

Candidate Name	Centre Number	Candidate Number

WELSH JOINT EDUCATION COMMITTEE
General Certificate of Secondary Education



CYD-BWYLLGOR ADDYSG CYMRU
Tystysgrif Gyffredinol Addysg Uwchradd

672/01

GCSE IN APPLIED SCIENCE (Double Award)

NEW SPECIFICATION

Unit 2: Science and Society

FOUNDATION TIER (Grades G-C)

A.M. WEDNESDAY, 13 June 2007

(1 hour 15 minutes)

For Examiner's use only	
Section A	
Section B	
Total	

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 (56 marks)*Answer all the questions in the spaces provided.*

1. Complete the table below.

[4]

Element	Chemical symbol
Sulphur	.....
.....	Cu
Hydrogen	.....
.....	Fe

2. Manufacturers use materials to make different things.

Here is a list of different materials:

sodium, aluminium, sulphur, gold, lead.(i) From the list, name **two** materials that can be used straight from the ground.

[2]

..... and

(ii) From the list, name the **non-metal**.

[1]

3. Choose a word from the boxes to complete the sentences below.

Each word may be used once, more than once, or not at all.

consumer

producer

carnivore

prey

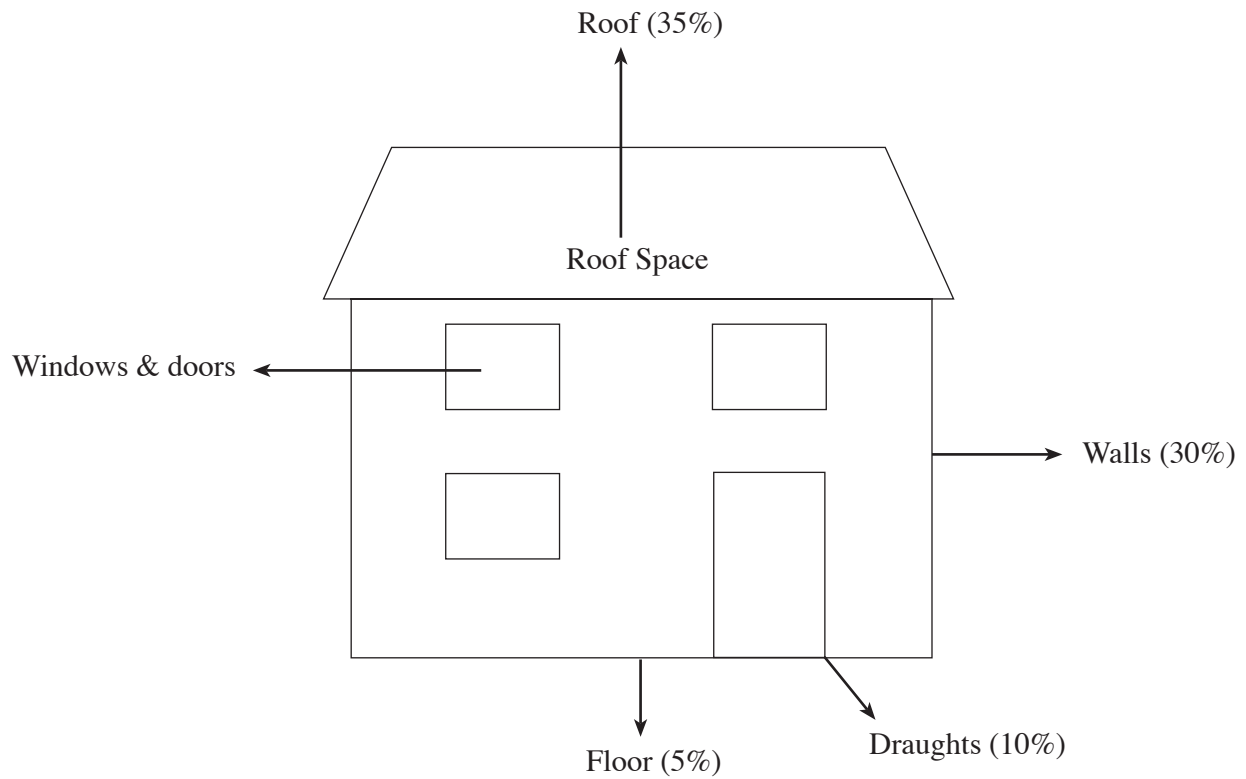
herbivore

predator

- (i) A living thing that must eat is a [1]
- (ii) A living thing that makes its own food is a [1]
- (iii) An animal that eats other animals is a [1]
- (iv) An animal that hunts other animals is a [1]
- (v) An animal that eats plants is a [1]

4. A builder is advising a homeowner about saving energy costs.

(a) The builder uses the diagram below to show where a house loses energy.



(i) Find the percentage heat loss through the windows and doors. [1]

.....

(ii) Heat can be lost by conduction, convection or radiation.

1. **Name** the method of heat transfer through the walls. [1]

.....

2. **Name** the method of heat transfer through the roof. [1]

.....

3. **Name** the method of heat transfer through the floor. [1]

.....

- (b) The builder suggests some methods of saving energy.
These are shown in the table below, together with other information.

Method	Cost	Savings per year	Payback time
Loft insulation	£360	£60	6 years
Cavity wall insulation	£1500	£50	..... years
Draught proofing	£60	£	10 years
Underlay	.....	£5	20 years

- (i) Complete the table. [3]
- (ii) Use the information in the table to give **two** reasons why the homeowner should install loft insulation first. [2]
1.
2.

5. A genetics student is studying about how characteristics are passed from parent to child. One characteristic passed from parent to child is hair colour.

- (a) **B** is the gene for brown hair and **b** is the gene for blonde hair.
The gene for brown hair (**B**) is the dominant gene.
The table shows the possible combinations of gene pairs.

Complete the table to show the hair colour produced by **all** the gene pairs.

[2]

	Gene pairs	Hair colour produced
1.	BB	Brown
2.	Bb	.....
3.	bb	.....

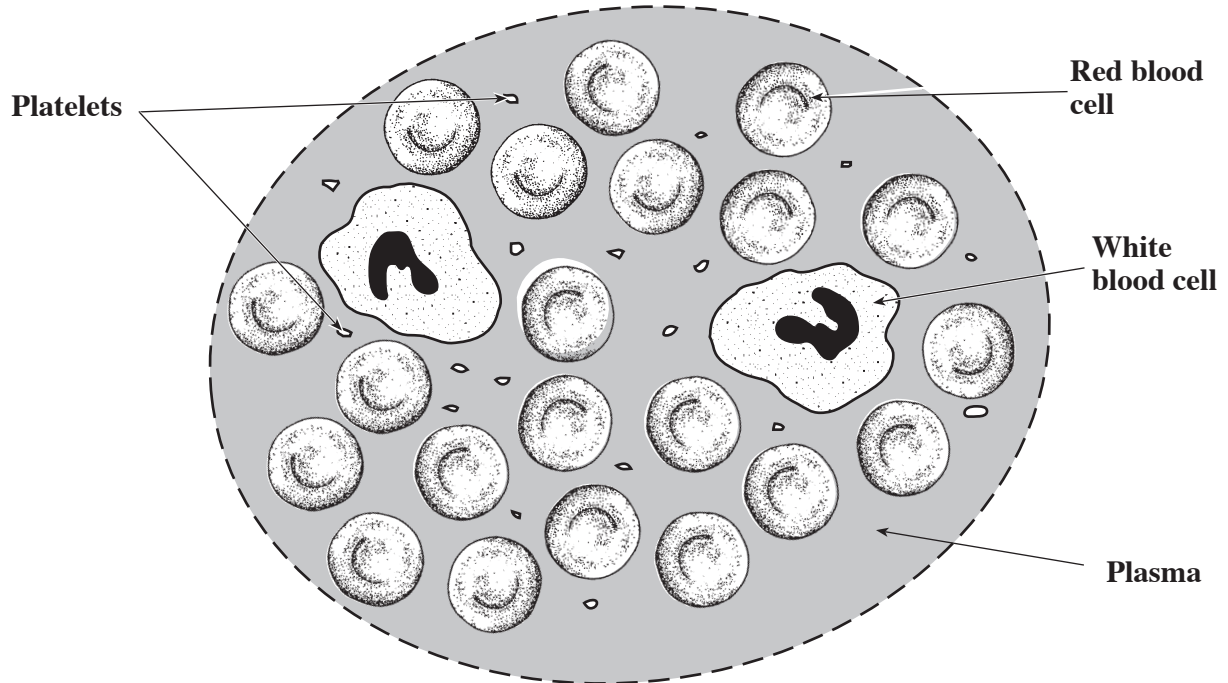
- (b) A child has parents with gene pairs **Bb** and **bb**.
The possible gene pairs of the child can be found using the Punnett square below.

	B	b
b	.....	.....
b	.....	bb

Complete the diagram to show the possible types of gene pairs for the child.
Part of the diagram has been done for you.

[3]

6. Blood is a liquid called **plasma**, containing different cells called **red blood cells**, **white blood cells** and **platelets**.



Each part of the blood has a different job to do.
The table shows some of the parts of the blood and some of the jobs they do.
Complete the table.

[3]

Part of the blood	The job it does
Red blood cell	.....
.....	Destroys germs
.....	Helps clotting

7. Scientists study the properties of materials.

(a) The table shows the properties of some materials.

Material	Hard	Malleable	Brittle
A	yes	no	yes
B	no	no	no
C	yes	yes	no
D	no	yes	no

(i) Which material, **A**, **B**, **C** or **D**, is likely to be a metal? [1]

(ii) Which material, **A**, **B**, **C** or **D**, is likely to be glass? [1]

(b) Some materials in use today are:

polyvinyl chloride (pvc), glass, copper, plywood.

(i) Which material in the list is a composite? [1]

(ii) Which material in the list is a polymer? [1]

(iii) Give **one** reason why electrical wiring is made from copper. [1]

.....

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8. Some farmers use **intensive farming methods** to increase their crop production.

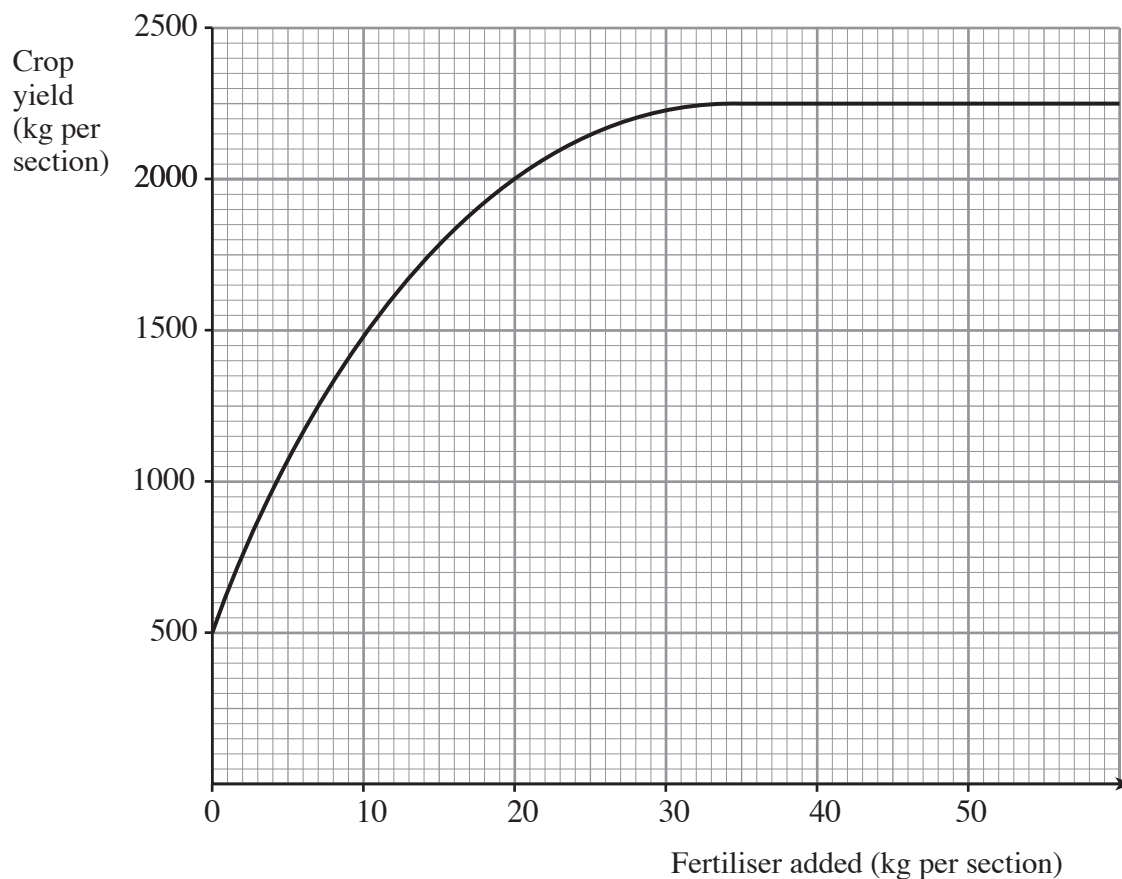
(a) Tick (✓) **two** methods of intensive farming in the list below.

[2]

Using pesticides	
Using a tractor	
Removing weeds by hand	
Using insecticides	

(b) The farmer decides to use artificial fertilisers.
He divides his fields into six equal sections.
He adds no fertiliser to one section and different amounts of fertiliser to the other sections.

The graph below shows the crop production from each section of field with the different amounts of fertiliser added.



(i) Use the graph to find the crop production when no fertiliser is added. [1]

..... kg.

(ii) Use the graph to find the amount of fertiliser needed for crop production of 2000kg per section.

..... kg. [1]

(iii) The farmer expected the crop production to increase if he used more fertiliser. **Explain** whether the graph shows this to be true. [2]

.....

.....

.....

9. The diagrams show the skin at different temperatures.



Diagram A



Diagram B

(i) **State** which diagram, **A** or **B**, shows the skin on a hot day. [1]

(ii) Give **three** reasons for your answer. [3]

1.

2.

3.

10. (a) Read the information in the box below about the ozone layer and ultra violet (UV) radiation. Answer the questions that follow.

Scientists monitor the ozone layer that surrounds the Earth.
 This is because the ozone layer has an important role to play in protecting us from ultra violet radiation from the Sun.
 The Sun produces UV, which is split into three bands: UVA, UVB and UVC.
 UVA is not absorbed by ozone and is harmful to living organisms.
 UVB is also harmful to living organisms but most is absorbed by ozone.
 UVC is completely absorbed by ozone.

- (i) **State** the important role played by the ozone layer. [1]
-

- (ii) Name **one** type of UV radiation that passes through the ozone layer. [1]
-

- (iii) Name **one** type of UV radiation that **does not** pass through the ozone layer. [1]
-

- (iv) What is the health risk if our bodies get too much UV radiation? [1]
-

- (b) UV radiation is part of the electromagnetic spectrum.
 The electromagnetic spectrum is shown in the table below.

Radio waves	A	Infra-red	Visible light	Ultra violet	X rays	B
-------------	----------	-----------	---------------	--------------	--------	----------

- (i) **Name** the part of the electromagnetic spectrum labelled **A**. [1]
-

- (ii) **Name** the part of the electromagnetic spectrum labelled **B**. [1]
-

11. (a) Early astronomers thought that the surface temperature of the planets would decrease as distance from the Sun increased.

This is an example of:

- A an observation
- B a conclusion
- C a prediction

Tick (✓) the correct box above.

[1]

- (b) (i) Later on, astronomers were able to measure radiation from the planets.

This is an example of:

- A an observation
- B a conclusion
- C a prediction

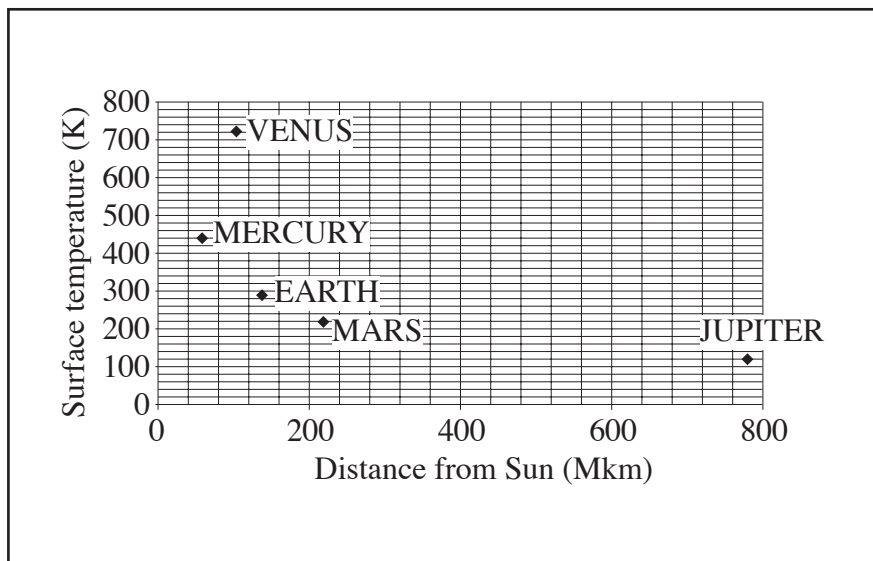
Tick (✓) the correct box above.

[1]

- (ii) This allowed them to calculate the surface temperatures of the planets.

The graph below shows the surface temperatures for the five planets closest to the Sun, and their distance from the Sun.

These planets are Mercury, Venus, Earth, Mars and Jupiter.



Name the planet with the hottest surface temperature.

[1]

A3

(iii) Early astronomers thought that planets further away from the Sun would have lower temperatures.

How many planets follow this pattern? [1]

.....

(c) (i) **Name** the sixth planet from the Sun. [1]

.....

(ii) Using the information in the graph, estimate a value for the surface temperature of this planet.

..... K. [1]

SECTION B (24 marks)

Answer all the questions in the spaces provided.

12. A health visitor is explaining to schoolchildren how microorganisms can cause disease.



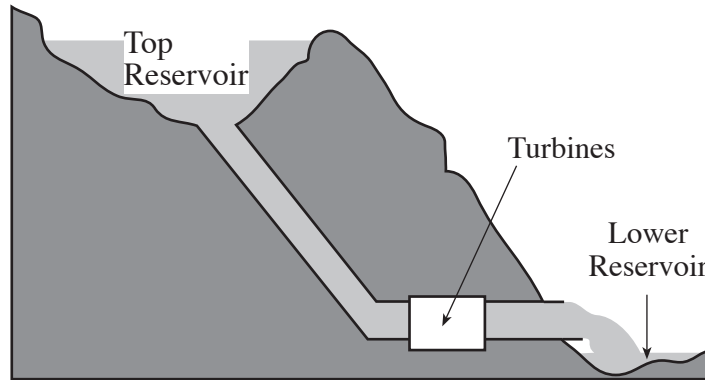
(i) Name **two** types of microorganisms. [2]

..... and

(ii) The health visitor told the schoolchildren they were to be given a vaccination. **Explain** the purpose of giving vaccinations to schoolchildren. [2]

.....
.....

13. A power company that generates electricity for the National Grid uses hydroelectric power. The diagram of a hydroelectric power station is shown below.



(a) Give **two** advantages of using hydroelectric power stations to generate electricity. [2]

(i)

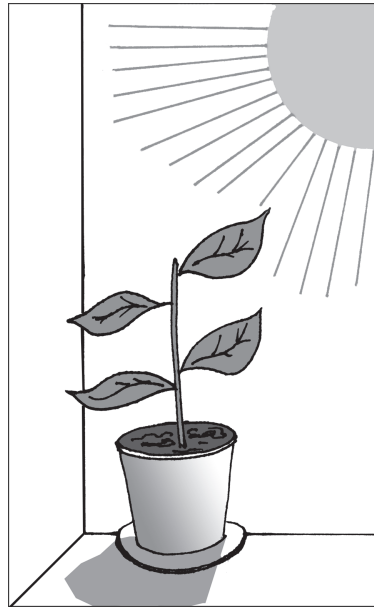
(ii)

(b) Give **two** disadvantages of building a hydroelectric power station. [2]

(i)

(ii)

14. A plant scientist is investigating photosynthesis in plants.



(a) (i) Give **one** reason why plants carry out photosynthesis. [1]

.....
(ii) **Name** the part of the plant in which photosynthesis occurs. [1]

.....

(b) The photosynthesis reaction is shown by the chemical equation below:



(i) **Name** the **two** compounds needed by plants to carry out photosynthesis. [2]

1.

2.

(ii) **Name** the gas produced by the plant during photosynthesis. [1]

15. Many children have problems with tooth decay.

Dentists believe that fluoride should be added to drinking water to reduce tooth decay. Some people say this will not make any difference.

A study was carried out to find if adding fluoride to water would reduce tooth decay. The findings are shown in the table below.

Country	Tooth decay index	Water type
Australia	0.9	fluoridated
Finland	1.2	unfluoridated
Iceland	1.5	unfluoridated
Ireland	1.4	fluoridated
Netherlands	0.9	unfluoridated
New Zealand	1.5	fluoridated
Sweden	1.0	unfluoridated
United States	1.4	fluoridated

Data adapted from World Health Organization (WHO) Oral Health Country Programme.

- (a) Supporters of adding fluoride to water say that the results for Australia show that the lowest index of tooth decay occurs where fluoride is added to water.

Explain why the results in the table do **not** fully support this view. [2]

.....

.....

- (b) Scientists say that they would like more information from the study.

- (i) They would like to know what the tooth decay index was in Australia, Ireland, New Zealand and in the United States before fluoride was added to the water.

Give **one** reason why this information would be useful. [1]

.....

- (ii) They would also like to know whether the results are from a fair test. State **two** ways of making the study a fair test. [2]

1.

2.

16. An electrician was comparing the power produced by different appliances. He took measurements of voltage and current for each appliance. He calculated the power for some of the appliances. These are shown in the table below.

(a) Complete the table to show the power of the tumble drier in kilowatts. [1]

Appliance	Voltage in volts	Current in amps	Power in watts	Power in kilowatts
Microwave	230	3.0	690	0.69
Tumble drier	230	10.0	2300	.....
Hair drier	230	5.0		

(b) The electrical power of a device is given by:

$$\text{power} = \text{voltage} \times \text{current}$$

Use the equation to calculate the power of the hair drier. [2]

Power = W

(c) The electrician calculated the power of the tumble drier. The tumble drier was used for 30 minutes. Using the equation:

$$\text{energy} = \text{power(kW)} \times \text{time(h)}$$

find the energy used by the tumble drier in **kilowatt-hours**, during this time. [3]

Energy = kWh