

Candidate Name	Centre Number	Candidate Number
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**GCSE**

672/01

**APPLIED SCIENCE**

**(Double Award)**

**Unit 2: Science and Society**

**FOUNDATION TIER**

A.M. THURSDAY, 5 June 2008

1¼ hours

For Examiner's use only	
<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.

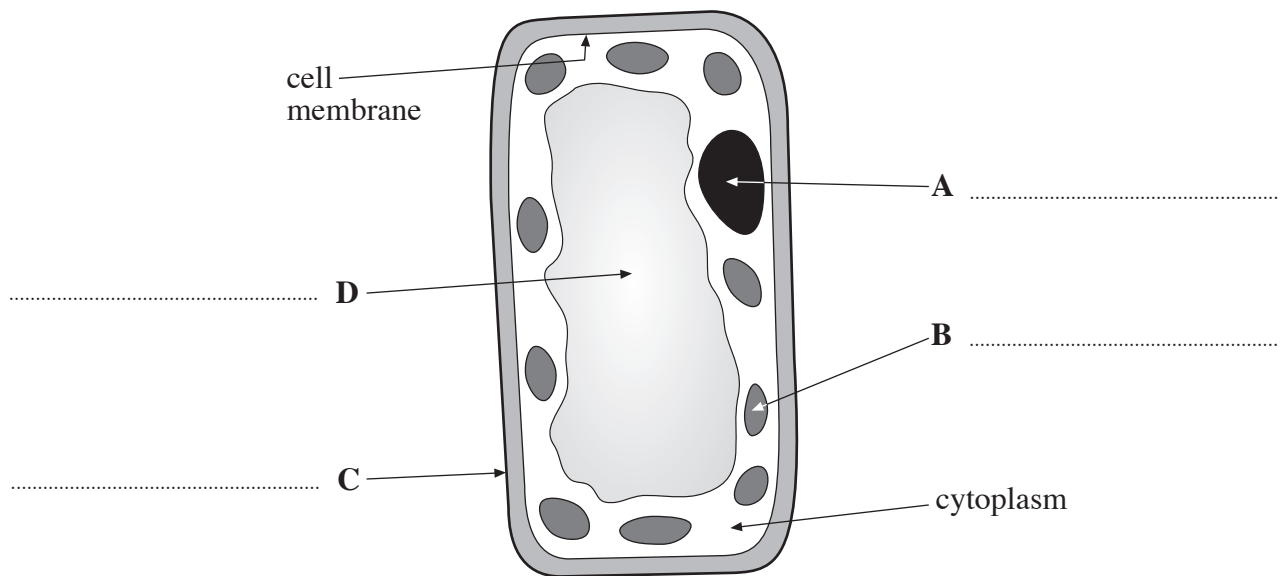
**SECTION A (56 marks)**

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

1. Complete the sentences that follow by underlining the correct word in the brackets. [4]

- (i) The pancreas releases insulin into the blood when the sugar level is too (**low / high**).
- (ii) In a diabetic, blood glucose levels may become very (**low / high**) because of a lack of insulin.
- (iii) (**Herbivores / carnivores / omnivores**) eat meat only.
- (iv) (**Herbivores / carnivores / omnivores**) eat plants only.

2. The diagram shows a plant cell.



(i) Label the parts A, B, C and D using words from the box. [4]

nucleus,      cell wall,      chloroplast,      vacuole,      chromosome

(ii) Green plants make glucose by photosynthesis.

Name the structure in the cell above, that makes the cell green. .... [1]

3. (i) The pictures show uses of electromagnetic radiation.  
Join with a line, the name of a type of electromagnetic radiation with its use.  
Only draw **four** lines.

[4]

Sun bed



Gamma Rays

Heater



Microwaves

Image of skull



Infra red

Satellite dish



Ultra violet

Body scanner



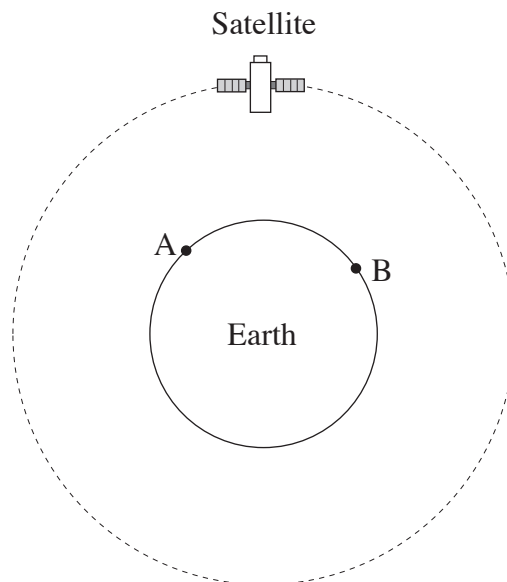
- (ii) State **one** way that medical staff protect themselves from X-rays.

[1]

4. The table shows how the time for one orbit of a satellite depends upon its height above the surface of the Earth.

Satellite	Height above the surface of the Earth (thousands of km)	Time for one orbit (h)
X	20	12
Y	36	24
Z	48	36

- (a) (i) State how the time for one orbit changes as the height above the surface of the Earth increases. [1]
- .....
- (ii) Which satellite, X, Y or Z is in a geostationary orbit? ..... [1]
- (b) Add lines to the diagram to show how the geostationary satellite is used to transfer a signal from A to B. [1]

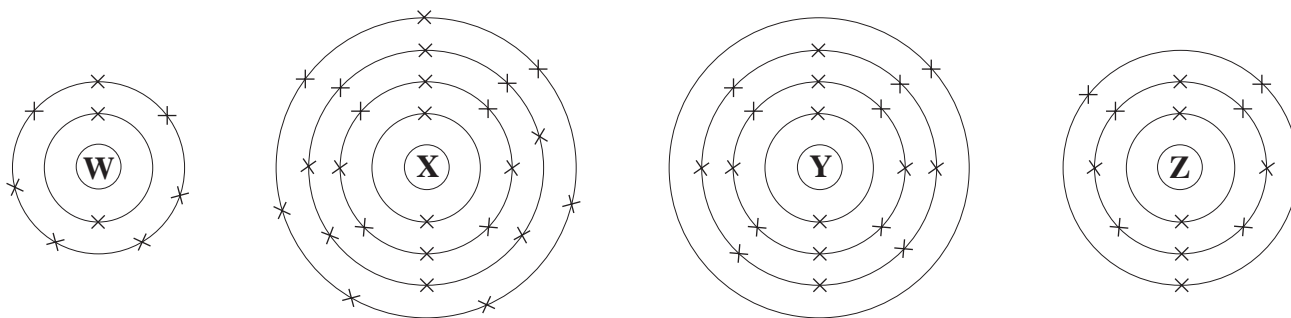


5. The table shows the percentage of electricity generation using different energy sources in some European countries.

	% of Electricity generation by energy source					
	Nuclear	Coal	Oil	Gas	Hydro and Wind	Geothermal and Biomass
<b>France</b>	76	6	2	1	13	1
<b>Spain</b>	30	28	9	12	19	2
<b>Germany</b>	29	28	1	35	5	3
<b>United Kingdom</b>	28	34	2	32	2	2
<b>Italy</b>	0	9	41	27	18	4
<b>Austria</b>	0	6	5	17	67	5
<b>Luxembourg</b>	0	0	0	16	81	3

- (i) Which country produces the largest percentage of electricity using nuclear energy?  
 ..... [1]
- (ii) Which country produces the largest percentage of electricity using coal?  
 ..... [1]
- (iii) Which country produces the largest percentage of electricity using renewable energy sources? ..... [1]
- (iv) What percentage of the electricity in the UK is produced using fossil fuels?  
 ..... [1]

6. The diagrams show the atoms from four elements in the periodic table.



- (a) (i) How many electrons are there in atom Z? ..... [1]
- (ii) How many electrons are there in the outer shell of W? ..... [1]
- (iii) Which atom is from a group 1 element? ..... [1]
- (iv) Which two elements are from the same group of the periodic table?  
..... [1]

(b) The table gives some information about the properties of group 1 elements.

Element	Electron number	Melting point (°C)
Li	3	180
Na	11	98
K	19	64
Rb	37	39
Cs	55	29

- (i) State what happens to the melting point of the elements as the electron number increases. [1]  
.....
- (ii) Complete the following sentence by underlining the correct choice in the brackets. [1]  
Group 1 elements are (**noble gases** / **alkali metals** / **halogens**).
- (iii) Name the element with the symbol **K**. ..... [1]
- (iv) Which of the atoms W, X, Y or Z in the diagrams above is from the element K?  
..... [1]

7. Complete the sentence using words from the box. [5]  
Each word or phrase may be used once, more than once or not at all.

**universe, galaxy, solar system, Mars, Mercury, moon, asteroid.**

- (i) The Sun is at the centre of the .....
- (ii) The nearest planet to the Sun is .....
- (iii) The ..... is the natural satellite of the Earth.
- (iv) The Milky Way is the name of our .....
- (v) The ..... started with a hot Big Bang.

8. Some of the gases in the atmosphere are:

**nitrogen, carbon dioxide, oxygen, ozone.**

- (i) Which gas is used by plants to carry out photosynthesis? ..... [1]
- (ii) Which gas do plants produce as a waste product of photosynthesis? ..... [1]
- (iii) Which gas filters out harmful ultra violet radiation from the Sun? ..... [1]
- (iv) Which gas is a waste product of respiration? ..... [1]

9. There are two varieties of peppered moths.

(a) The picture shows the dark and light peppered moths on the bark of a tree.



(i) Give **one** reason why the dark peppered moth is more likely to be eaten by a bird. [1]

.....

(ii) State what is likely to happen to the size of the population of the dark peppered moth. [1]

.....

(iii) In areas affected by pollution, the bark of trees will be darker.



Explain why the population of dark peppered moths will increase in these areas. [2]

.....

.....



(b) The allele for dark peppered moths is dominant (**D**) and the allele for light peppered moths is recessive (**d**).

(i) State the allele (gene) pair for light peppered moths. .... [1]

(ii) One allele pair for dark peppered moths is **Dd**. State the other allele (gene) pair.  
..... [1]

(iii) If two light peppered moths breed, give **one** reason why none of the offspring can be dark. [1]

.....  
.....

(iv) If two dark peppered moths breed, give **one** reason why some of the offspring could be light. [1]

.....  
.....

10. Two different types of lamps that homeowners could use are shown below.

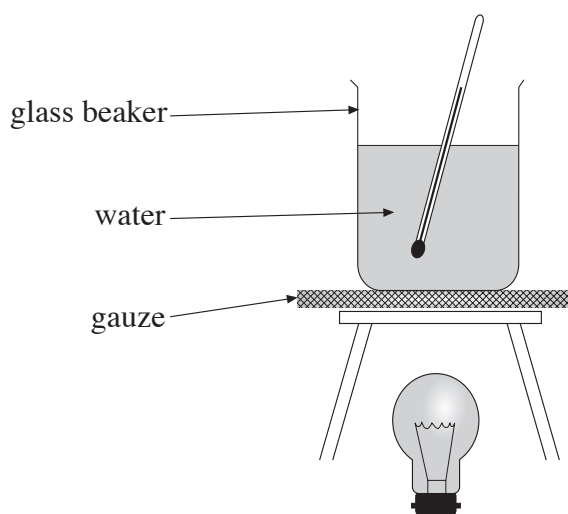
100 W Filament lamp



20 W Low energy lamp



(a) An experiment compares the amount of heat energy given out by the two different lamps. The diagram shows how the experiment will be carried out firstly with the filament lamp.



State **two** things that must be done to make the test fair when repeating it with the low energy lamp. [2]

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

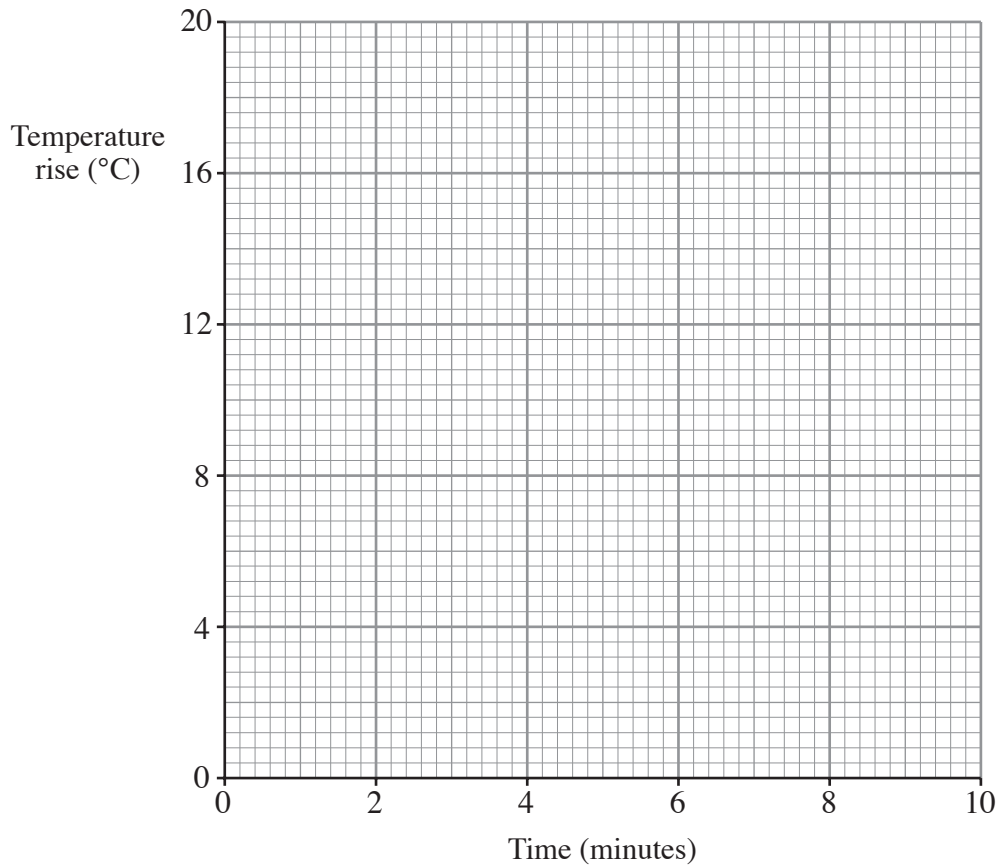
(b) The results from the experiment with the 100W filament lamp are shown in the table.

Time after switching lamp on (minutes)	Temperature of water (°C)	Temperature rise of the water (°C)
0	20	0
2	24	4
4	28	.....
6	32	12
8	36	.....
10	40	20

(i) Complete the table.

[2]

- (ii) Use the data in the table to plot the points on the grid and draw a suitable line. [3]



- (iii) Give **one** reason why the temperature rise will be less when the experiment is repeated with the 20W low energy lamp. [1]

.....

- (iv) Give **two** reasons why using low energy lamps will save a homeowner money. [2]

1. ....

.....

2. ....

.....

**SECTION B (24 marks)**

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

**11.** The MMR vaccine has been successful at protecting children from three diseases caused by viruses.

(a) One of these diseases is rubella.

(i) Name the other **two** diseases. [2]

1. ....

2. ....

(ii) Give **one** reason why rubella cannot be treated with antibiotics. [1]

.....

(b) Some parents are concerned there is a risk that their children could become very ill if given the vaccine.

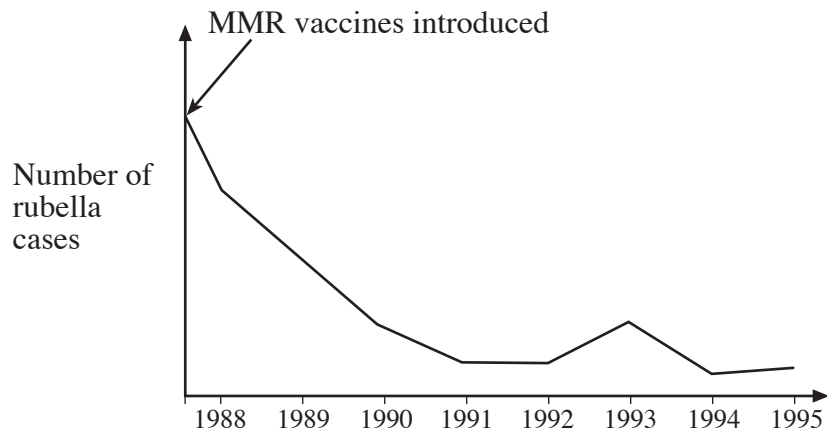
The NHS provided some information comparing the risks of using the vaccine and not using it.

Condition	Rate after natural disease	Rate after first dose of MMR
Convulsions	1 in 200	1 in 1,000
Meningitis/Encephalitis	1 in 200 to 1 in 5,000	Less than 1 in 1,000,000
Conditions affecting blood clotting	1 in 3,000	1 in 24,000
Severe allergic response (anaphylaxis)	–	1 in 100,000
Deaths	1 in 2,500 to 1 in 5,000 depending on age	0

Use this information to give **three** reasons why parents should get their children vaccinated. [3]

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

(c) The graph shows how the number of children suffering from rubella changed after the MMR vaccine was introduced.



(i) If parents decide not to give their children the MMR vaccine, state what is likely to happen to the number of rubella cases in this country. [1]

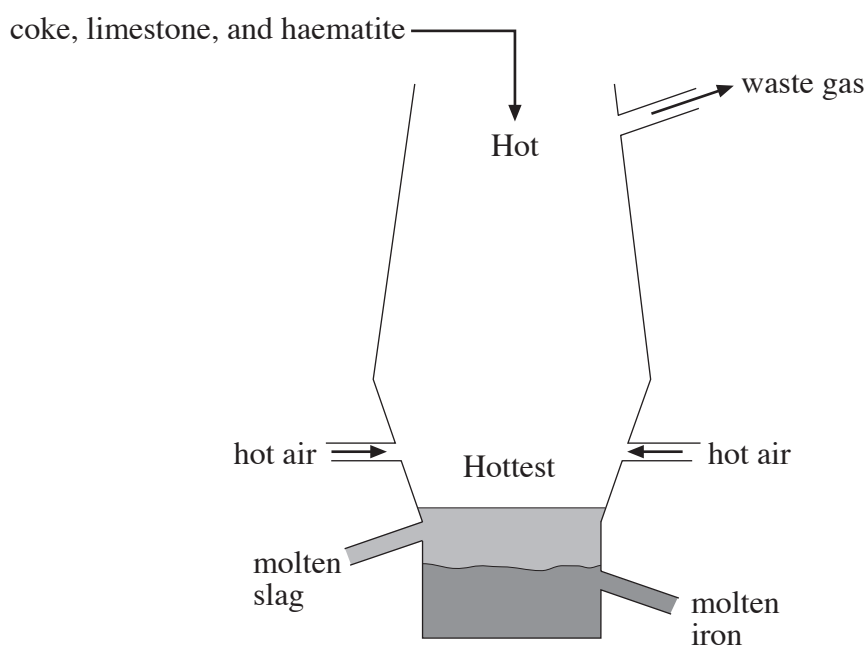
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(ii) Give **one** reason for your answer. [1]

.....

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12. Iron has many uses.  
It is extracted from its ore in a blast furnace as shown below.



- (a) The table shows some information about the raw materials used in the process.  
Fill in the gaps.

[3]

Raw material	Chemical name	Symbol or formula	Type of material
haematite	iron oxide	.....	compound
coke	.....	C	element
limestone	calcium carbonate	CaCO <sub>3</sub>	.....

- (b) In the blast furnace there are several chemical reactions taking place that result in iron being extracted. The coke burns with oxygen to produce carbon dioxide. This reaction is **exothermic**. The CO<sub>2</sub> then reacts with more coke to give carbon monoxide. Carbon monoxide reacts with the iron oxide to give molten iron, which trickles to the bottom of the furnace where it is collected. Carbon dioxide is also produced as a waste gas.

- (i) State what happens in an **exothermic** reaction. [1]

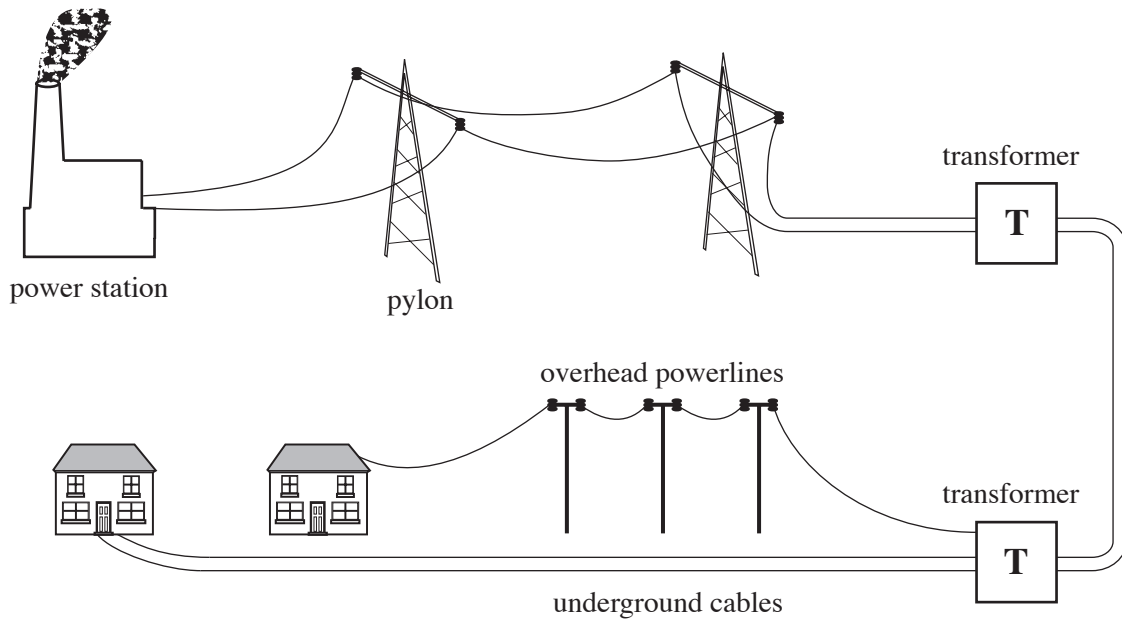
.....

- (ii) Using the information given, complete the word equations below. [3]

carbon dioxide + ..... → carbon monoxide

carbon monoxide + ..... → iron + .....

13. The diagram shows part of the national grid system in this country.



(a) (i) Explain why a national grid system is needed. [2]

.....

.....

.....

(ii) State the purpose of transformers (T) in the grid. [1]

.....

.....

(b) Electrical energy can be sent along overhead wires or underground cables.

(i) State **one** advantage of using overhead wires. [1]

.....

(ii) State **one** advantage of using underground cables. [1]

.....



(c) In one power station, the energy stored in coal is used to produce electricity. When 20 kg of coal is burned, it releases 60 000 000 J of energy.

(i) Calculate the energy in 1 kg of coal. [2]

Energy in 1 kg of coal = ..... J

(ii) When 1 kg of coal is burned in the power station, 1 200 000 J of electrical energy is produced. Use the equation below to calculate the efficiency of the energy transfer. [2]

$$\text{Efficiency} = \frac{\text{useful energy output}}{\text{energy input}} \times 100\%$$

Efficiency = ..... %