

Surname	Initial(s)
Signature	

Paper Reference(s)

5008 5036

Edexcel GCSE

Science (5008)

Chemistry (5036)

C1b – Topics 7 and 8

Foundation and Higher Tiers

Wednesday 5 March 2008 – 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.

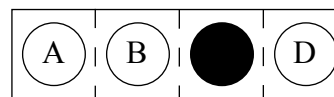
Before the test begins:

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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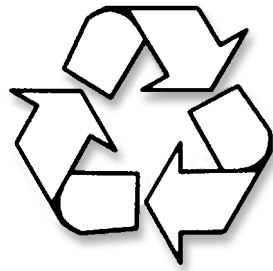
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Turn over

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

Recycling



On average each household in the United Kingdom produces about 1 tonne of solid waste a year. Much of this waste is deposited in landfill sites. Some of this waste can be recycled.

1. Steel cans are easy to separate from aluminium cans because steel cans are
 - A less dense
 - B shiny
 - C magnetic
 - D conductors

2. Compared to making new glass bottles, recycling old bottles
 - A uses more raw energy
 - B is more expensive
 - C saves energy
 - D means more material is put in landfill sites

3. Paper rots in landfill sites to form methane gas. Methane can be used as a fuel because it
 - A burns to produce heat energy
 - B is a colourless gas
 - C is not renewable
 - D is only found in landfill sites

4. Drinking water can be recovered from sea water by desalination. In the process
 - A salt is added
 - B no energy is required
 - C salt is removed
 - D water is added

New materials

Use the information in the table to answer questions 5, 6 and 7.

The table shows names and properties of three man-made materials.

name of material	properties of material
Gore-Tex	breathable and waterproof
Lycra	very stretchy
Teflon	very slippery

5. Jackets made of Gore-Tex
- A absorb rainwater
 - B keep sweat in
 - C allow rainwater in
 - D allow sweat to escape
6. An advantage of using Lycra instead of cotton in sports swimwear is that Lycra
- A reacts with chlorine in the swimming pool
 - B fits closely
 - C reacts with seawater
 - D loses its shape
7. The property of Teflon given in the table means Teflon can be used for
- A car tyres
 - B car windscreen wiper blades
 - C adhesives
 - D ladders
8. Kevlar is a material which protects against small, fast-moving objects. Which of these does **not** use Kevlar?
- A football shirts
 - B gloves for gardening
 - C sword-fencing clothing
 - D bulletproof vests

Carbon monoxide

The following appeared on a safety information sheet.

NEVER use petrol-powered generators indoors or in a garage. They produce carbon monoxide that can build up to dangerous levels in minutes.

9. The formula for carbon monoxide is
- A C
 - B CO
 - C CO₂
 - D Co
10. The carbon monoxide is produced because there is a lack of
- A energy
 - B nitrogen
 - C oxygen
 - D petrol
11. The carbon monoxide is dangerous because it is
- A toxic
 - B explosive
 - C very smelly
 - D an unstable liquid
12. Petrol is obtained from crude oil by
- A complete combustion
 - B desalination
 - C incomplete combustion
 - D fractional distillation

Bio-ethanol

Bio-ethanol is a bio-fuel which can be used instead of petrol.
Ethanol can be produced from many crops, including maize and wheat.
Ethanol is also present in alcoholic drinks.

13. Which of these is needed to produce ethanol from sugar?
- A oxygen
 - B carbon dioxide
 - C a temperature of 100°C
 - D yeast
14. Which of these is correct and an advantage of using bio-ethanol, instead of petrol, as a fuel?
- A bio-ethanol is non-biodegradable
 - B bio-ethanol is non-renewable
 - C growing crops to make large quantities of bio-ethanol uses only small areas of land
 - D use of bio-ethanol conserves oil supplies
15. Which word equation correctly shows the complete combustion of ethanol?
- A ethanol + air → carbon dioxide
 - B ethanol + oxygen → carbon dioxide
 - C ethanol + air → carbon dioxide + water
 - D ethanol + oxygen → carbon dioxide + water
16. Drinking too many alcoholic drinks is likely to result in
- A faster reactions
 - B damage to health
 - C clearer thinking
 - D sharper vision

**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.**

Creams

Use this information to answer questions 17 and 18.

Sunscreen is applied to protect the skin.
Some sunscreens contain nanoparticles.



17. Which of these statements is true about nanoparticles?

- A** nanoparticles are more than 1cm in diameter
- B** nanoparticles do not contain atoms
- C** nanoparticles are less than 100 nm in diameter
- D** nanoparticles are smaller than individual atoms

18. Sunscreens containing nanoparticles

- A** always come in smaller bottles than normal sunscreens
- B** neither absorb nor reflect UV radiation
- C** appear transparent in visible light
- D** allow UV radiation to reach the skin

Use this information to answer questions 19 and 20.

Mayonnaise is added as a sauce in some foods.
Mayonnaise contains lecithin, which is an emulsifier.



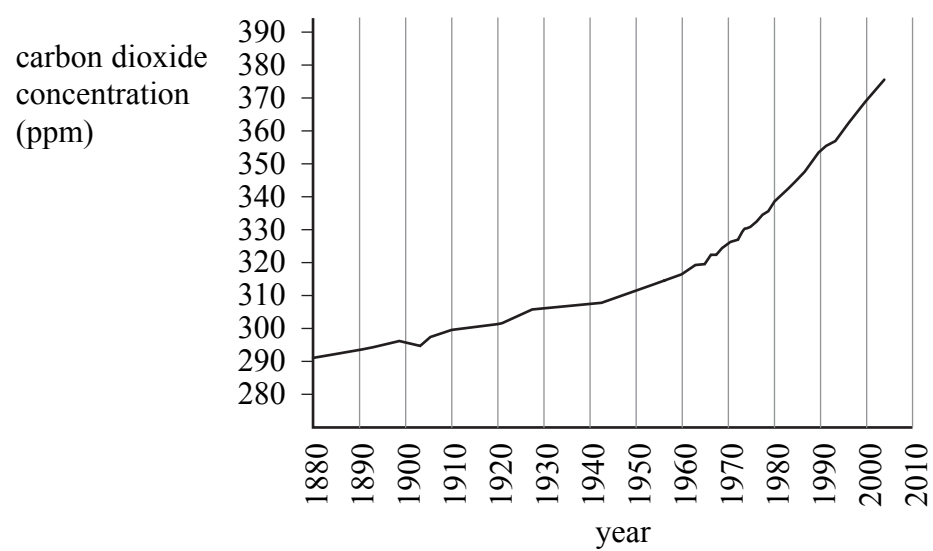
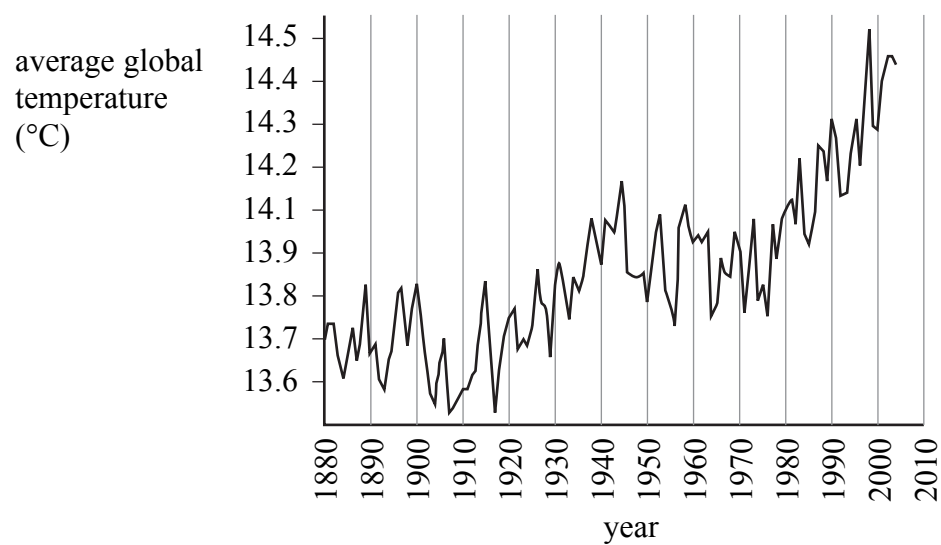
19. Mayonnaise is an emulsion.
An emulsion is a mixture of

- A** a solid and a liquid
- B** a gas and a liquid
- C** two solids
- D** two liquids

20. The molecules of lecithin have
- A a hydrophobic part only
 - B a hydrophobic and a hydrophilic part
 - C a hydrophilic part only
 - D neither a hydrophobic nor a hydrophilic part

Global warming

The graphs below show the variation in average global temperature and concentration of carbon dioxide in the atmosphere from 1880 to 2004.



Source: www.whrc.org

21. From 1880 to 2004 the average global temperature
- A showed a decreasing trend
 - B stayed the same
 - C increased from each year to the next
 - D showed an increasing trend

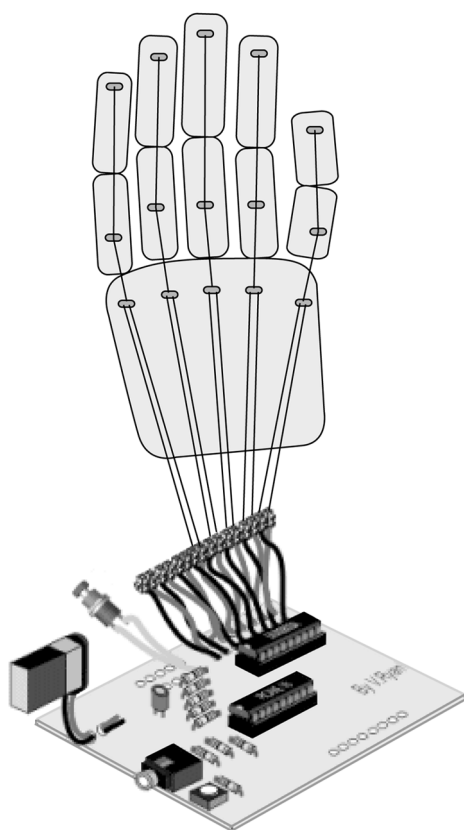
22. From 1880 to 2004 the concentration of carbon dioxide
- A started to increase more rapidly from 1960 onwards
 - B decreased
 - C stayed constant
 - D increased by the same amount each year
23. Predictions have been made for the average global temperatures from 2010 to 3010. These values are not certain because they are based on
- A experiments
 - B changes in plants
 - C computer models
 - D ocean currents
24. Which of these activities is least likely to increase global warming?
- A burning coal
 - B growing trees
 - C combustion of petrol
 - D aeroplane flights

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.**

New wire materials



Source: www.technologystudent.com

A robotic hand uses stretched wires attached to the end of each finger. When a current is applied to the wire the fingers move.

The wire is an alloy of nickel and titanium which melts above 1000 °C. It is an example of a shape memory alloy.

25. A shape memory alloy is an example of

- A** a nanocomposite
- B** intelligent packaging
- C** a carbon fibre
- D** a smart material

26. A straight strip of the same alloy was folded. When heated to 90 °C the strip is most likely to

- A** shrink
- B** return to its original shape
- C** turn into liquid
- D** remain unchanged

Crude oil

Crude oil can be separated into many useful substances by fractional distillation.

27. Which of these substances is **not** a fraction produced by distillation of crude oil?

- A diesel oil
- B bitumen
- C fuel oil
- D pure octane (a hydrocarbon)

28. Which line shows the fractions in order of increasing boiling point?

	lowest boiling point			highest boiling point
A	gases	petrol	kerosene	diesel
B	petrol	gases	kerosene	diesel
C	diesel	kerosene	petrol	gases
D	gases	kerosene	petrol	diesel

29. Which row of the table correctly describes the viscosity and ease of ignition of diesel compared to kerosene?

	viscosity of diesel	ease of ignition of diesel
A	more viscous	easier
B	less viscous	more difficult
C	more viscous	more difficult
D	less viscous	easier

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

- A $2C_8H_{18} + 17O_2 \rightarrow 16CO + 18H_2O$
- B $2C_8H_{18} + 25O_2 \rightarrow 16CO_2 + 18H_2O$
- C $C_8H_{18} + 8O_2 \rightarrow 8CO + 9H_2O$
- D $C_8H_{18} + 12O_2 \rightarrow 8CO_2 + 9H_2O$

Ethanol

Ethanol is produced by the fermentation of sugar.

Ethanol is present in alcoholic drinks.

Ethanol can be blended with petrol to form another fuel, gasohol.

31. Which of these conditions are necessary to produce ethanol by fermentation?

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

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

32. Which equation represents fermentation?

- A** $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$
B $C_6H_{12}O_6 \rightarrow 2CO_2 + 2C_2H_5OH$
C $C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O$
D $2C_2H_5OH + 2CO_2 \rightarrow C_6H_{12}O_6$

33. Which row of the table shows the effect of drinking too much ethanol on a person's liver and behaviour?

	effect on		
	liver	reaction time	speech
A	no effect	faster	clearer
B	damaged	faster	slurred
C	no effect	slower	clearer
D	damaged	slower	slurred

34. Which of the following statements about gasohol are correct?

- 1 gasohol produces no greenhouse gases when used as a fuel
- 2 gasohol involves only renewable materials
- 3 the use of gasohol conserves finite resources

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

Health problems

Atmospheric pollutants can be the cause of heart problems and lung diseases.

35. Carbon monoxide is formed by the incomplete combustion of
- A all fuels
 - B hydrocarbon fuels only
 - C any fuel containing carbon
 - D fossil fuels only
36. When inhaled, carbon monoxide
- A increases the amount of oxygen the blood can carry
 - B combines with haemoglobin
 - C reduces the amount of carbon dioxide in the body
 - D reacts with oxygen
37. Two causes of lung disease are the inhalation of particulates and hydrocarbons. Both particulates and hydrocarbons are emitted by cars. Which of the following statements are correct?
- 1 the particulates include carbon dioxide
 - 2 hydrocarbons are released into the atmosphere as a result of incomplete combustion
 - 3 soot is not a particulate
- A 1 only
 - B 2 only
 - C 3 only
 - D 1, 2 and 3

38. Which is the balanced equation for the formation of carbon monoxide when methane, CH₄, is burnt?
- A $2\text{CH}_4 + \text{O}_2 \rightarrow 2\text{CO} + 4\text{H}_2$
- B $\text{CH}_4 + \text{O}_2 \rightarrow \text{CO} + \text{H}_2\text{O} + \text{H}_2$
- C $2\text{CH}_4 + 3\text{O}_2 \rightarrow \text{CO} + \text{CO}_2 + 4\text{H}_2\text{O}$
- D $2\text{CH}_4 + 3\text{O}_2 \rightarrow 2\text{CO} + 4\text{H}_2\text{O}$

Use the information in the table below to answer questions 39 and 40.

The table shows the number of adults in the USA with the lung diseases bronchitis and emphysema and the total number of adults affected by these lung diseases between the years 2000 and 2004.

disease	total number of adults with the disease in				
	2000	2001	2002	2003	2004
bronchitis	9 400 000	11 200 000	9 100 000	8 750 000	8 600 000
emphysema	3 100 000	3 000 000	3 100 000	3 300 000	3 600 000
lung diseases	11 400 000	13 300 000	11 200 000	10 900 000	10 700 000

Source: National Center for Health Statistics, USA.

39. From 2000 to 2004, the number of adults with bronchitis shows
- A the same trend as the number of adults with emphysema
- B a decrease every year
- C that the number of adults smoking cigarettes has decreased
- D a decreasing trend overall
40. The total number of adults with lung diseases is not the same as the sum of the number of adults with bronchitis and the number of adults with emphysema. This could be because some adults
- A have emphysema only
- B do not have lung diseases
- C have both bronchitis and emphysema
- D have bronchitis only

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

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