUNIOR CERTIFICATE EXAMINATION, 1997

SCIENCE – ORDINARY LEVEL

(N.B. Not for Science – Local Studies Candidates)

TUESDAY, JUNE 17 – AFTERNOON 2.00 – 4.30

SECTION A TO BE ANSWERED BY ALL CANDIDATES.
(Sections B, C, D, E are on separate sheets).
Answer the questions in the spaces provided.

SECTION A – CORE (144 MARKS)

Answer any 12 parts (a), (b), (c), etc. from this Section.
Return this Section of the examination paper in your answer book.

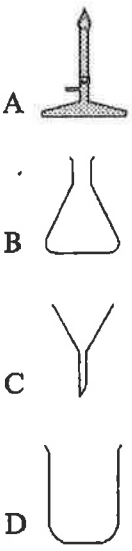
1. (*a*) Name the pieces of apparatus shown in the diagram

A .....

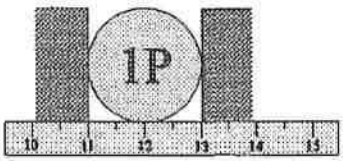
B .....

C .....

D .....



(b) What is the DIAMETER of the coin shown on the right?



..... cm.

Use the units of measurement listed below to complete the table.

s, cm^2, m/s, m.

Example

	Unit
Length	m
Speed	
Area	
Time	

(c) Fill in the spaces below using the following sources of energy.

WIND, COAL, OIL, SUN.

..... and ..... are **renewable** sources of energy.

..... and ..... are **non-renewable** sources of energy.

(d) Choose **two** good CONDUCTORS of heat from the list below.

COPPER, PAPER ALUMINIUM, IRON, AIR, WATER.

..... and .....

Plastic is an **insulator**. What is meant by the term INSULATOR?

.....

(e) Why does an electric plug usually contain a FUSE?

.....

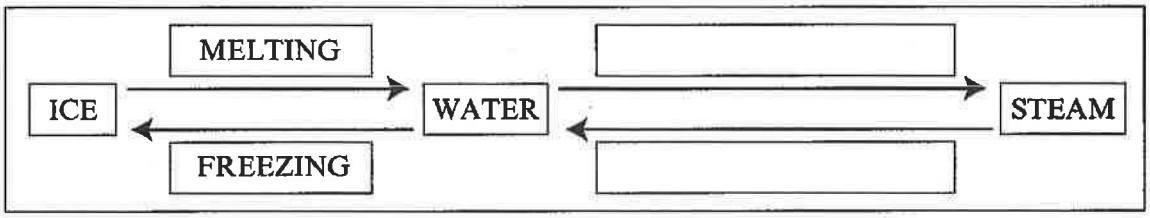
Complete the following sentences:

The LIVE wire in a plug is coloured .....

The NEUTRAL wire in a plug is coloured .....

(*f*) Insert the words listed below into their correct positions in the blank spaces. (Note carefully the directions of the arrows)

EVAPORATION, CONDENSATION



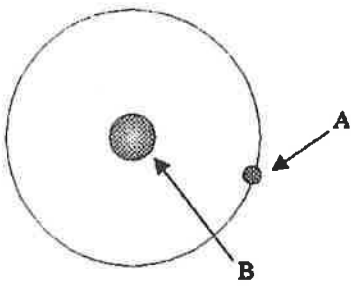
At what TEMPERATURE does water change to steam? ..... °C

At what TEMPERATURE does water change to ice? ..... °C

(*g*) What is an ATOM?

.....

Name the parts of the atom labelled A and B on the diagram.



.....

.....

(*h*) What is an INDICATOR?

.....

Match the substances listed with the correct pH in the table below.

VINEGAR, TOOTHPASTE, WATER.

pH	Substance
7	
below 7	
above 7	

(i) Air is a mixture of gases. Complete the sentence using the gases listed below.

OXYGEN, NITROGEN, CARBON DIOXIDE.

Approximately ONE FIFTH of the air is composed of ..... and

FOUR FIFTHS of ..... .

State **one** use for NITROGEN.

.....

State **one** use for CARBON DIOXIDE.

.....

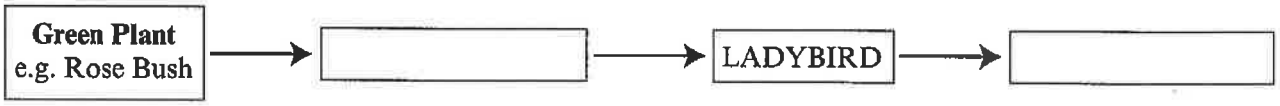
(j) Match the **elements** listed with the correct **symbols** in the table below.

SODIUM, CHLORINE, OXYGEN, HYDROGEN, HELIUM, CARBON

SYMBOL	C	Na	O	H	Cl	He
ELEMENT						

(k) Use the animals listed below to complete the FOOD CHAIN.

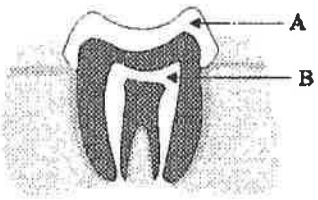
THRUSH, GREENFLY.



Why do **food chains** always start with a **green plant**?

.....

(l) The diagram shows the structure of a **tooth**.
Name the parts labelled A and B.



A. .....

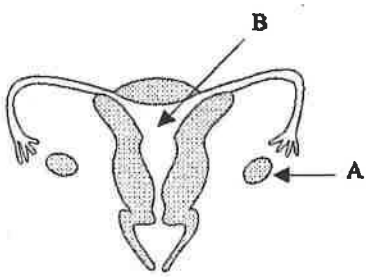
B. .....

There are four different types of tooth: INCISORS, CANINES, PREMOLARS and MOLARS.

Which of the four types of tooth is used for **biting** food? .....

Which of the four types of tooth is used for **chewing** food? .....

(*m*) Name the parts of the female reproductive system labelled A and B.



A. .....

B. .....

What is **produced** by A? .....

How many **days** does it take to complete the menstrual cycle? .....

(*n*) What is meant by a BALANCED DIET?

.....

Name a **food** which contains a large amount of CALCIUM. .....

Why is CALCIUM needed in the body?

.....

(*o*) Name **two** things that bacteria need in order to grow.

..... and .....

State **one** way in which BACTERIA are **useful** to humans.

.....

State **one** way in which BACTERIA are **harmful** to humans.

.....

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SCIENCE – ORDINARY LEVEL

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TUESDAY, JUNE 17

Section A is on a separate sheet which provides space for your answers.
The completed sheet should be enclosed in your answer-book.

SECTIONS B, C, D, E

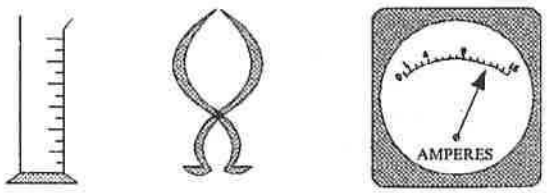
The questions from these sections should be answered in your answer-book.

Choose any **three sections** from **B, C, D, E.**
Answer **two** questions from each chosen section. All questions carry equal marks.

SECTION B – PHYSICS (72 marks)

Answer any **two** questions.

2. (*a*) The pieces of apparatus on the right are all used for measuring.



A B C

(i) What is measured with A? (3)

(ii) What is measured with B? (3)

(iii) What is measured with C? (3)

(iv) Draw a simple diagram of an OPISOMETER, an instrument used to measure curved lines. (6)

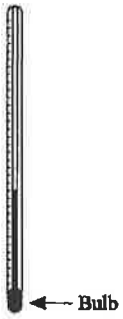
(*b*) (i) How would you find the MASS of a stone? (3)

(ii) If the mass of a stone is 20 g and its volume is 10 cm^3, find the DENSITY of the stone if

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$ (6)

(*c*) Describe, with the help of a labelled diagram, how you would measure the VOLUME of a stone. (12)

3. (*a*) The diagram shows a laboratory THERMOMETER.



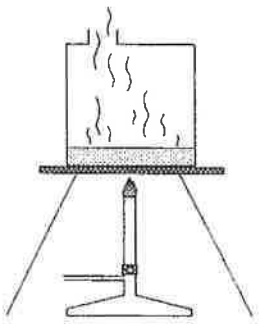
(i) What is it used to measure? (3)

(ii) Name a LIQUID which can be used to fill the bulb of a thermometer. (3)

(iii) Give **one** reason that **water** is **not** used in a thermometer. (6)

(*b*) Describe, with the help of a labelled diagram, an experiment that shows that liquids expand when they are heated. (12)

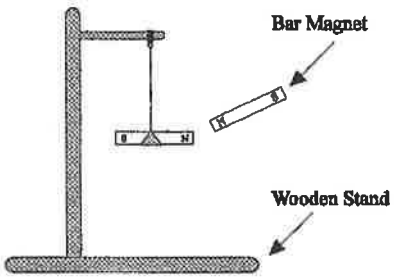
(*c*) The experiment shown was set up and the water in the can was allowed to boil. After a while the Bunsen burner was switched off and the can was sealed with the lid.



(i) What happens to steam when it cools? (3)

(ii) The can collapses on itself as it cools. Explain why this happens. (9)

4. (*a*) A BAR MAGNET was hung up as shown and a second magnet was brought close to it.



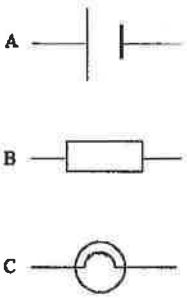
(i) What would happen if **two** NORTH poles were brought close together? (3)

(ii) What would happen if a NORTH and SOUTH pole were brought close together? (3)

(iii) Why is a **wooden stand** used in the experiment instead of a metal one? (6)

(*b*) You are given a bar magnet, a sheet of paper and some iron filings. Describe how you would use them to show the MAGNETIC FIELD around the magnet. (12)

(*c*) Scientists use symbols to represent the parts of electrical circuits.



(i) What is represented by A? (3)

(ii) What is represented by B? (3)

(iii) Draw a SIMPLE CIRCUIT which includes A, B and C. (6)

SECTION C – CHEMISTRY (72 marks)

Answer any **two** questions.

5. (*a*) From the list on the right.

LITMUS
LEMON JUICE
SULPHUR DIOXIDE
WASHING SODA

(i) Name an ACID. (3)

(ii) Name a BASE. (3)

(iii) Name an INDICATOR (3)

(iv) Name a substance which dissolves in rainwater to form acid rain. (3)

(*b*) You are given some red cabbage; describe how you would use it to make an indicator which can be used to find out if a substance is an acid or a base. (12)

(*c*) Two water samples A and B were tested with a soap solution to compare the HARDNESS of each. The amount of soap solution needed to form a lather was measured and the following results were obtained.

Sample of water	A	B
Soap solution needed in cm^3	10	20

(i) Which sample A or B was the **hard** water? (3)

(ii) How can **temporary hardness** be removed? (3)

(iii) Give **one advantage** of hard water. (3)

(iv) Give **one disadvantage** of hard water. (3)

6. (*a*) Fluorine, aluminium and helium are all **elements**.

(i) Explain what is meant by the word ELEMENT. (6)

(ii) Is helium more or less dense than air? (3)

(iii) Give **one** use for aluminium. (3)

(*b*) The diagram on the right shows Group I of the Periodic Table of the Elements.

I
Li
Na
K
Rb
Cs
Fr

(i) Name the **family** of elements in **Group I**. (3)

(ii) Why are some of the elements of Group I **not** found free in nature? (3)

(iii) Sodium is a metal which floats on water. Is this statement **true** or **false**? (3)

(iv) **Copy** and **complete** the following word equation.

Sodium + Water → Sodium Hydroxide + _____ (3)

(*c*) Oxygen can be made in the laboratory by adding hydrogen peroxide to manganese dioxide.

(i) How would you **test** that the gas collected is oxygen? (6)

(ii) Oxygen is slightly soluble in water. Why is this an important property of oxygen? (3)

(iii) What **gas** is produced when carbon is burned in oxygen? (3)

7. (*a*) When iron filings and sulphur are mixed together a **mixture** is formed.

(i) What is meant by the word MIXTURE? (6)

(ii) How would you **separate** the iron filings from the sulphur? (3)

(iii) How could you change the mixture of iron and sulphur into the compound iron sulphide? (3)

(*b*) You are given a mixture of salt and water. Describe, with the help of a labelled diagram, an experiment you would carry out to separate the salt from the water. (12)

(*c*) The **rusting** of iron is a chemical change.

(i) State **one** way in which iron can be prevented from rusting. (3)

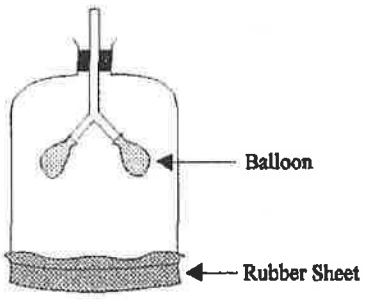
(ii) What substance apart from oxygen is needed for iron to rust? (3)

(iii) Give **another** example of a **chemical change**, apart from those mentioned in this question. (6)

SECTION D – BIOLOGY (72 marks)

Answer any **two** questions.

8. (*a*) The diagram on the right shows a model of the breathing system.



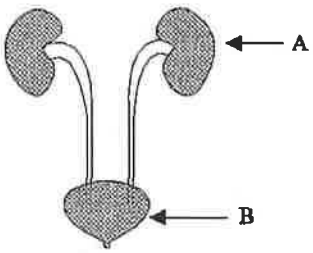
(i) What parts of the body are represented by the balloons? (3)

(ii) What happens to the balloons when the rubber sheet is pulled downwards? (3)

(iii) Does the air we breathe **out** contain **more** or **less** carbon dioxide than the air we breathe in? (3)

(iv) What happens to lime water when carbon dioxide is added to it? (3)

(*b*) Excretion is the removal of wastes from the body. The diagram on the right shows part of the excretory system.



(i) Name the part labelled A. (3)

(ii) Name the part labelled B. (3)

(iii) What **liquid** collects in B? (3)

(iv) Name **one** waste product removed through the skin. (3)

(*c*) In Ireland today heart disease is a major problem.

(i) State **two** ways in which heart disease can be prevented. (6)

(ii) Name the type of muscle in the wall of the heart. (3)

(iii) The average adult heart beats a certain number of times each minute. Is it approx 52, 72, 92 or 102 times a minute? (3)

9. (*a*) (i) **Name a habitat** you have studied. (3)

(ii) State **one** way in which plants depend on animals in the habitat you named. (3)

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

(iv) Name the **producer** in the food chain: Cabbage → Caterpillar→ Thrush. (3)

(*b*) Pollution is caused by substances which harm the environment.

(i) Give **one** example of **water pollution**. (3)

(ii) Give **one** example of **air pollution**. (3)

(iii) State **one** way in which humans can reduce the amount of air pollution in cities. (3)

(iv) State **one** way in which farming can damage the environment. (3)

(*c*) Describe, with the help of labelled diagrams, an experiment you would carry out to measure the amount of humus in a sample of dried soil. (12)

10. (*a*) Green plants make their own food in a process called **photosynthesis**.

(i) Which **part** of the plant makes the **most** food? (3)

(ii) Name the **type of food** made by the plant. (3)

(iii) What **gas** is taken in by the plant to make food? (3)

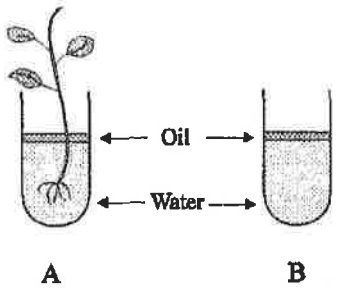
(iv) Why do plants **not** make food at night? (3)

(*b*) The experiment on the right was set up and left for a few days.

(i) What will happen to the water level in **test tube A** after a few days? (3)

(ii) Why was the oil placed on the water? (3)

(iii) What does the experiment show? (6)



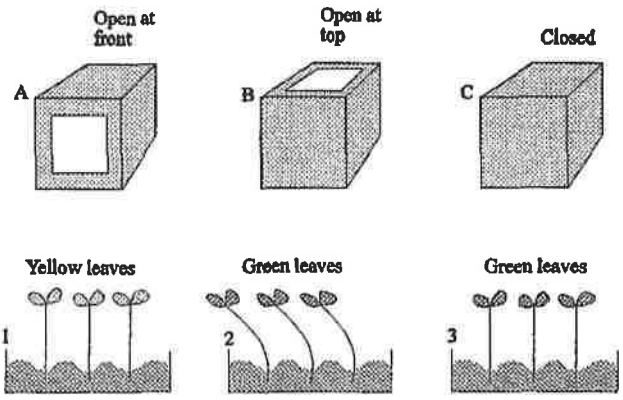
(*c*) A dish containing seeds on moist cotton wool was placed in each of the boxes A, B, C, shown. After a while the three sets of seedlings 1, 2, 3 were removed.

(i) Which set of seedlings was grown in box A? (3)

(ii) Which set was grown in box B? (3)

(iii) Which set was grown in box C? (3)

(iv) Would the seedlings have grown if the seeds were placed on **dry** cotton wool? (3)

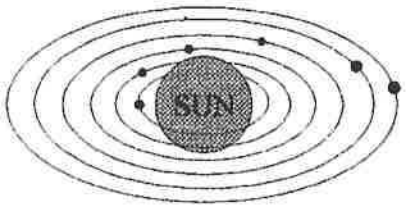


SECTION E – APPLIED SCIENCE (72 marks)

Answer any **two** questions.

11. EARTH SCIENCE

(*a*) The diagram shows part of the Solar System.



(i) Name the planet **nearest** to the Sun. (3)

(ii) Taking any **one named planet** of the solar system as an example, give a reason that life, as we know it, is not found there. (6)

(iii) 1996 was a **leap year**. Explain why it is necessary to have a leap year (366 days). (3)

(*b*) The water vapour in the air is the result of evaporation of water. Describe, with the help of labelled diagrams, how you would show that **the rate of evaporation** is higher on a windy day than on a calm day. (12)

(*c*) There are different types of **cloud**. Choose a type of cloud from the list on the right which

Cirrus
Cumulus
Nimbostratus
Cumulonimbus

(i) brings **rain**; (3)

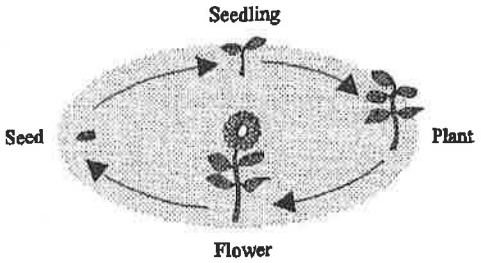
(ii) indicates **fine** weather; (3)

(iii) is a thick white fluffy cloud, dome shaped on top; (3)

(iv) is a very thick low (below 2,500 m) dark layer of cloud bringing **snow or rain**. (3)

12. HORTICULTURE

(*a*) The diagram on the right shows the life cycle of a flowering plant.



(i) Name a plant which takes **one year** to complete its life cycle. (3)

(ii) Name a plant which takes **two years** to complete its life cycle. (3)

(iii) Seeds usually go through a period of dormancy before they germinate. What is meant by **dormancy**? (6)

(*b*) You are given 100 grass seeds. Describe the experiment you would carry out to find the percentage germination of the seeds. (12)

(*c*) Outdoor plants are usually grown in soil.

(i) Name **two** things which the soil provides for the plants. (6)

(ii) Why is compost used instead of garden soil to grow pot plants? (6)

13. MATERIALS SCIENCE

(*a*) From the list on the right choose a material which

Nylon
Brass
PVC
Oil

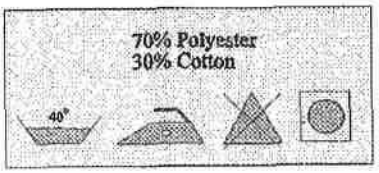
(i) is a **plastic**; (3)

(ii) is a metal **alloy**; (3)

(iii) is **man-made**; (3)

(iv) is a **hydrocarbon**. (3)

(*b*) The information on the right was given on a care label inside a school shirt.



(i) Give **one** advantage of including polyester in the shirt. (3)

(ii) Give **one** advantage of including cotton in the shirt. (3)

(*c*) Answer **one** of the following questions, **A**, **B**, **C** or **D**.

A. PLASTICS

(i) Give **two** uses for plastics in the home. (6)

(ii) You are given some polystyrene, cotton wool and glass wool. Describe, with the help of labelled diagrams, an experiment you would do to decide which is the best insulator. (12)

OR

B. TEXTILES

From the list on the right choose

Silk
Linen
Cotton
Wool

(i) a **natural** fibre made from **plants**; (3)

(ii) a **natural** fibre made from **animals**. (3)

(iii) Describe, with the help of a labelled diagram, how you would compare the **resistance to wear** of two different textiles. (12)

OR

C. METALS

From the list, on the right, name a metal mined in

Copper
Lead
Zinc
Silver

(i) Navan, Co. Meath. (3)

(ii) Gortdrum, Co. Tipperary. (3)

(iii) Describe, using a labelled diagram, how you would extract a sample of metal from its ore. (12)

OR

D. TIMBER

(i) Name **two** hardwoods. (6)

(ii) You are given thin sheets of mahogany and pine. Describe, with the help of a labelled diagram, the experiment you would carry out to compare the bending strength of the two timbers. (12)

14. FOOD

(*a*) (i) Name a food which contains a large amount of **fat**. (3)

(ii) What **use** is made of fat in the body? (3)

(iii) How would you test food for fat? (6)

(*b*) The information, given on the right, shows the ingredients present in a packet of biscuits.

Ingredients: Sugar, wheat flour, Wheat starch, Fat, salt, gelatine, colour E104, preservative E223.

(i) Which ingredient is present in the **greatest** amount in the biscuits? (3)

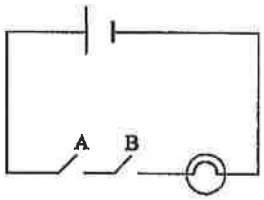
(ii) E104 is a colourant. What does the letter E tell you? (3)

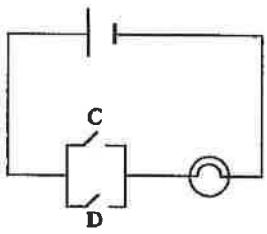
(iii) E223 is added to the food as a preservative. Name **another** method of keeping food fresh. (6)

(*c*) You are given a container of cream. Describe how you would use it to make butter. (12)

15. ELECTRONICS

(*a*) The circuits on the right were set up to investigate the action of switches. Will the bulb light when





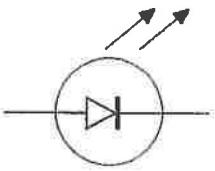
(i) A is **open** and B is **closed**? (3)

(ii) A and B are both **closed**? (3)

(iii) C is **open** and D is **closed**? (3)

(iv) C and D are **closed**? (3)

(*b*) (i) Name the **device** shown on the right. (3)

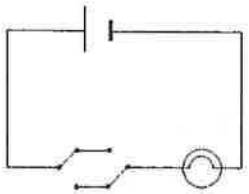


(ii) Give **one** everyday use for the device shown. (3)

(iii) Draw a simple circuit showing a switch, a battery, a resistor and the device shown forward biased.

(9)

(*c*) The diagram shows a circuit for switching on a light in one place and switching it off in another.

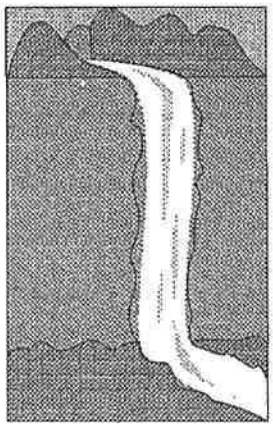


(i) What do you call this type of switch? (3)

(ii) Copy the circuit diagram showing one way the switches should be arranged for the light to be on. (6)

16. ENERGY CONVERSIONS

(*a*) The diagram shows a waterfall.



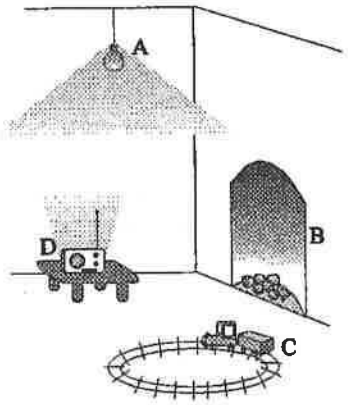
(i) The water at the top of the waterfall has **potential energy**. What is meant by **potential energy**? (3)

(ii) The water falling in the waterfall has **kinetic energy**. What is meant by **kinetic energy**? (3)

(iii) Give another example of potential energy being changed to kinetic energy. (6)

(*b*) Describe, with the help of a labelled diagram, an experiment you would do to show that heat is released when a fuel is burned. (12)

(*c*) The diagram shows a room in a house. State the energy conversion occurring in



(i) A (the light bulb) (3)

(ii) B (the fire) (3)

(iii) C (the electric train) (3)

(iv) D (the radio) (3)