

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 4 March 2011 – 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.

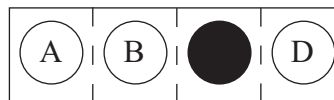
**Before the test begins:**

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.**

### **Making wine**

This equipment can be used to make wine.



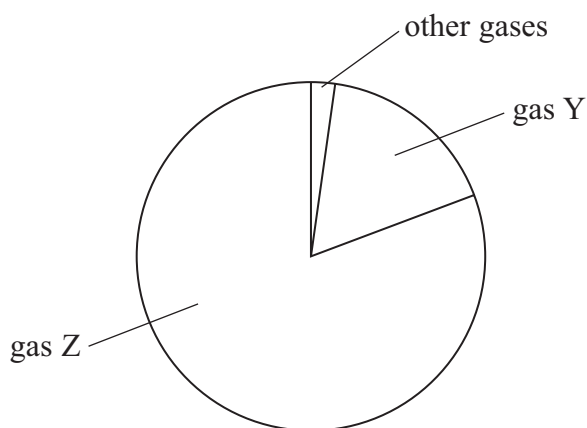
Wine is made by fermentation.  
Wine contains ethanol.

1. Ethanol is found in
  - A water
  - B lemonade
  - C all alcoholic drinks
  - D fresh fruit juice
  
2. The ethanol in this wine is produced from
  - A carbon dioxide
  - B hydrocarbons
  - C water
  - D sugars
  
3. The most suitable of these temperatures for fermentation is
  - A  $-25\text{ }^{\circ}\text{C}$
  - B  $0\text{ }^{\circ}\text{C}$
  - C  $25\text{ }^{\circ}\text{C}$
  - D  $100\text{ }^{\circ}\text{C}$

4. After drinking wine, people have ethanol in their bloodstream. Ethanol in the bloodstream can cause
- A clearer vision
  - B slower reactions
  - C fewer colds
  - D increased alertness
5. When wine is left in an opened bottle for a few days, the taste becomes less pleasant. The taste of the wine changes because the ethanol in it reacts with a gas in air. The gas is
- A carbon dioxide
  - B nitrogen
  - C water vapour
  - D oxygen
6. Wine bottles are made of glass. The glass can be recycled. It is important to recycle glass because
- A glass in landfill sites decomposes to form carbon dioxide
  - B glass that is not recycled must be disposed of by burning
  - C recycling glass releases oxygen into the atmosphere
  - D making new glass uses raw materials

### The Earth's atmosphere

7. The pie chart shows the composition of today's atmosphere.



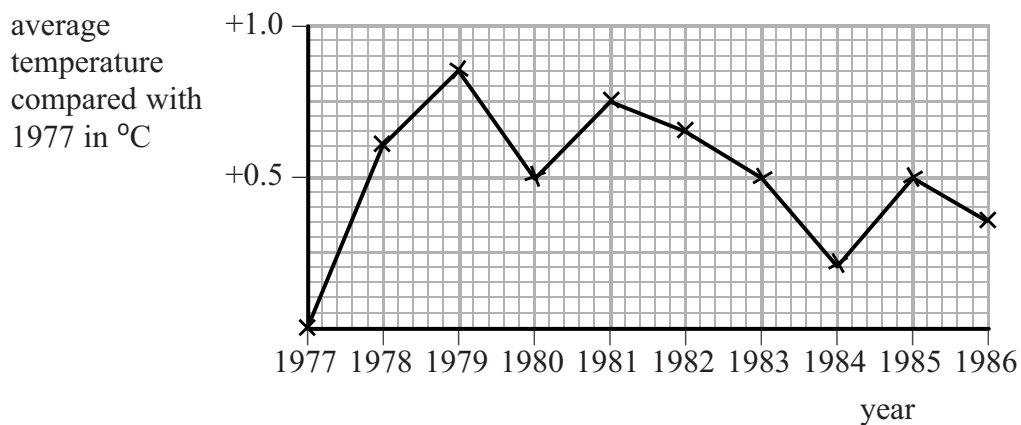
Gas Y is

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

8. Which of these gases in the Earth's atmosphere is most likely to cause global warming?
- A hydrogen
  - B argon
  - C carbon dioxide
  - D nitrogen

*Use this information to answer questions 9 and 10.*

Scientists measured the average temperature of the Earth's upper atmosphere each year. The graph shows this temperature for each year compared with the temperature in 1977.



9. The highest average temperature for each year between 1977 and 1986 was recorded in
- A 1978
  - B 1979
  - C 1984
  - D 1985
10. From 1977 to 1986 the temperature of the Earth's upper atmosphere
- A increased overall
  - B decreased overall
  - C increased every year
  - D decreased every year

## Clothes

Use the following information to answer questions 11, 12 and 13.

The table shows the properties of four materials used in clothing.

material	properties
Sympatex	breathable and waterproof
Lycra	very stretchy
Thinsulate	traps air to provide thermal insulation
Nomex	fireproof

11. The photograph shows a racing car driver leaving his car after it has burst into flames.



Which material is likely to be used in a racing car driver's suit to provide protection?

- A Sympatex
  - B Lycra
  - C Thinsulate
  - D Nomex
12. Jane wears a hat made of Thinsulate.  
Thinsulate is used to
- A keep her dry in very heavy rain
  - B stop her sweating in hot weather
  - C keep her head warm
  - D protect her from lightning
13. Lycra is often used in clothing for athletes.  
It is used to make the clothing
- A strong
  - B fit closely
  - C waterproof
  - D colourful

## Fuels

14. Methane,  $\text{CH}_4$ , is used as a fuel.  
Methane
- A is a hydrocarbon
  - B is a mixture of hydrogen and carbon
  - C is a liquid at room temperature and pressure
  - D does not produce water when burnt
15. All useful fuels
- A are solids
  - B are liquids
  - C burn with a sooty flame
  - D produce heat when burnt
16. Logs cut from trees can be used as a fuel.  
The trees provide a sustainable source of fuel if
- A only young trees are used
  - B trees are grown to a large size before being cut down
  - C new trees are planted to replace those cut down
  - D more than one type of tree is used

**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.**

### **Alternative fuels**

E85 is used in some countries as a fuel for cars.  
It is a mixture of 85% ethanol and 15% petrol.  
The ethanol in the mixture is made from plants.

17. Using E85 instead of petrol is an advantage because
- A E85 is a totally renewable fuel
  - B when plants grow they remove carbon dioxide from the atmosphere
  - C when ethanol burns it does not produce carbon dioxide
  - D crude oil is not used to produce E85
18. One problem caused by using E85 instead of petrol is that
- A ethanol is difficult to ignite
  - B large areas of land are needed to grow the plants
  - C the products of combustion are different from those produced by burning petrol
  - D stronger fuel tanks are required for E85 than for petrol

*Use the following information to answer questions 19 and 20.*

Some buses use hydrogen instead of diesel as a fuel.  
The hydrogen is produced from water, using large amounts of energy.

19. A disadvantage of using hydrogen is
- A the product of combustion is toxic
  - B it produces soot when burnt
  - C it is expensive to produce
  - D hydrogen does not burn well in cold weather
20. An advantage of using hydrogen as a fuel is
- A no waste products are formed
  - B it is a bio-fuel
  - C there are large supplies of the raw material from which it is made
  - D hydrogen is less explosive than petrol

## Useful materials

21. E471 is an emulsifier used in ice cream.  
The emulsifier
- A acts as a preservative
  - B stops the ice cream mixture separating
  - C stops the ice cream mixture melting
  - D makes the ice cream softer
22. John has a toothbrush with a handle that changes colour after being held in the hand for two minutes.  
The bristles of the brush are made from nylon.  
They do not change colour.



Which row of the table describes the material used for the handle and the nylon used for the bristles?

	material used for handle is	nylon is
A	smart	not smart
B	not smart	smart
C	smart	smart
D	not smart	not smart

23. Common salt, obtained from sea water, is used as a preservative for foods.  
The chemical name of common salt is
- A sodium
  - B sodium carbonate
  - C sodium hydroxide
  - D sodium chloride
24. Silver nanoparticles have many uses.  
Which of these is the smallest particle?
- A a nanoparticle of silver
  - B a silver crystal
  - C the particles in silver powder
  - D an atom of silver

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

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

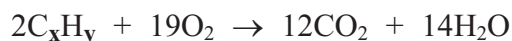


**Questions 25 to 40 must be answered by Higher tier candidates only.  
Foundation tier candidates do not answer questions 25 to 40.**

**Producing heat**

- 25.** Butane,  $C_4H_{10}$ , is used as a fuel in some portable heaters.  
Possible products of the incomplete combustion of butane are carbon monoxide and a substance Y.
- Y is
- A** carbon dioxide
  - B** sulphur dioxide
  - C** nitrogen
  - D** carbon
- 26.** Some people fit carbon monoxide detectors in their homes.  
Carbon monoxide is difficult to detect without this special detector because it
- A** is heavier than air
  - B** spreads rapidly
  - C** is colourless and odourless
  - D** does not take part in chemical reactions
- 27.** Carbon monoxide is dangerous because it
- A** causes respiratory diseases such as asthma
  - B** combines with haemoglobin in the blood
  - C** combines with oxygen in the lungs
  - D** causes death by forming blood clots
- 28.** Which of these statements about the combustion of butane are correct?
- 1 during complete combustion butane burns with a yellow flame
  - 2 incomplete combustion occurs if there is insufficient oxygen for complete combustion
- A** 1 only
  - B** 2 only
  - C** both 1 and 2
  - D** neither 1 nor 2

29. The formula of a hydrocarbon is  $C_xH_y$ .  
The equation for the combustion of this hydrocarbon is



The formula of this hydrocarbon is

- A  $C_6H_{12}$
- B  $C_6H_{14}$
- C  $C_{12}H_{24}$
- D  $C_{12}H_{28}$

### Useful products

Over many years chemists have made products that are useful.  
Research is carried out to develop new products.

30. Teflon is used to coat the inner surface of some saucepans.  
This use of Teflon
- A is to improve the flavour of the food
  - B reduces the amount of energy needed to cook the food
  - C was discovered after Teflon was first made
  - D is the only use for Teflon
31. Which of these statements about ethanol is **not** correct?
- A ethanol in the bloodstream has no effect on a person's reaction time
  - B consuming drinks containing ethanol can cause antisocial behaviour
  - C consuming drinks containing ethanol can make a person more self-confident
  - D large amounts of ethanol in the bloodstream can cause a person to become unconscious
32. Ethanol is produced by fermentation.  
Which of these is a balanced equation for the production of ethanol by fermentation?
- A  $C_2H_4 + H_2O \rightarrow C_2H_5OH$
  - B  $C_6H_{12}O_6 + 2H_2O \rightarrow 2C_2H_5OH + 2CO_2 + 2H_2$
  - C  $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$
  - D  $C_6H_{12}O_6 + 3H_2O \rightarrow 3C_2H_5OH + 3O_2$

33. Beer is brewed by fermentation of a mixture of substances.  
Which row of the table shows three substances that must be present in the mixture for fermentation to take place?

	<b>substances</b>		
<b>A</b>	water	carbon dioxide	sugar
<b>B</b>	carbon dioxide	sugar	yeast
<b>C</b>	yeast	sugar	water
<b>D</b>	sugar	yeast	ethanol

34. Nanoparticles are used in some new products.  
Which of these statements are correct?

- 1 scientists are certain that products containing nanoparticles pose no risk to humans
- 2 nanoparticles in these products cannot enter the environment

- A** 1 only  
**B** 2 only  
**C** both 1 and 2  
**D** neither 1 nor 2

35. Mayonnaise can be made from oil, vinegar and egg yolks.  
The egg yolks contain lecithin.  
The lecithin molecule has a hydrophilic part and a hydrophobic part.  
Which row of the table explains why lecithin prevents oil and vinegar from separating?

	<b>hydrophilic part of lecithin molecule attracted to</b>	<b>hydrophobic part of lecithin molecule attracted to</b>
<b>A</b>	oil	vinegar
<b>B</b>	egg	oil
<b>C</b>	vinegar	egg
<b>D</b>	vinegar	oil

36. Gore-Tex is a 'breathable' fabric which has a special membrane.  
Which of these statements about Gore-Tex are correct?

- 1 the membrane prevents water droplets passing through
- 2 all the holes in the membrane are smaller than a water molecule

- A** 1 only  
**B** 2 only  
**C** both 1 and 2  
**D** neither 1 nor 2

37. Sodium hydroxide and hydrogen are manufactured from raw materials. Sodium hydroxide and hydrogen have important uses. Which row of the table shows the correct raw material and a use for the substance named?

	substance	raw material	use
A	sodium hydroxide	sodium metal	making soap
B	sodium hydroxide	rock salt solution	flavouring food
C	hydrogen	liquid air	as a fuel
D	hydrogen	rock salt solution	making hydrochloric acid

### Crude oil

38. Fractional distillation is used to separate crude oil into useful substances. The process uses a fractionating column. Which of these statements about fractional distillation are correct?
- 1 propane,  $C_3H_8$ , is present in the fraction obtained from the top of the column
  - 2 crude oil is heated before it enters the bottom of the column
- A 1 only  
B 2 only  
C both 1 and 2  
D neither 1 nor 2
39. Diesel oil and kerosene are both obtained from crude oil. They can both be used as fuels. Which of these statements is **not** correct?
- A kerosene is more likely to solidify in cold weather than diesel oil  
B diesel oil is more difficult to ignite than kerosene  
C both fuels produce the same products on complete combustion  
D kerosene is less viscous than diesel

40. Four fractions obtained from crude oil are shown in the table. The table also shows the average size of the molecules in these fractions and their uses. Which row of the table is correct?

	<b>fraction</b>	<b>average size of molecules in fraction</b>	<b>used as a fuel for</b>
<b>A</b>	gases	smaller than those in kerosene	trains
<b>B</b>	fuel oil	larger than those in kerosene	power stations
<b>C</b>	kerosene	smaller than those in gases	planes
<b>D</b>	naphtha	larger than those in gases	ships

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

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