

Candidate Name	Centre Number	Candidate Number

WELSH JOINT EDUCATION COMMITTEE  
General Certificate of Secondary Education



CYD-BWYLLGOR ADDYSG CYMRU  
Tystysgrif Gyffredinol Addysg Uwchradd

652/01

**GCSE IN APPLIED SCIENCE (Double Award)**

**Unit 2: Science for the Needs of Society**

**FOUNDATION TIER (Grades G-C)**

A.M. WEDNESDAY, 18 January 2006

(1 hour 30 minutes)

<b>For Examiner's use only</b>	
<b>Section A</b>	
<b>Section B</b>	
<b>Total</b>	

**INSTRUCTIONS TO CANDIDATES**

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

**INFORMATION FOR CANDIDATES**

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

You are reminded to show all your working. Credit is given for correct working even when the final answer given is incorrect.

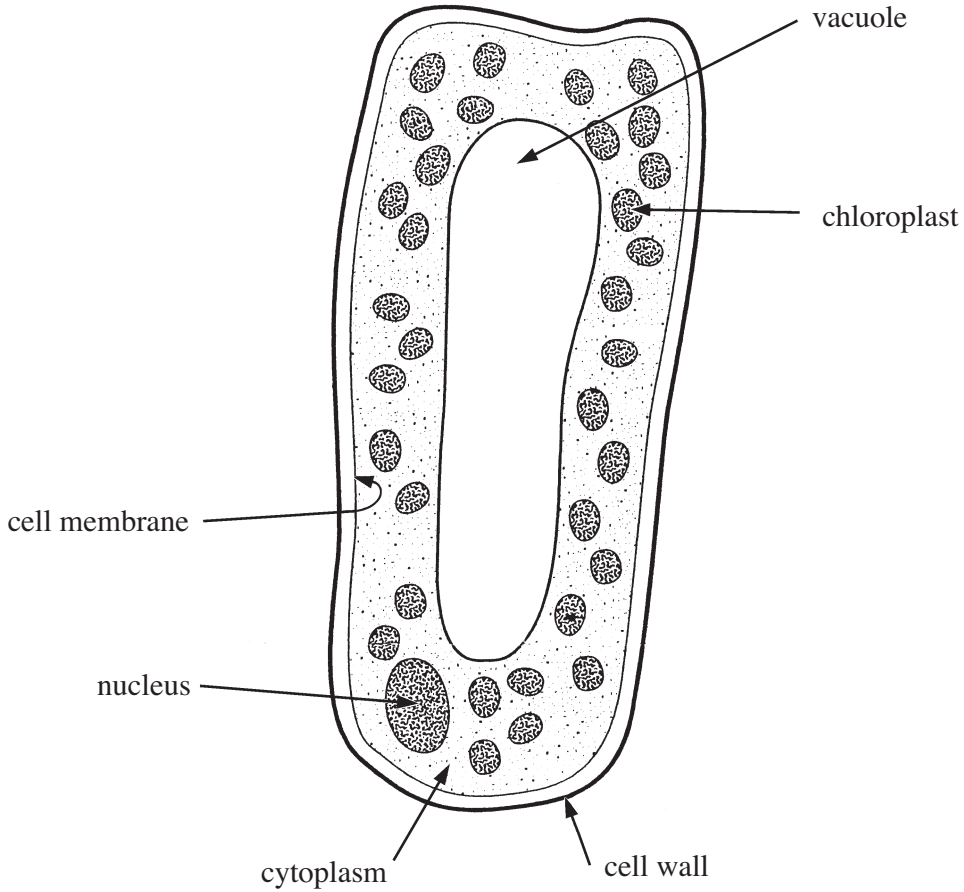
No certificate will be awarded to a candidate detected in any unfair practice during the examination.

**SECTION A (50 marks)**

Answer **all** the questions in the spaces provided.

1. Students are looking at cells under a microscope.

(a) The first cell they look at is shown in the diagram below.



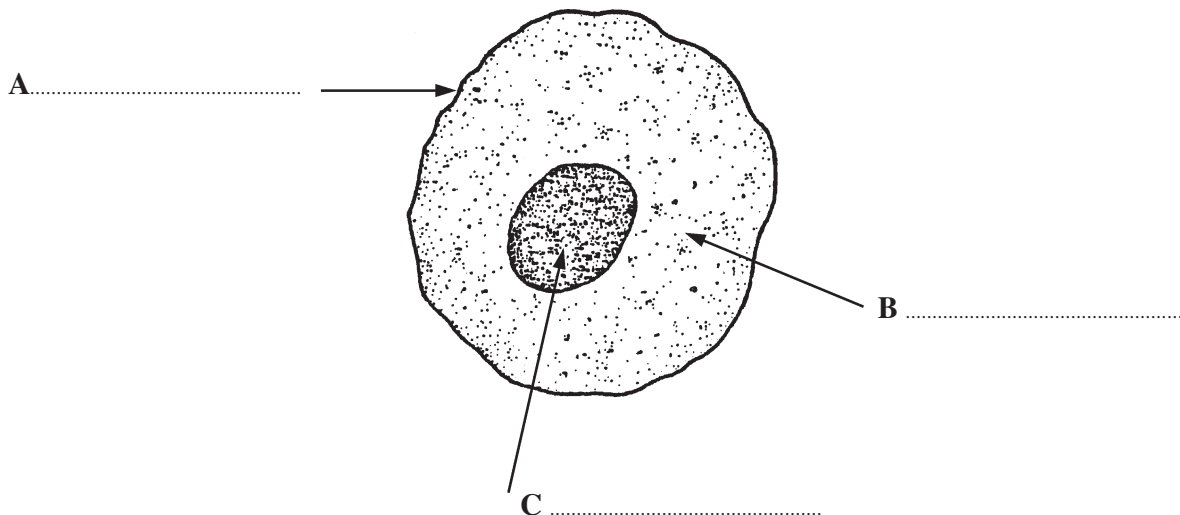
Name **two** parts of the cell that show that this is a plant cell.

[2]

1. ....
2. ....

(b) The students then look at cells from an animal.  
The diagram of the cell they drew is given below.  
Label **A**, **B** and **C** on the diagram.

[3]



2. Companies use different materials to make different objects.

(a) Some examples are shown in the table below.

Object	Material
shirt	cotton
key	brass
ring	gold
cup	polystyrene
gloves	wool
window	glass
shelves	plywood

(i) From the table, **name** a material that is a metal. .... [1]

(ii) From the table, **name** a material that is a polymer. .... [1]

(iii) From the table, **name** a material that comes from a plant. .... [1]

(iv) From the table, **name** a material that comes from an animal. .... [1]

(v) From the table, **name** a composite material. .... [1]

(b) Some of these materials and their properties are shown in the table below.

Material	Hard	Malleable	Brittle
<b>A</b>	yes	no	yes
<b>B</b>	no	no	yes
<b>C</b>	yes	yes	no

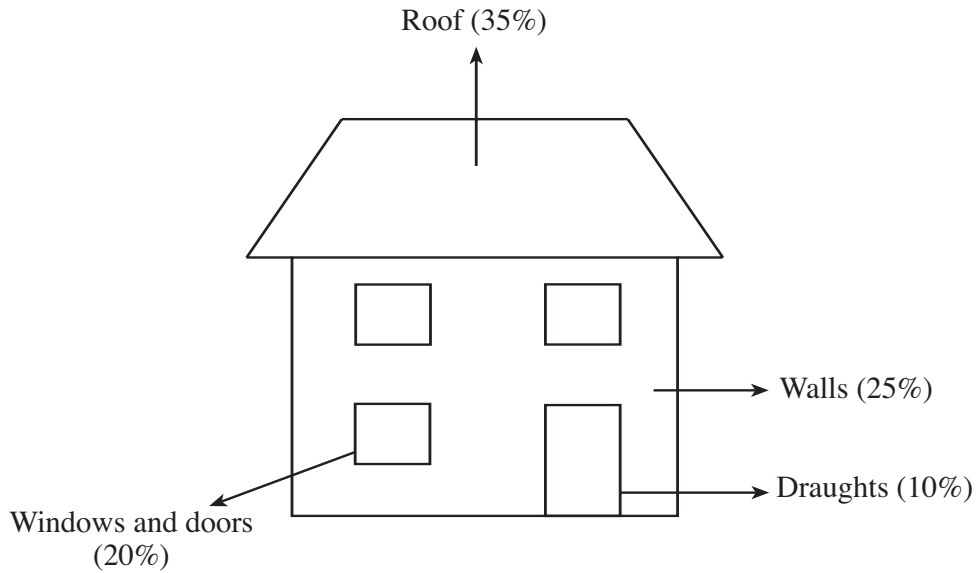
Use the information in the table to answer the questions below.

(i) Which material, **A**, **B** or **C** is gold? ..... [1]

(ii) Which material, **A**, **B** or **C** is glass? ..... [1]

(iii) Which material, **A**, **B** or **C** is polystyrene? ..... [1]

3. A homeowner is trying to reduce the amount of money spent on heating the home. The diagram shows the amount of heat energy lost through some parts of the house.



- (a) Through which part of the house is most heat energy lost? ..... [1]
- (b) (i) Heat energy is also lost through a different part of the house. Show this on the diagram with an arrow. [1]
- (ii) How much heat energy is lost through this part of the house? ..... [1]
- (c) The homeowner finds out information about cutting down the energy lost from the home. This information is shown in the table below.

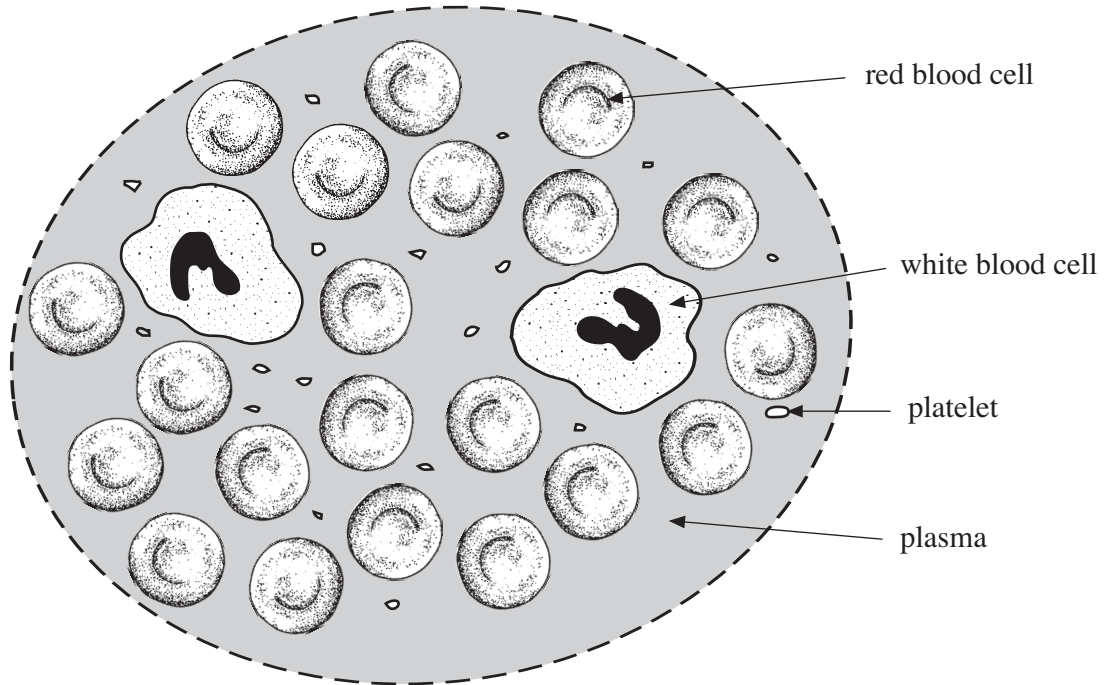
Method	Cost of Installation	Savings per year	Payback time
Loft insulation	£600	£150	4 years
Double glazing	£5000	£50	100 years
Wall insulation	£2000	£100	..... years
Draught proofing	£90	£ .....	10 years

- (i) Fill in the gaps in the table. [2]
- (ii) Use the information in the table to give **one** reason why the homeowner should install loft insulation first. [1]

.....

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4. When your doctor takes a blood sample, it is sent to the local hospital. Here it is looked at under a microscope. The different parts of the blood can clearly be seen in the diagram below.



- (a) Each part of the blood has a different job to do. This is shown in the table below.

Part of the blood	The job it does
Red blood cell	.....
.....	Carries digested food
.....	Kills bacteria
Platelets	.....

Fill in the gaps in the table.

[4]

- (b) In some people, the red blood cells are not the normal shape. These people are suffering from sickle cell disease. This disease can be passed on from parent to child.

**S** is the gene for **normal red blood** cells.  
The gene for **sickle cells** is **s**.

The gene pair **Ss** produces normal red blood cells.

- (i) What type of red blood cells are produced by the gene pair **ss**? [1]

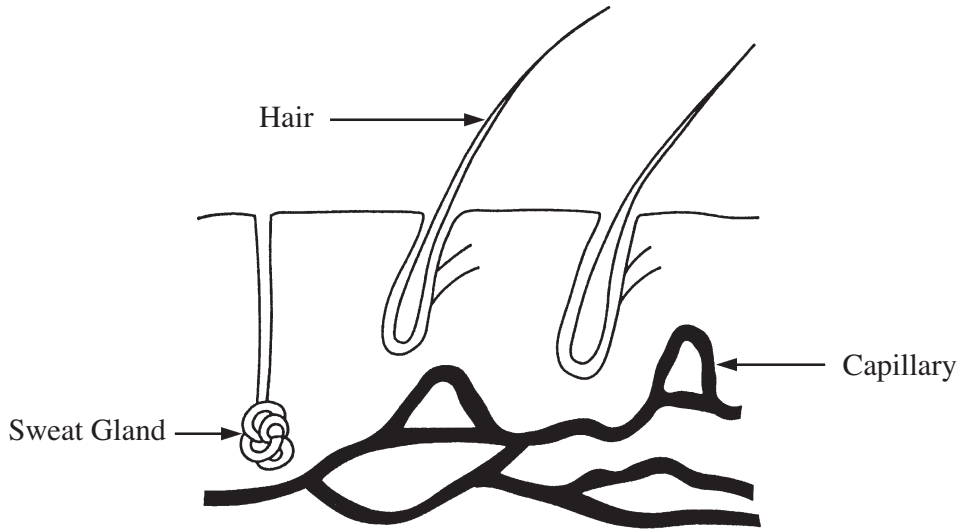
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- (ii) A child has parents with gene pairs **Ss** and **Ss**. The possible gene pairs of the child can be found using a Punnett square (cross diagram). Complete the Punnett square below to show all possible gene pairs for the child. Part of the diagram has already been completed for you. [3]

Gene type from parent	S	s
S	.....	.....
s	.....	<b>ss</b>

5. Explorers travel to different places all over the world. Some of the places they visit are very hot. Other places are very cold. They need to know how the body changes to cope with these different temperatures. The diagrams show the skin at different temperatures.

**Diagram A**



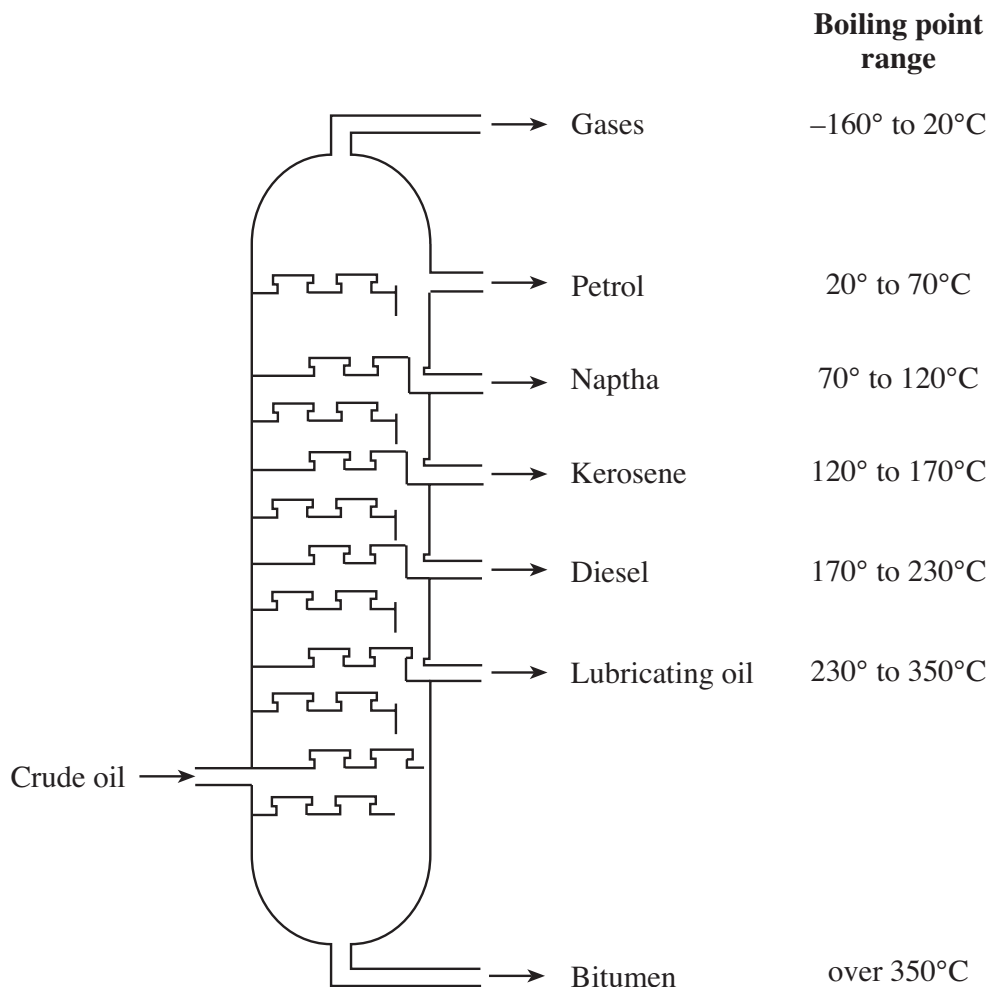
**Diagram B**



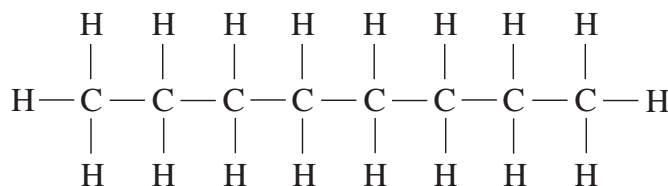
- (a) (i) State which diagram, **A** or **B**, shows the skin on a cold day. .... [1]
- (ii) Give **three** reasons for your answer. [3]
1. ....
2. ....
3. ....
- (b) Give **one** other way in which the body tries to keep warm in cold conditions. [1]



6. Crude oil is a mixture of many substances called **fractions**.  
These fractions are used by industry, motorists, airlines, roofers and road layers.  
In an oil refinery, the **fractions** are collected in different parts of a tall tower.



- (a) (i) **Name** a fraction used by jet engines. .... [1]  
 (ii) Give **one** use of bitumen. .... [1]  
 (iii) Which car fuel has the highest boiling point? .... [1]  
 (iv) Which fraction has the largest molecules? .... [1]
- (b) Petrol is a mixture of hydrocarbons.  
The structure of one hydrocarbon is shown below.



Name the **two** elements in the hydrocarbon. [2]

1. ....

2. ....

7. Some items from supermarkets contain mixtures of materials.  
The materials can be solid, liquid or gas.  
They can be mixed together in different ways.

(a) Match the mixture with the correct way it is made up by joining the boxes.

One example has been completed for you.

[5]

<u>Type of mixture</u>	<u>How it is made up</u>
Solution	Small bits of solid not dissolved in liquid
Suspension	A solid dissolved in liquid
Gel	Gas bubbles trapped in a liquid
Foam	A liquid trapped inside a solid
Emulsion	A fine spray of liquid particles in a gas
Aerosol	Two liquids mixed together

A5

8. Yoghurt is sold in all supermarkets.  
Some people prefer to make their own yoghurt at home.  
It is very important that people follow instructions carefully, since yoghurt is made using a type of micro organism.  
The micro organisms feed on the milk sugar (lactose) and turn it into lactic acid.

**HOW TO MAKE YOGHURT**

Method:

- Heat the milk until it reaches body temperature (37°C).
- In a jug blend in the 2 tablespoons of live micro organism with a little of the warm milk.
- When a smooth mixture is obtained, pour into the rest of the warm milk and stir.
- Pour the milk/yoghurt mixture into a pre warmed thermos flask, seal and leave for 7 hours.
- Pour the yoghurt into a basin, and refrigerate for 4 hours to allow the yoghurt to thicken further.
- Yoghurt made this way can be kept in a refrigerator for 4 or 5 days.

(a) (i) **Name** the type of micro organism that turns milk into yoghurt. [1]

.....

(ii) Explain why it is important that the milk is not heated above 37°C. [1]

.....

.....

(iii) Give **one** reason why the mixture is left in the flask for 7 hours. [1]

.....

(iv) Give **one** reason why the flask is sealed. [1]

.....

(v) Give **one** reason why the yoghurt must be kept in a refrigerator. [1]

.....

(b) (i) Explain why it is important to use clean equipment for yoghurt making. [1]

.....

.....

(ii) Explain why yoghurt would not be made if penicillin was added to the mixture. [1]

.....

.....

**SECTION B (40 marks)**

Answer **all** the questions in the spaces provided.

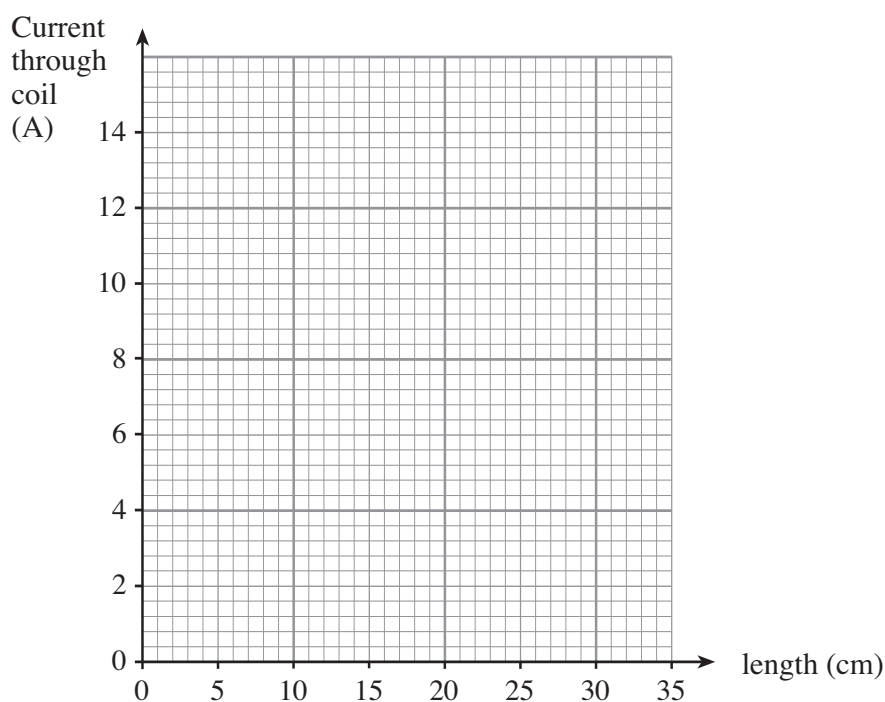
9. A manufacturer makes heating coils for 230V fan heaters. They investigated how the current through the coil depended on the length of wire.

The results of their investigation are shown in the table.

Length (cm)	Current (A)
5	12
10	6
15	4
20	3
30	2

- (a) Plot these points on the grid and join them with a suitable line.

[3]



- (b) (i) The manufacturer decided to use a coil taking a current of 8A. Use the graph to find the length of wire needed to make the coil.

[1]

Length = ..... cm

- (ii) Write down **in words**, an equation connecting power, current and voltage.

[1]

- (iii) Calculate the power in this coil when connected to 230V.

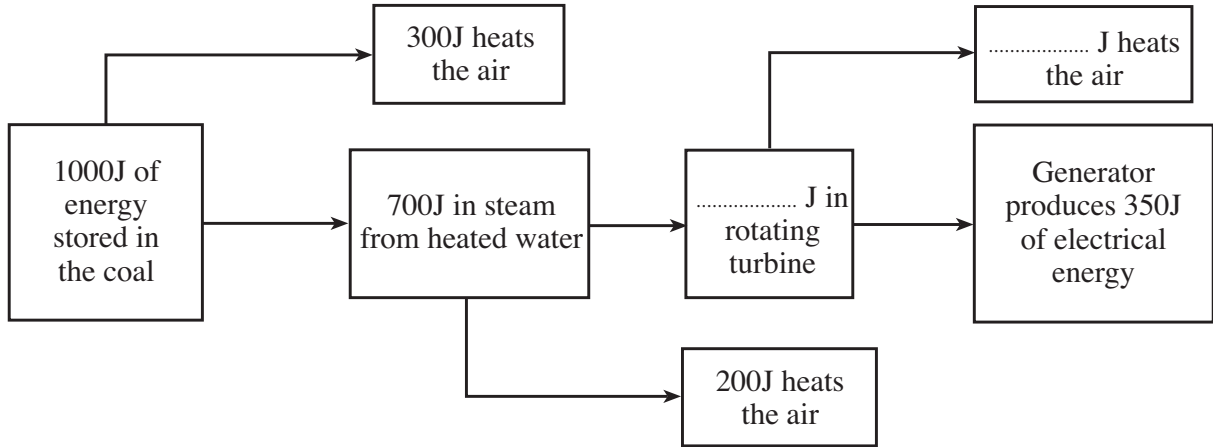
[2]

Power = ..... W

B7

10. Some power companies produce electricity by using coal.  
Not all the energy stored in the coal is eventually converted into electrical energy.

(a) The diagram below shows the energy flow in the process of producing electricity.



(i) Complete the flow diagram by filling in the missing energy values. [2]

(ii) State the useful energy output from an input of 1000J. .... [1]

(iii) Explain what is meant by the following sentence:  
“The efficiency of producing electricity from coal is 35%.” [2]

.....

.....

(iv) State what happens to the rest of the input energy. [1]

.....

.....

(b) Give **two** reasons why the power company should look for other methods of producing electricity instead of using coal. [2]

1. ....

2. ....

**11.** Sodium chloride is a very important mineral with many uses in industry.  
It is made from the metal, sodium and the gas, chlorine.  
Before industry can use sodium chloride, it has to be separated from rock salt.

(a) (i) From the paragraph above, **name** an element. .... [1]

(ii) From the paragraph above, **name** a mixture. .... [1]

(iii) From the paragraph above, **name** a compound. .... [1]

(b) Write down the formula for sodium chloride. .... [1]

(c) Sodium is a metal, but sodium chloride is a non metal.  
Give **two** differences between metals and non metals. [2]

1. ....

2. ....

(d) Explain why the following stages are necessary when separating salt from rock salt: [5]

(i) adding to water;

.....  
.....

(ii) filtering;

.....  
.....

(iii) evaporation.

.....  
.....

B11

12. A supermarket sells two groups of vegetables.  
One group of vegetables is obtained from intensive farming and the other from organic farming.  
The vegetables from organic farming are more expensive because of the different methods used at the farm.

(a) Intensive farming makes use of weed killers.

(i) Give **one** disadvantage of using weed killers. [1]

.....

(ii) Give **one** method of controlling weeds in organic farming. [1]

.....

(b) Fertilisers are added to soil to make sure plants get the minerals they need.  
Name **two** minerals that plants need for healthy growth. [2]

1. .... 2. ....

(c) Intensive farming makes use of artificial fertilisers.

(i) Give **one** advantage of using artificial fertilisers. [1]

.....

(ii) Give **one** disadvantage of using artificial fertilisers. [1]

.....

(d) Give **two** reasons why organic farm vegetables are more expensive than those produced by intensive farming methods. [2]

1. ....

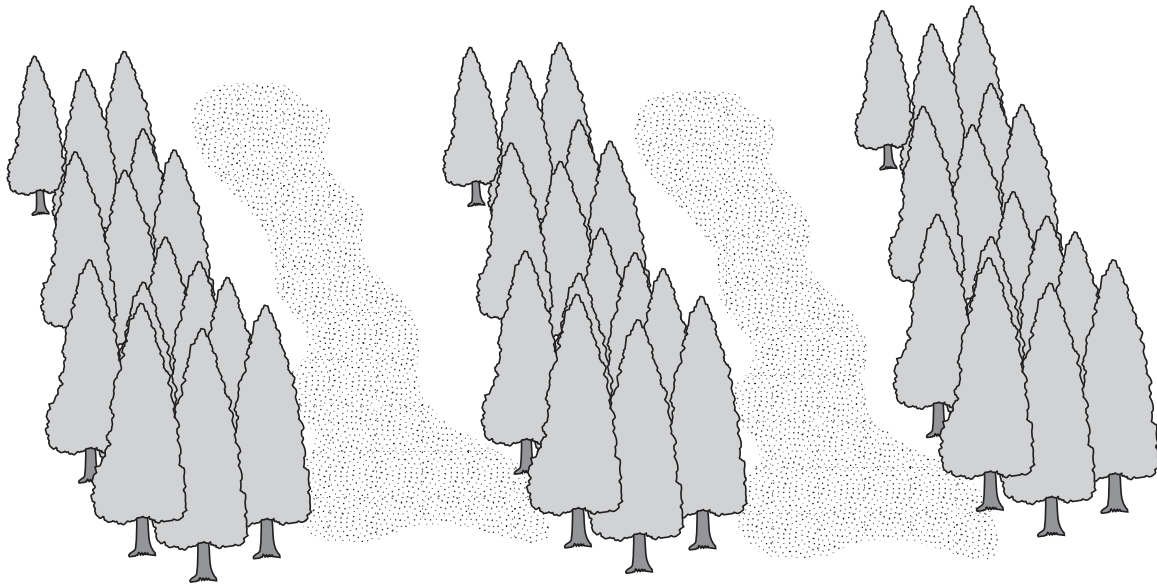
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2. ....

.....



13. The Forestry Commission is planning a new forest.  
They are planting conifer trees in groups.  
Each group of trees will be separated by a strip of land.  
Grass grows on the strips of land, but no grass grows amongst the groups of conifers.



(a) Green plants make their food by photosynthesis.

(i) Name **three** things needed by plants for photosynthesis to occur. [3]

- 1. ....
- 2. ....
- 3. ....

(ii) Name the **two** products of photosynthesis. [2]

- 1. ....
- 2. ....

(b) Give **one** reason why no grass grows amongst the conifers. [1]

.....  
.....

B6