

Surname	Initial(s)
Signature	

Paper Reference(s)

**5008                      5036**

# **Edexcel GCSE**

## **Science (5008)**

## **Chemistry (5036)**

C1b – Topics 7 and 8

### **Foundation and Higher Tier**

Friday 19 June 2009 – Morning

Time: 20 minutes

**Materials required for examination**

Multiple Choice Answer Sheet  
HB pencil, eraser and calculator

**Items included with question papers**

Nil

### **Instructions to Candidates**

Use an HB pencil. Do not open this booklet until you are told to do so.  
Mark your answers on the separate answer sheet.

**Foundation tier candidates:** answer questions 1 – 24.

**Higher tier candidates:** answer questions 17 – 40.

All candidates are to answer questions 17 – 24.

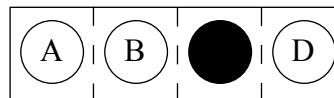
**Before the test begins:**

Check that the answer sheet is for the correct test and that it contains your candidate details.

**How to answer the test:**

For each question, choose the right answer, A, B, C or D  
and mark it in HB pencil on the answer sheet.

For example, the answer C would be marked as shown.



Mark only **one** answer for each question. If you change your mind about an answer, rub out the first mark **thoroughly**, then mark your new answer.

Do any necessary calculations and rough work in this booklet. You may use a calculator if you wish.

You must not take this booklet or the answer sheet out of the examination room.

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**Questions 1 to 16 must be answered by Foundation-tier candidates only.  
Higher-tier candidates start at question 17.**

### **The Chevrolet Sequel car**



This car uses hydrogen as a fuel.  
Hydrogen can be obtained from natural gas.  
Natural gas is a hydrocarbon.

1. The symbol for an atom of hydrogen is
  - A H
  - B Hd
  - C He
  - D Hy
  
2. A hydrocarbon contains
  - A hydrogen only
  - B carbon only
  - C hydrogen and carbon only
  - D hydrogen, carbon and oxygen
  
3. All fuels are
  - A gases at room temperature
  - B liquids at room temperature
  - C solids at room temperature
  - D sources of heat energy
  
4. When hydrogen burns the only substance formed is
  - A water
  - B carbon dioxide
  - C soot
  - D carbon monoxide

## The Earth's atmosphere

The Earth's atmosphere is a mixture of gases.

5. Today's atmosphere is mainly
- A oxygen
  - B carbon dioxide
  - C helium
  - D nitrogen
6. Which of these gases do scientists believe was **not** in the atmosphere very soon after the Earth was formed?
- A oxygen
  - B carbon dioxide
  - C methane
  - D ammonia

*Use the following information to answer questions 7 and 8.*

Recent changes in the composition of the atmosphere have been linked to the burning of fossil fuels.

7. A gas produced by burning fossil fuels is
- A oxygen
  - B carbon dioxide
  - C hydrogen
  - D nitrogen
8. Gases produced by burning fossil fuels may
- A cause an increase in the size of the polar ice caps
  - B reflect all light
  - C cause global warming
  - D stop all of the heat from the Sun reaching the Earth's surface

## Sunscreens

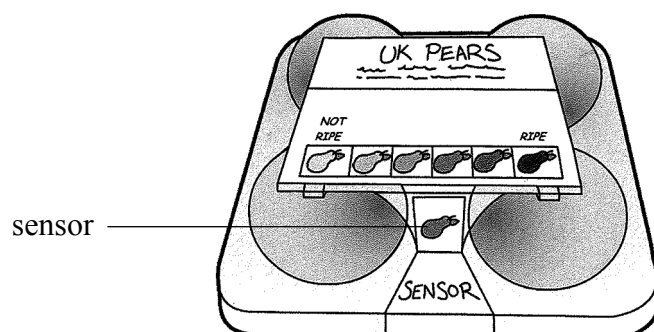
Many sunscreens contain nanoparticles.

Most sunscreens are sold in plastic containers.

9. Which of these statements about nanoparticles is correct?
- A a nanoparticle is more than 1 cm in diameter
  - B the diameter of a nanoparticle is about 0.000000001 m
  - C nanoparticles do not contain atoms
  - D nanoparticles are larger than solid particles in conventional sunscreens
10. An advantage of sunscreens containing nanoparticles is that they
- A always come in smaller bottles than conventional sunscreens
  - B are transparent when rubbed onto the skin
  - C are smart
  - D cost less because you use more
11. Some plastics are recycled.  
An advantage of recycling plastics is
- A a reduction in the amount of solid waste
  - B the use of energy is increased
  - C an increase in the use of landfill sites
  - D an increase in the use of non-renewable resources
12. Plastics are made from crude oil.  
Making plastic containers from recycled plastic is an example of
- A combustion
  - B conserving a non-renewable resource
  - C using a renewable resource
  - D using nanotechnology

## Food and drink

13. Scientists are researching the use of indicator labels.  
The sensor on this pack of pears changes colour as the fruit ripens.



The sensor is made of a material that must be

- A soluble
  - B smart
  - C a nanocomposite
  - D an insulator
14. Beer is made by the process of
- A combustion
  - B desalination
  - C ignition
  - D fermentation
15. Drinking large amounts of beer can cause
- A clearer thinking
  - B antisocial behaviour
  - C improved health
  - D faster reactions
16. Mayonnaise is an emulsion.  
It contains lecithin.  
Lecithin is an emulsifier.

An emulsifier has

- A a hydrophobic part only
- B a hydrophilic part only
- C neither a hydrophobic nor a hydrophilic part
- D a hydrophobic and a hydrophilic part

**Higher tier candidates start at question 17 and answer questions 17 to 40.  
Questions 17 to 24 must be answered by all candidates: Foundation tier and Higher tier**

### **Combustion of fuels**

Many fuels are hydrocarbons.

**17.** Complete combustion of hydrocarbons produces

- A** water only
- B** water and carbon dioxide
- C** carbon dioxide only
- D** carbon

*Use the following information to answer questions 18 to 20.*

Carbon monoxide is formed by the incomplete combustion of hydrocarbons.  
It is a toxic gas.

**18.** Carbon monoxide is particularly dangerous because it is difficult to detect.  
It is difficult to detect because it is

- A** odourless and green in colour
- B** sweet smelling and green in colour
- C** odourless and colourless
- D** sweet smelling and colourless

**19.** The incomplete combustion of hydrocarbons is caused by a shortage of

- A** nitrogen
- B** carbon dioxide
- C** hydrogen
- D** oxygen

**20.** Carbon monoxide is toxic because it

- A** is an alkaline gas
- B** soaks into the skin
- C** attacks the lungs
- D** lowers the ability of the blood to carry oxygen

## Ski clothing

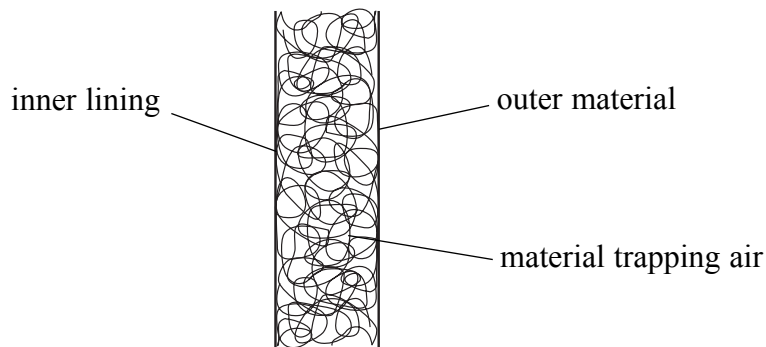
Wayne is going skiing.  
He is wearing a jacket, a helmet and sunglasses.



21. The frames of the sunglasses are made of Flexon.  
Wayne bent the frame of his sunglasses.  
The frame returned to its original shape when warmed.

This shows that Flexon must be

- A a hydrophobic material
  - B a plastic material
  - C a material that reacts to an external stimulus
  - D a metal with a low melting point
22. Wayne's jacket is made of three different types of material.



- the inner lining material takes the moisture away from the body to the outer material
- the outer material lets water vapour out but prevents water from entering
- the material between the inner and outer materials traps air to keep Wayne warm

Which row of the table shows the nature and possible name of the outer material?

	nature of the outer material	possible name of the outer material
A	breathable	Gore-Tex
B	non-breathable	Lycra
C	breathable	Lycra
D	non-breathable	Gore-Tex

*Use the following information to answer questions 23 and 24.*

The table describes four synthetic materials, A, B, C and D.

<b>material</b>	<b>description of material</b>
<b>A</b>	stretchable, lightweight and low strength
<b>B</b>	slippery, brittle and average strength
<b>C</b>	flexible and high strength
<b>D</b>	thin, loosely-packed fibres and low strength

23. Which of these materials has the most important property for the material between the inner and outer layers of Wayne's jacket?
24. A ski helmet protects the head from injury.  
Which of these materials has the most important properties for the material of the outer shell of a ski helmet?

**TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS**

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**Foundation tier candidates do not answer any more questions after question 24.**



**Questions 25 to 40 must be answered by Higher tier candidates only.  
Foundation tier candidates do not answer questions 25 to 40.**

**Ski clothing continued**

25. Some of Wayne's ski equipment is made of carbon fibre which is three times stronger than steel and four times less dense than steel.  
Carbon fibre is most frequently used to make
- A ski gloves and ski poles
  - B skis and ski poles
  - C ski gloves and ski boots
  - D skis and ski gloves

**Public opinion**

*Use this information to answer questions 26 and 27.*

The following headline and article appeared in a newspaper.

**Bio-fuels will harm the planet, MPs (Members of Parliament) said today.**  
Plans to produce bio-fuels from crops should be scrapped, a committee of MPs said today.

26. Growing crops to make bio-fuels will cause
- A an increase in carbon dioxide production
  - B more crude oil to be imported
  - C less land to be available for food production
  - D acid rain
27. Some other people think bio-fuels should be used because
- A supplies of crude oil should be conserved
  - B bio-fuels are non-renewable
  - C the use of bio-fuels is totally sustainable
  - D bio-fuels can be made from coal
28. Some people are concerned about the use of nanoparticles in cosmetics.  
This is because
- A the use of small particles makes the cosmetics less expensive
  - B new materials are usually harmful
  - C the nanoparticles may be harmful to health
  - D all products containing nanoparticles cause pollution

## Gases

Nitrogen and hydrogen are gases at room temperature and pressure.

Hydrogen, instead of petrol, can be used as a fuel in some cars.

29. From what source can nitrogen be obtained and what is the name of the process used to obtain it?

	source	name of process
<b>A</b>	seawater	electrolysis
<b>B</b>	air	electrolysis
<b>C</b>	seawater	fractional distillation
<b>D</b>	air	fractional distillation

30. Here are three statements about hydrogen.

- 1 hydrogen can be produced from renewable and non-renewable resources
- 2 in a fuel tank in a car, hydrogen gas would be stored at atmospheric pressure
- 3 the production of hydrogen requires no energy

Which of these statements is correct?

- A** 1 only  
**B** 2 only  
**C** 3 only  
**D** 2 and 3 only
31. Which is the balanced equation for the burning of hydrogen in air?
- A**  $2\text{H}_2 + 2\text{O}_2 \rightarrow 2\text{H}_2\text{O}$   
**B**  $\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O}_2$   
**C**  $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$   
**D**  $\text{H}_2 + \text{O} \rightarrow \text{H}_2\text{O}$
32. Hydrogen can be obtained from seawater.  
Which group of three substances is also obtained from seawater?
- A** sodium hydroxide, nitrogen and potassium hydroxide  
**B** potassium hydroxide, chlorine and sodium chloride  
**C** potassium chloride, oxygen and sodium hydroxide  
**D** sodium chloride, chlorine and sodium hydroxide

33. Which row of the table shows two uses of hydrogen?

<b>A</b>	to make ammonia	in food packaging
<b>B</b>	to make sulphuric acid	to make margarine
<b>C</b>	to make sulphuric acid	in food packaging
<b>D</b>	to make ammonia	to make margarine

### Wine

Wine is produced by fermentation of the sugars in grape juice.

34. Here are three possible conditions for reactions

- 1 the addition of oxygen
- 2 a temperature of 70°C
- 3 the presence of yeast and water

Which of these are correct conditions for the fermentation of grape juice to form wine?

- A** 1 only
- B** 1 and 2 only
- C** 3 only
- D** 2 and 3 only

35. Which of these is a balanced equation for a fermentation reaction?

- A**  $C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O$
- B**  $2C_2H_5OH + 2CO_2 \rightarrow C_6H_{12}O_6$
- C**  $C_2H_4 + H_2O \rightarrow C_2H_5OH$
- D**  $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$

36. Here are three statements about drinking alcohol

- 1 alcohol poisoning cannot result in death
- 2 drinking one glass of wine will have no effect on the human body
- 3 drinking wine can make people behave differently

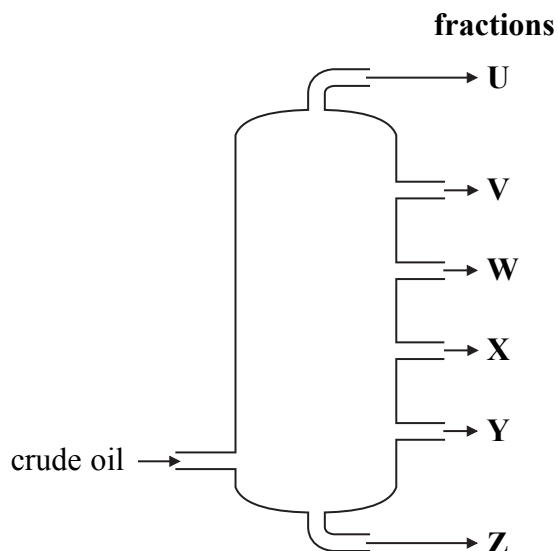
Which of these statements is correct?

- A** 1 only
- B** 2 only
- C** 3 only
- D** 2 and 3 only

## Crude oil

Use this information to answer questions 37 to 39.

The diagram shows a fractionating column used to separate crude oil into useful fractions.



37. Which of the following statements is **not** correct?
- A the highest temperature is at the bottom of the column
  - B each fraction contains a number of different hydrocarbons
  - C the composition of all crude oils is the same
  - D the fraction with the lowest boiling point is collected from the top of the column

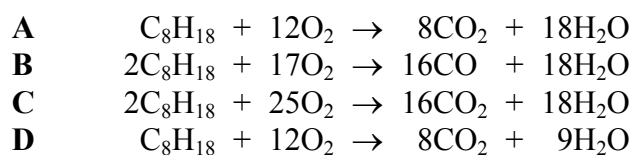
38. The table shows fractions, names of fractions and possible uses of the fractions. Which row of the table is correct?

	<b>fraction</b>	<b>name</b>	<b>used as fuel for</b>
<b>A</b>	<b>V</b>	gases	camping stoves
<b>B</b>	<b>W</b>	petrol	cars
<b>C</b>	<b>X</b>	diesel	lorries
<b>D</b>	<b>Z</b>	bitumen	ships

39. Comparing fractions **W** and **Y**, which row of the table is correct?

	<b>ease of ignition of W</b>	<b>average length of carbon chain in molecules in W</b>
<b>A</b>	easier than <b>Y</b>	shorter than in molecules in <b>Y</b>
<b>B</b>	more difficult than <b>Y</b>	shorter than in molecules in <b>Y</b>
<b>C</b>	easier than <b>Y</b>	longer than in molecules in <b>Y</b>
<b>D</b>	more difficult than <b>Y</b>	longer than in molecules in <b>Y</b>

40. Petrol contains octane,  $C_8H_{18}$ .  
Which of these is the balanced equation for the complete combustion of octane?



**TOTAL FOR HIGHER TIER PAPER: 24 MARKS**

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