

**Tuesday 12 June 2012 – Morning**

**GCSE APPLIED SCIENCE: DOUBLE AWARD J649**

**B482/01** Unit 2: Science for the needs of society (Foundation Tier)

Candidates answer on the Question Paper.  
A calculator may be used for this paper.

**Duration: 1 hour**

**OCR supplied materials:**  
None

**Other materials required:**

- Pencil
- Ruler (cm/mm)



Candidate forename		Candidate surname	
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Centre number						Candidate number				
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**INSTRUCTIONS TO CANDIDATES**

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

**INFORMATION FOR CANDIDATES**

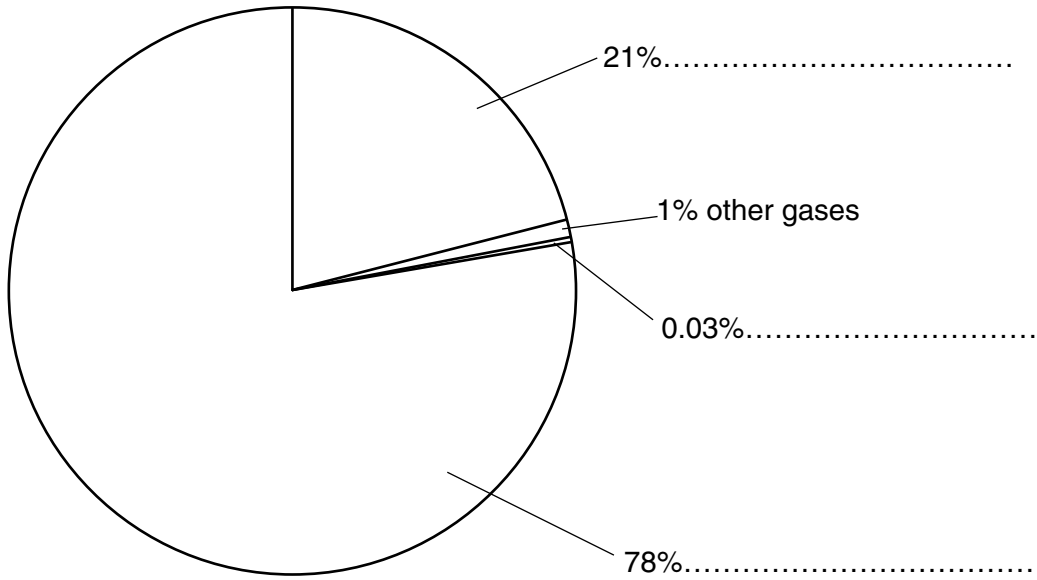
- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **60**.
- The marks allocated and the spaces provided are a good indication of the length of answers required.
- This document consists of **16** pages. Any blank pages are indicated.

Answer **all** the questions.

1 The gases in the Earth's atmosphere are very important to everybody.

(a) The pie chart shows the percentage of different gases in the Earth's atmosphere.

Complete the labels to show the names of the gases.



[3]

(b) Describe how the Earth's **atmosphere** is changing as a result of human activity.

.....  
..... [2]

(c) Some of the carbon dioxide in the atmosphere comes from fossil fuels.

(i) Write down the names of two fossil fuels.

..... and ..... [2]

(ii) How is the energy released from fossil fuels?

..... [1]

(d) Carbon dioxide is also released into the atmosphere by other processes.

Which process produces carbon dioxide?

Put a tick (✓) in the box next to the correct answer.

- |                 |                          |
|-----------------|--------------------------|
| crystallisation | <input type="checkbox"/> |
| evaporation     | <input type="checkbox"/> |
| photosynthesis  | <input type="checkbox"/> |
| respiration     | <input type="checkbox"/> |

[1]

(e) Which of these energy sources do **not** produce carbon dioxide?

Put ticks (✓) in the boxes next to the **two** correct answers.

- |               |                          |
|---------------|--------------------------|
| biofuels      | <input type="checkbox"/> |
| biomass       | <input type="checkbox"/> |
| hydroelectric | <input type="checkbox"/> |
| petrol        | <input type="checkbox"/> |
| wind turbines | <input type="checkbox"/> |

[2]

[Total: 11]

2 The table shows information about some metals that a company uses.

metal	melting point in °C	electrical conductivity	mass of 1 cm <sup>3</sup> of the metal in g	corrosion resistance	cost
aluminium	660	good	2.70	does not corrode	high
silver	961	excellent	10.5	corrodes very slowly	very high
iron	1535	fair	7.90	corrodes quickly	medium
copper	1083	excellent	8.90	corrodes slowly	high

(a) Which metal has the highest melting point?

.....

[1]

(b) Use the information in the table to work out the mass of 5 cm<sup>3</sup> of aluminium.

Show your working.

..... g [2]

(c) The company makes electrical wiring for overhead power cables.

Which metal is the best choice for making overhead power cables?

Explain your answer.

metal .....

explanation .....

..... [2]

(d) Some electrical contacts on circuit boards are made from silver.

The contacts are made by melting the silver.

(i) Give one **disadvantage** of using silver rather than the other metals for making circuit boards.

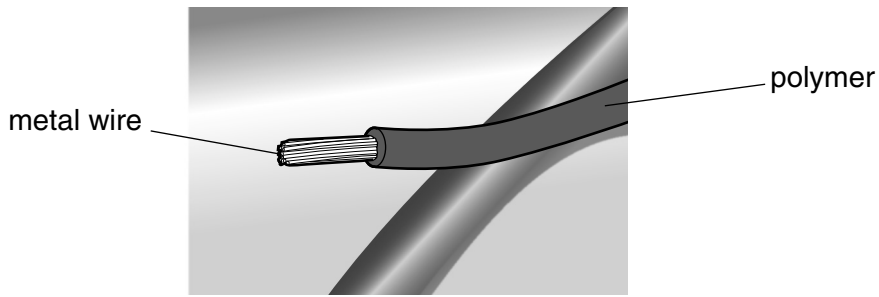
..... [1]

(ii) Give **two** reasons why silver is a good choice for making circuit boards.

1. ....

2. .... [2]

(e) The company uses a polymer as a coating for some of their electrical wires.



Why is a polymer a good choice for coating electrical wires?

Put ticks (✓) in the boxes next to the **two** best reasons.

polymers are made of carbon and hydrogen atoms

polymers are insulators

polymers are very flexible

polymers have low melting points

polymers are made from crude oil

[2]

[Total: 10]

- 3 The Government publishes guidelines about how much alcohol it is safe to drink.

The alcohol content of drinks is measured in units of alcohol.

One small glass of wine or beer contains about one unit of alcohol.

Look at the table. It shows the Government guidelines.

	average body mass in kg	recommended maximum units per day	recommended maximum total units per week
men	79	4	21
women	68	3	14

- (a) Helen is a woman. She drinks 3 units of alcohol every day of the week.

Does Helen drink more alcohol units than the Government recommends?

Explain your reasoning.

.....  
 ..... [2]

- (b) The Government gives different maximum units for men and women.

Suggest why they are different.

.....  
 ..... [1]

(c) Helen reads a magazine article, which says that drinking too much alcohol can damage your heart.

One of the jobs of the heart is to transport substances to the body cells where they are used to release energy.

(i) What substances do cells use to release energy?

Put ticks (✓) in the boxes next to the **two** correct answers.

- carbon dioxide
- nitrogen
- glucose
- oxygen
- hormones

[2]

(ii) What does the heart do to transport these substances around the body?

..... [1]

(d) Helen also smokes cigarettes.

She wants to stop smoking.

Give two benefits to Helen, other than cost, of giving up smoking.

.....  
..... [2]

[Total: 8]

4 'Crop yield' measures how much crop a field produces. Farmers want to increase their crop yields.

Alex works for a company that sells chemicals for use on farms.

He advises a farmer to use some chemicals on a crop.



**Alex**

If you want to increase your crop yield you need to think about spraying your crop with pesticides, fertilisers and herbicides.

The farmer grows wheat.

There are large populations of greenfly and ladybirds that live in wheat fields.

The ladybirds eat the greenfly.

The greenfly feed on the wheat plants.

(a) Use this information to complete the food chain.

energy from the sun → ..... → ..... → ..... [1]

(b) Alex advises the farmer to buy a pesticide to kill the greenfly in one of his wheat fields.

(i) What effect, if any, would killing the greenfly have on the crop yield?

Put a tick (✓) in the box next to the correct answer.

increases

decreases

stays the same

[1]

(ii) Explain why this happens.

.....

..... [1]



- (c) The farmer has noticed that over the years the number of ladybirds in the field has gone down.

What effect do fewer ladybirds have on crop yield?

Explain your answer.

.....  
.....  
.....  
..... [3]

- (d) Alex tells the farmer he should add fertiliser to the soil.

The wheat uses minerals from the fertiliser for growth.

- (i) Which minerals are needed for growth?

Put ticks (✓) in the boxes next to the **two** correct answers.

helium	<input type="checkbox"/>
nitrate	<input type="checkbox"/>
chlorine	<input type="checkbox"/>
phosphate	<input type="checkbox"/>
acids	<input type="checkbox"/>

[2]

- (ii) Which part of the plant absorbs minerals from the soil?

..... [1]

- (e) Alex advises the farmer to use herbicides to kill weeds.

How do weeds reduce crop yield?

..... [1]

- (f) The farmer is not sure that he wants to use herbicides on his wheat.

Give one **disadvantage**, other than cost, of using herbicides on wheat.

..... [1]

[Total: 11]

5 In February 2010, the last steelworks in Britain closed down.

Many local people protested against the closure.



(a) Give one advantage and one disadvantage to local people after the steelworks closed.

advantage .....

disadvantage ..... [2]

(b) Some of the people who worked at the steelworks were scientists.

What jobs at the steelworks must be done by scientists?

Put ticks (✓) in the boxes next to the **two** best answers.

research and development of new processes

selling the steel to customers

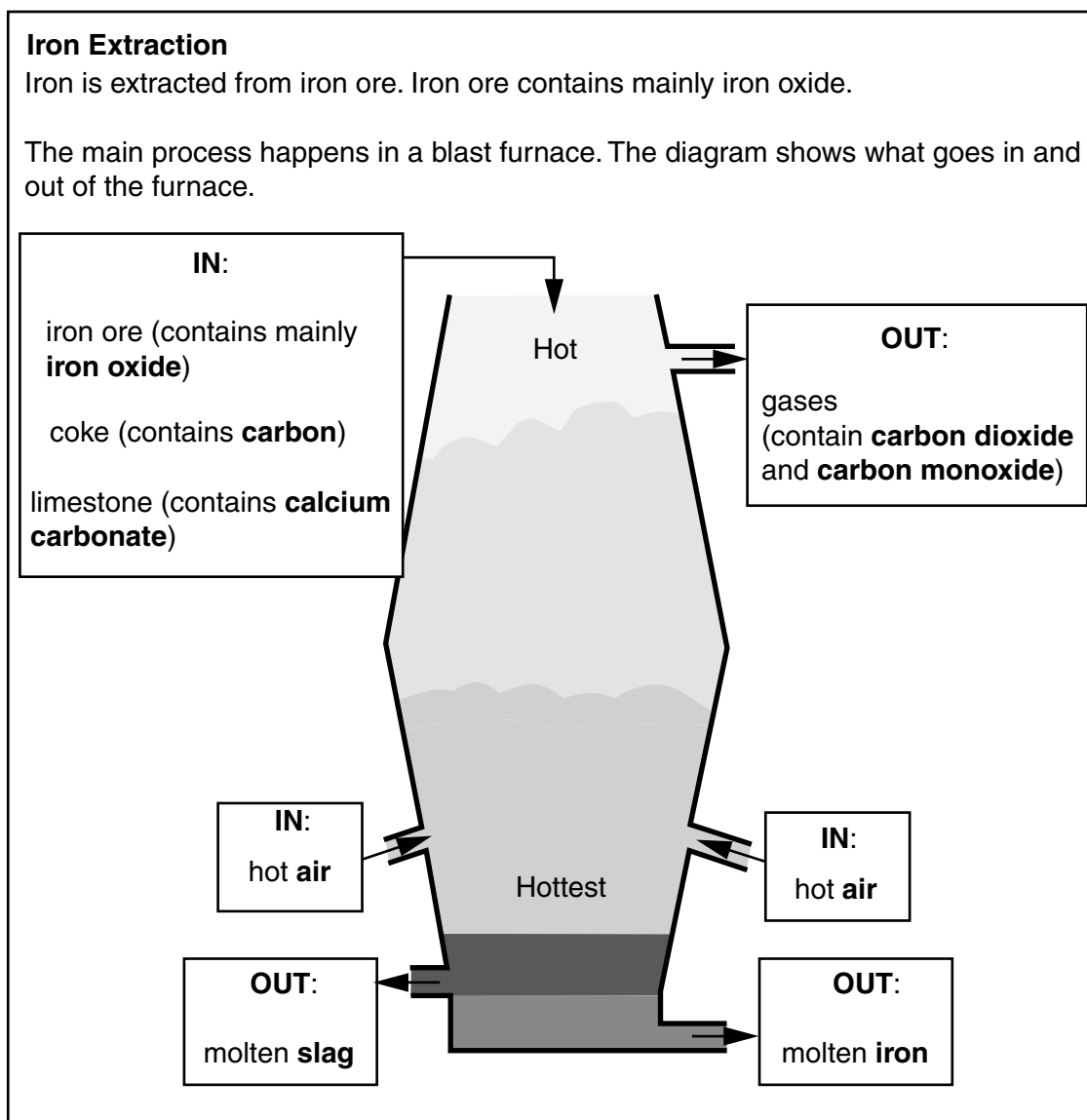
checking the quality of the steel

interviewing new office employees

arranging the transport of the steel around the country

[1]

- (c) The information in the box explains how the iron used to make steel was extracted from iron ore.



Give the name of one **element**, one **compound** and one **mixture** from the diagram.

element .....

compound .....

mixture .....

[1]

(d) The process uses iron ore.

What is an ore?

Put a tick (✓) in the box next to the correct answer.

pure metal

a pure metal compound

a mixture of a mineral with waste rock

a solution of a metal compound

[1]

(e) In a blast furnace, iron oxide reacts with carbon monoxide.

(i) During the reaction the carbon monoxide gas is oxidised.

What is the name of the waste gas that is made in the reaction?

..... [1]

(ii) Write a word equation for the reaction between carbon monoxide and iron oxide.

..... [1]

(f) The information mentions several different substances.

Draw straight lines to join the correct **name** of each substance with its correct **formula**.

name	formula
<input type="text" value="iron"/>	<input type="text" value="CaCO&lt;sub&gt;3&lt;/sub&gt;"/>
<input type="text" value="calcium carbonate"/>	<input type="text" value="Fe&lt;sub&gt;2&lt;/sub&gt;O&lt;sub&gt;3&lt;/sub&gt;"/>
<input type="text" value="iron oxide"/>	<input type="text" value="CO&lt;sub&gt;2&lt;/sub&gt;"/>
<input type="text" value="carbon dioxide"/>	<input type="text" value="CO"/>
	<input type="text" value="Fe"/>

[2]

(g) Which other metal can be extracted by heating its ore with carbon?

Put a **ring** around the correct answer.

**aluminium**

**lead**

**sodium**

**magnesium**

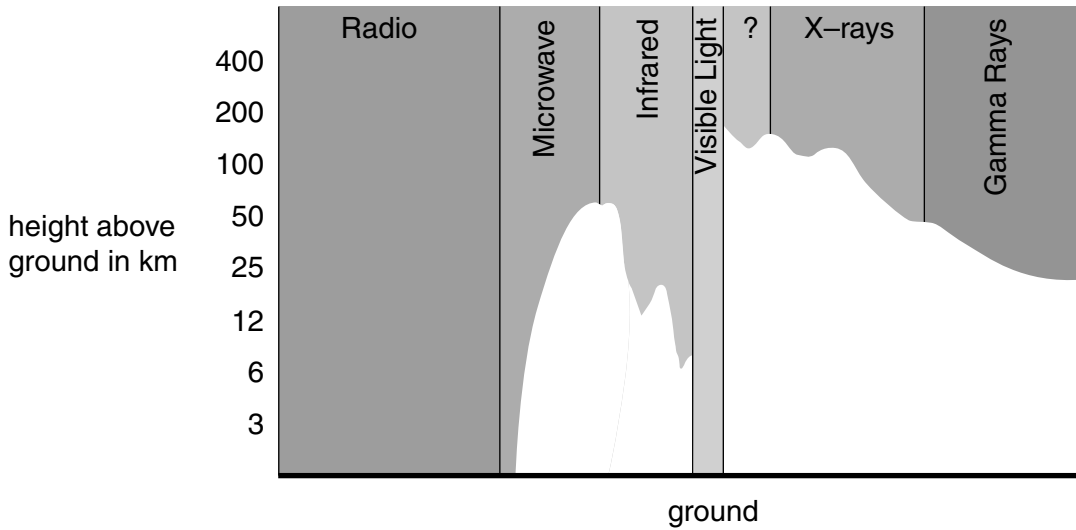
[1]

[Total: 10]

6 Trish works at an astronomical observatory.

- (a) She says the atmosphere is a real nuisance because it absorbs some types of electromagnetic radiation. This means we have to send some types of telescope into space to detect certain parts of the electromagnetic spectrum.

She sketches a graph to show how well each type of electromagnetic radiation gets through the atmosphere.



Use the graph to help you answer the following questions.

- (i) Which types of electromagnetic radiation reach the Earth's surface?  
 ..... and ..... [2]
- (ii) Suggest two types of telescope that could only be used in space.  
 ..... and ..... [2]
- (iii) Which part of the electromagnetic spectrum is not labelled on the graph?  
 ..... [1]

(iv) What is the difference between ultraviolet waves and radio waves in the electromagnetic spectrum?

Put ticks (✓) in the boxes next to the **two** correct answers.

- radio waves have a longer wavelength than ultraviolet waves
- radio waves can be seen by the human eye, ultraviolet waves cannot
- ultraviolet waves have a higher frequency than radio waves
- ultraviolet waves have a larger wavelength than radio waves
- radio waves don't have a frequency, ultraviolet waves do
- radio waves and ultraviolet waves travel at different speeds through space

[2]

(b) (i) Trish uses a telescope to look at objects outside the solar system.

Write down two types of astronomical object outside the solar system that Trish might look at.

..... and ..... [2]

(ii) As an astronomer, Trish often uses the unit **light-year**.

What is a light-year a unit of?

Put a tick (✓) in the box next to the correct answer.

- brightness
- distance
- spectrum
- time

[1]

[Total: 10]

**END OF QUESTION PAPER**

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