OCR
RECOGNISING ACHIEVEMENT

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Thursday 26 January 2012 – Morning

GCSE APPLIED SCIENCE: DOUBLE AWARD J649

B482/02 Unit 2: Science for the needs of society (Higher Tier)

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

OCR supplied materials:
None

Other materials required:
- Pencil
- Ruler (cm/mm)

Duration: 1 hour

B482/02

3708281970

Candidate forename		Candidate surname	

Centre number						Candidate number				

MODIFIED LANGUAGE

INSTRUCTIONS TO CANDIDATES

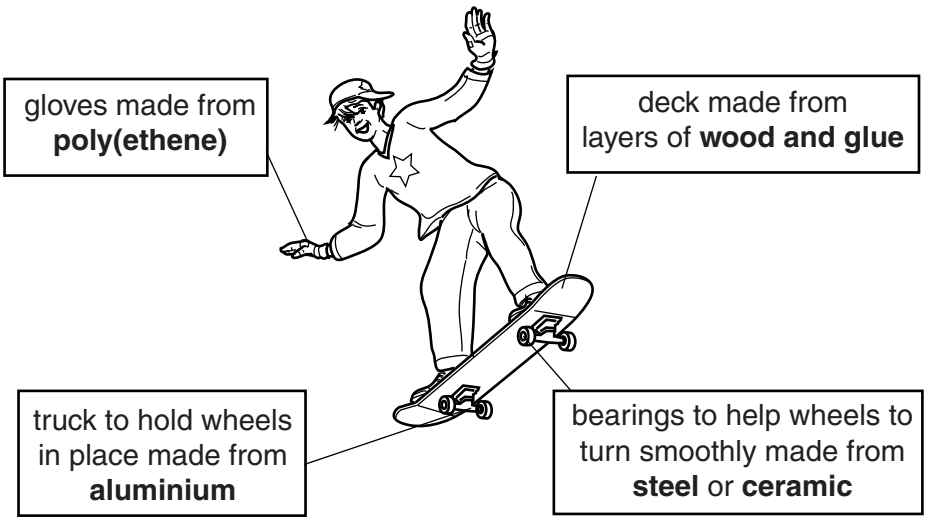
- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting 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 Skateboards and skateboard clothing are made from different materials.



(a) From the substances named on the diagram, give the name of....

(i) ....a **polymer**.

.....

[1]

(ii) ....an **element** that conducts electricity.

.....

[1]

(b) The deck of the skateboard is made of a composite material.

Which of the following statements about composite materials are true and which are false?

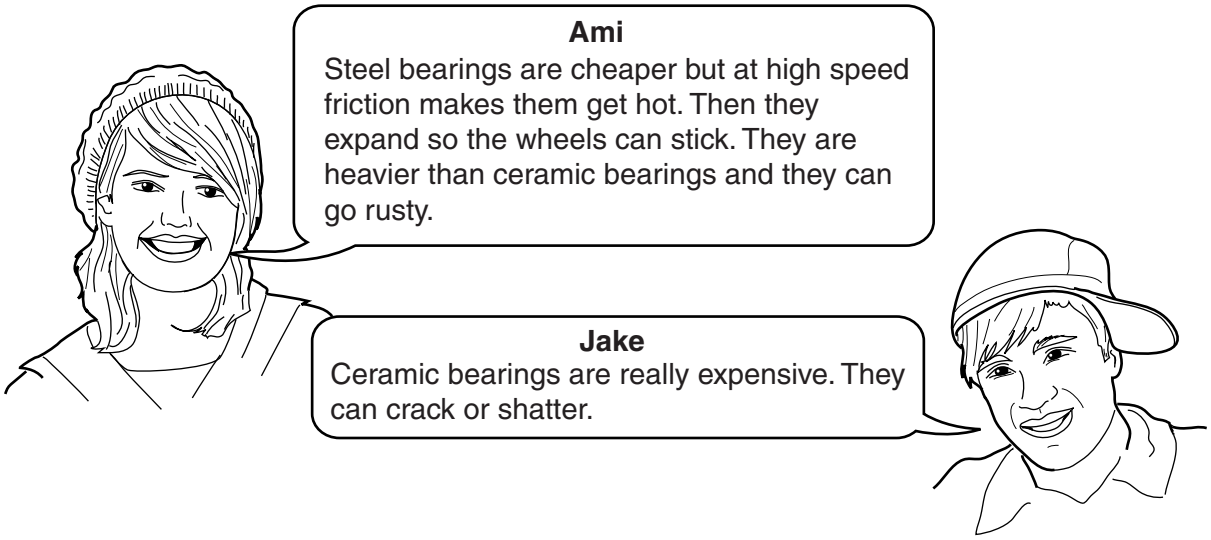
Put a tick (✓) in one box in each row.

	true (✓)	**false (✓)**
all the atoms in a composite are the same		
one example of a composite is glass reinforced plastic		
the properties of a composite are a combination of the properties of the materials used to make it		
materials used to make composites are always arranged in layers		

[2]

(c) Bearings help the wheels on skateboards go round smoothly.

Two friends are talking about the disadvantages of steel bearings and ceramic bearings.



(i) Use the information to explain the **advantages** of using ceramic bearings instead of steel.

.....

.....

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

(ii) Jake says that ceramics can crack or shatter.

What other properties do ceramics have?

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

can be drawn into wires	☐
conduct electricity	☐
do not melt when heated	☐
flexible	☐
hard	☐

[1]

(iii) One of the ceramics used in skateboards is called Cerbec.

Which of the following are also ceramics?

Put (rings) around the **two** correct answers.

glass **ionic** **cement** **melamine** **nylon** **[2]**

(d) Ami has an old skateboard. She thinks the materials used to make the skateboard should be recycled.

Give one **disadvantage** of recycling the materials in old skateboards.

.....

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

[Total: 10]

2 Joan works in a laboratory that studies the Earth's atmosphere.

(a) Some of the main gases in the atmosphere are very important for living things.

Which of the main gases in the atmosphere...

(i) ...is needed for aerobic respiration? ..... **[1]**

(ii) ...keeps the Earth warm? ..... **[1]**

(iii) ...makes up most of the atmosphere? ..... **[1]**

(b) Human activity causes changes to the atmosphere.

Joan monitors these changes.

She monitors some gases emitted by cars and by power stations.

Put a (ring) around **two** gases she might monitor.

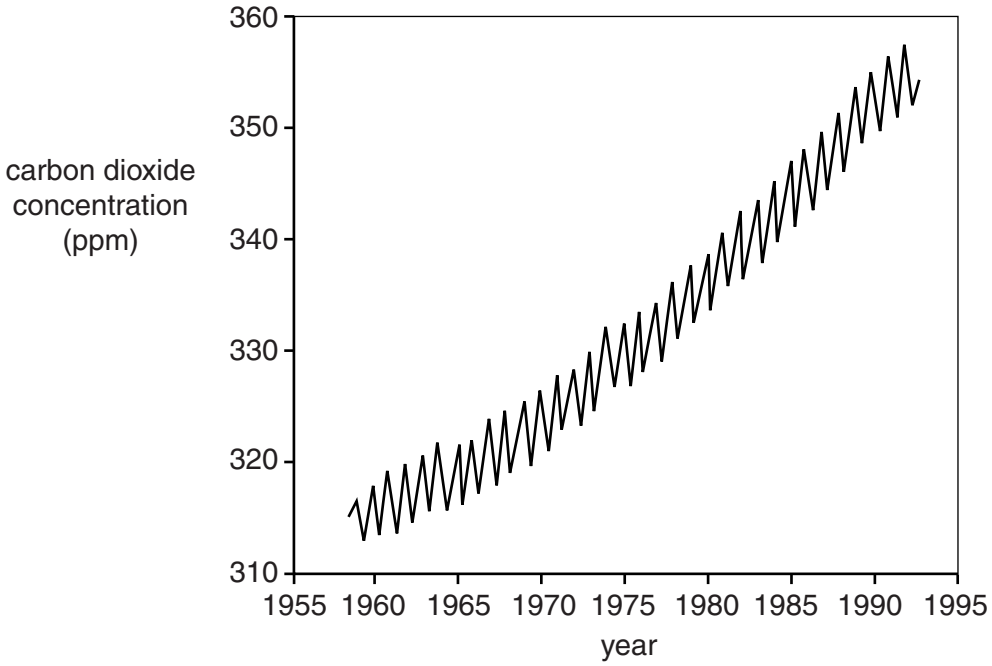
argon **carbon monoxide** **methane** **nitrogen**

oxygen **sulfur dioxide**

[2]

(c) Joan has data on carbon dioxide concentrations in the atmosphere.

She plots the data on a graph.



(i) Describe the **overall trend** shown by the graph.

.....

.....

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

(ii) The graph also shows small changes in the concentration of carbon dioxide during each year. The concentration goes up and down.

Suggest an explanation for these changes during each year.

.....

.....

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

(d) Scientists have been able to find out the concentration of carbon dioxide in the atmosphere over the last 100 **thousand** years.

What method did they use?

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

looking at temperature records	☐
measuring the amount of oxygen and assuming the rest was carbon dioxide	☐
examining ice cores	☐
examining igneous rocks	☐

[1]

[Total: 10]

3 Gary has a farm.

He is trying to decide whether he wants to use organic or intensive farming methods.

(a) Gary lists some of the things that he thinks are important.

Put a tick (✓) in the correct box in each row to show which things are linked to intensive farming and which are linked to organic farming.

	intensive (✓)	**organic (✓)**
high efficiency in energy transfers		
biological control of pests		
higher yields		
more humane conditions for animals		

[2]

(b) One of the differences between organic and intensive farming is in the fertilisers used.

Intensive farming uses artificial fertilisers and organic farming uses natural fertilisers.

Both types of fertiliser contain many nutrients. Three of the most important are Nitrates, P and K.

(i) Write down the name of elements P and K.

P .....

K ..... **[2]**

(ii) Explain what plants use nitrates for.

.....

.....

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

(iii) Fertilisers provide minerals.

How do the minerals get into plant cells?

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

active transport ☐

diffusion ☐

inspiration ☐

osmosis ☐

[1]

(c) Scientists have changed their minds about some processes used in intensive farming.

(i) Explain why DDT is no longer used as a pesticide in the UK.

.....

.....

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

(ii) Now farmers do not feed cows with high protein feed made from dead cows.

Explain why.

.....

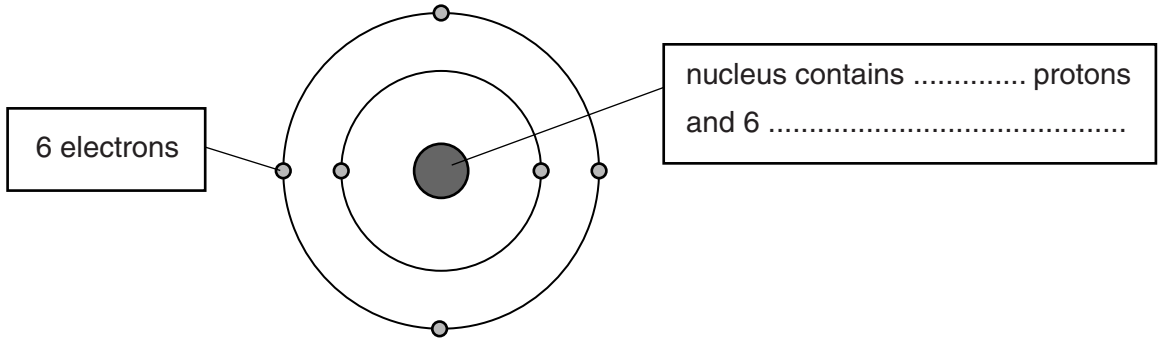
.....

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

[Total: 11]

4 All living things contain the element carbon.

(a) (i) Complete the diagram of the carbon atom.



[2]

(ii) What is the name for compounds that contain carbon?

Put a (ring) around the correct answer.

inorganic **organic** **natural** **speciality** **synthetic** **[1]**

(iii) Some materials do not contain any carbon.

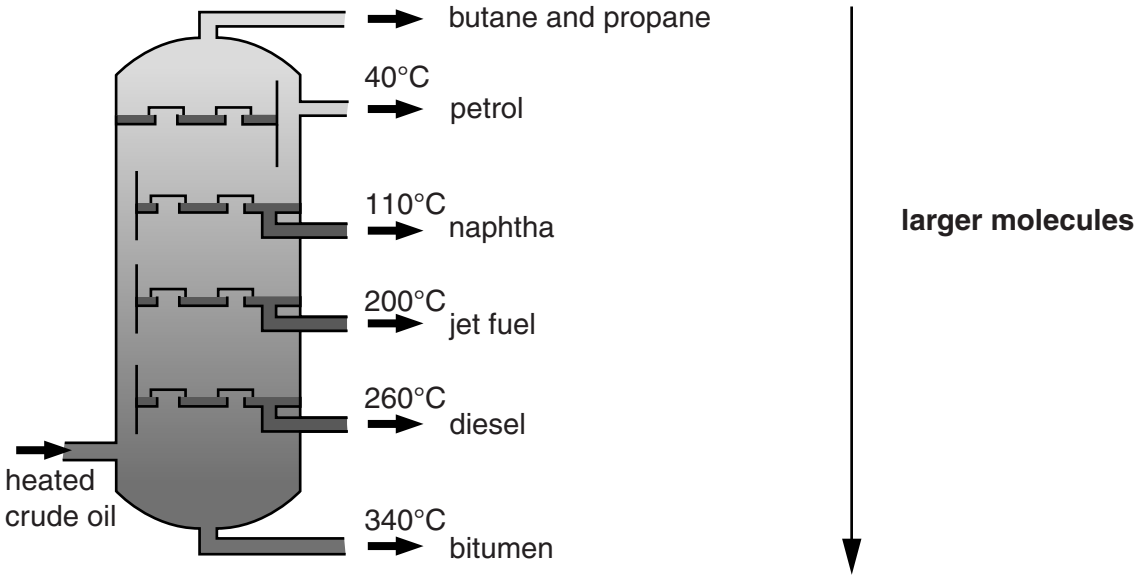
Which of the following do **not** contain carbon?

Put a (ring) around the **two** correct answers.

ceramics **synthetic fertilisers** **limestone** **methane** **polymers** **[1]**

(b) One of the main sources of carbon compounds is crude oil.

The diagram shows the process that separates the molecules in crude oil.



(i) Name this process.

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

(ii) Explain why butane and propane come out of the top of the column but bitumen comes out of the bottom.

.....

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

(iii) Which product that comes out of the column has the strongest forces between its molecules?

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

(iv) There is much less demand for the larger molecules in crude oil.

Petrol companies 'crack' larger molecules to make smaller molecules such as petrol.

Explain why 'cracking' makes the business more profitable and better for the environment.

.....

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

[Total: 10]

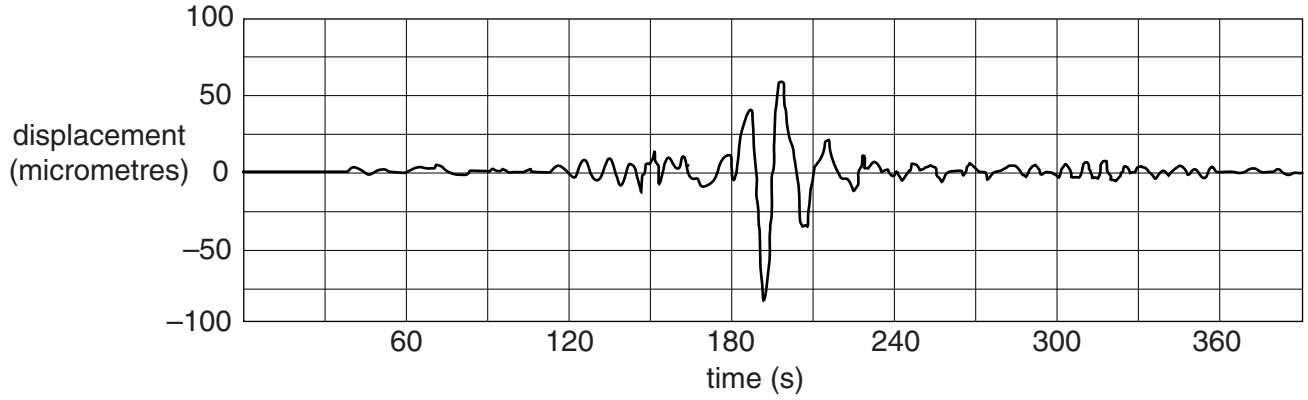
5 Sarah is a geologist, she studies earthquakes.

(a) She records the waves which earthquakes produce.

(i) What is the name of the device that she uses to record earthquake waves?

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

(ii) Here is a recording Sarah made.



What is the frequency of the wave?

frequency = ... unit ..... **[3]**

(iii) With the frequency and wavelength Sarah can work out the speed of an earthquake wave.

Calculate the speed of a wave with a wavelength of 100 m and a frequency of 0.5 Hz.

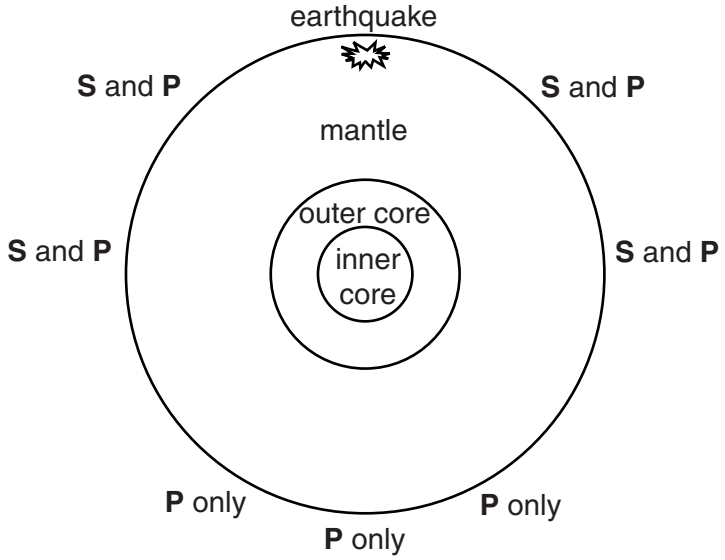
speed = ... m/s **[2]**

(b) Sarah can use information from earthquake waves to find out about the structure of the Earth.

Use the information about earthquake waves below to complete the table.

- **S**-waves can only travel through solids
- **P**-waves can travel through both solids and liquids

The diagram shows which waves from an earthquake are detected at different points on the Earth.



Complete the table to show which parts of the Earth are liquid and which are solid.

Put **one** tick (✓) in each row.

	liquid	**solid**	**cannot tell**
mantle			
outer core			
inner core			

[3]

(c) Sarah says most earthquakes happen at tectonic plate boundaries because the plates are moving.

(i) Draw arrows to show the direction plates are moving at these two plate boundaries.

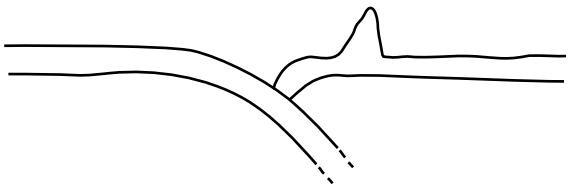


plate boundary **A**

plate boundary **B**

[2]

(ii) What forces are making the plates move?

.....

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

[Total: 13]

6 **(a)** Here is a set of statements describing a reflex arc.

One statement is **not** part of the reflex arc.

A – impulse passes along sensory neuron
B – brain processes impulse
C – muscle contracts
D – impulse passes along effector neuron
E – sensor generates a nerve impulse
F – impulse passes through spinal cord

Put the statements in the correct order to describe a reflex arc from the stimulus to the response.

stimulus | | | | | | response

[2]

(b) The monitoring and control of temperature in the human body involves a number of different processes.

(i) Which of the following body parts controls body temperature?

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

the brain ☐
the neurons of a reflex arc ☐
the lungs ☐
the receptors ☐

[1]

(ii) Explain how vasodilation can help to keep the body's temperature constant.

.....

.....

.....

.....

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

[Total: 6]

END OF QUESTION PAPER

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