EDEXCEL GCSE SCIENCE (360SCIENCE)

SCIENCE



EXAM QUESTION PACK

UNIT C1b MULTIPLE CHOICE 5008 PAPERS

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Surname	Initial(s)
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Paper Reference(s)

5008 5036

Edexcel GCSE

Science (5008)

Chemistry (5036)

C1b – Topics 7 and 8

Foundation and Higher Tier

Tuesday 15 November 2011 – Morning

Time: 20 minutes

Materials required for examination	**Items included with question papers**
Multiple Choice Answer Sheet HB pencil, eraser and calculator	Nil

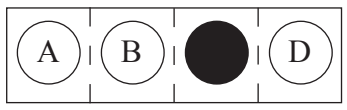
Instructions to Candidates

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:
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How to answer the test:
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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.

Fuel

1. Propane is a fuel.
It can be used as a fuel in patio heaters.



Propane is used as a fuel because, when it is burnt, it produces

A heat energy
B soot
C carbon monoxide
D carbon dioxide

2. Hydrocarbons contain

A carbon only
B hydrogen only
C carbon and hydrogen only
D carbon, hydrogen and oxygen

3. When a hydrocarbon burns in oxygen, the reaction is

A distillation
B combustion
C desalination
D fermentation

4. The incomplete combustion of a hydrocarbon can produce a substance which is a gas at room temperature and is toxic.
This gas is

A carbon dioxide
B steam
C carbon monoxide
D carbon

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5. Hydrogen can be used as a fuel.
When hydrogen burns in oxygen, the substance formed is

A carbon
B carbon dioxide
C carbon monoxide
D water

6. The symbol for an atom of hydrogen is

A H
B Hy
C Hd
D Hg

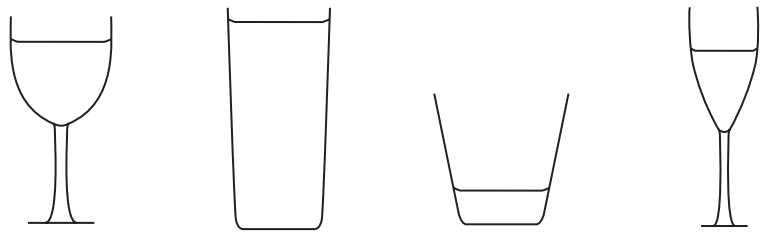
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Alcohol

7. When alcoholic drinks are made, sugar is reacted to form the alcohol.
The process is

A fermentation
B distillation
C dehydration
D combustion

8. The table shows glasses of four different alcoholic drinks.
The volume and number of units of alcohol in each drink in each glass is shown.
The percentage of alcohol in each of the alcoholic drinks is also given.



	A	**B**	**C**	**D**
name of alcoholic drink	red wine	lager	whisky	champagne
volume of drink in the glass (cm^3)	175	284	35	125
units of alcohol in the drink in the glass	2.3	1.1	1.4	1.5
percentage of alcohol in the drink (%)	13	4	40	12

Which glass contains the most alcohol?

9. What is the name of the main alcohol present in all alcoholic drinks?

A methanol
B ethanol
C methane
D ethane

10. People should not drink alcoholic drinks and then drive a car because the alcohol

A increases reaction time
B improves vision
C damages health
D makes them more alert

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New materials

The picture shows a Gore-Tex jacket with a Thinsulate lining.



11. The reason for using Gore-Tex is to make the jacket

A breathable
B warm
C lightweight
D flame resistant

12. The reason for adding a Thinsulate lining is to make the jacket

A waterproof
B a better insulator
C less flexible
D lighter

13. Members of the emergency services need to wear jackets to protect them from being injured in knife attacks.
Which is the most suitable material to provide this protection?

A Kevlar
B Gore-Tex
C Thinsulate
D Lycra

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Our atmosphere

14. Which two gases are present in the largest amounts in the Earth's atmosphere?

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

15. It is thought that the Earth's earliest atmosphere did **not** contain

A oxygen
B nitrogen
C carbon dioxide
D ammonia

16. Pure oxygen is obtained from liquid air by

A combustion
B fractional distillation
C adding water
D dehydration

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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

Rock salt and seawater

17. Which of the following substances can be obtained from rock salt during an industrial process?

A oxygen
B chlorine
C nitrogen
D methane

18. A salt which can be obtained from seawater is used to flavour food.
The salt is

A sodium sulphate
B sodium carbonate
C sodium chloride
D sodium hydroxide

19. In some hot countries, drinking water is obtained from seawater using a desalination process.
This process involves

A condensation and then evaporation
B condensation and then filtration
C evaporation and then filtration
D evaporation and then condensation

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Sunscreen

Many sunscreens are emulsions.
These contain emulsifiers.

20. An emulsion is a mixture of an emulsifier with

A a liquid and a gas
B a liquid and a solid
C two liquids
D two gases

21. Molecules of the emulsifier are used to stop the emulsion separating.
The molecule of the emulsifier must contain

A a hydrophobic part but no hydrophilic part
B a hydrophilic part but no hydrophobic part
C both a hydrophilic part and a hydrophobic part
D neither a hydrophilic part nor a hydrophobic part

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Our future

22. Biofuel made from sugar beet is a sustainable fuel.
This biofuel is sustainable because

A it can be reused
B it does not produce pollutants when burnt
C new sugar beet can be planted to replace that used to make the biofuel
D sugar beet is a waste product

23. A disadvantage of using biofuel, made from sugar beet, rather than fossil fuels is that

A crude oil reserves are used up more quickly
B the biofuel does not produce carbon dioxide when burnt
C growing sugar beet removes carbon dioxide from the atmosphere
D large areas of land are needed to grow sugar beet to produce the biofuel

24. Aluminium is recycled because

A recycling conserves natural resources
B recycling uses no energy
C there is no demand for objects made from recycled aluminium
D recycling aluminium increases the amount of aluminium in landfill sites

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

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

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

New technology

A new plastic packaging material has been developed to help keep food fresh.
The plastic has a layer of nanoparticles on its surface.

25. The plastic packaging keeps food fresh by preventing the food reacting with

A oxygen
B nitrogen
C carbon dioxide
D argon

26. Which of the following statements about nanoparticles are correct?

1 the properties of nanoparticles are fully understood
2 nanoparticles of an element are smaller than atoms of that element

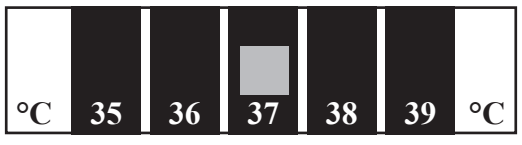
A 1 only
B 2 only
C both 1 and 2
D neither 1 nor 2

27. Nanoparticles of zinc oxide are used in some sunscreens.
The reason that nanoparticles rather than conventional-sized particles are used in these sunscreens is that

A conventional-sized particles of zinc oxide do not reflect UV rays
B conventional-sized particles of zinc oxide are invisible to the naked eye
C nanoparticles of zinc oxide do not reflect UV rays
D nanoparticles of zinc oxide are invisible to the naked eye

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28. The picture show a strip thermometer.



The strip thermometer is placed on the forehead to measure the temperature of the skin.
Part of the strip changes colour to show the temperature.
The strip thermometer must be made of a material that is

A smart
B intelligent
C an insulator
D soluble

29. Which of the statements about a Gore-Tex membrane are correct?

1 water vapour cannot pass through the membrane
2 water droplets can pass through the membrane

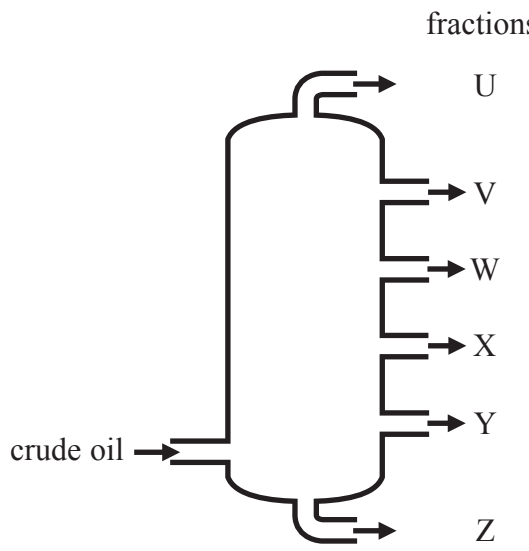
A 1 only
B 2 only
C both 1 and 2
D neither 1 nor 2

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Fuels

Use the following information to answer questions 30 to 32.

The diagram shows a fractionating column used to obtain fractions from crude oil by fractional distillation.



30. In which fraction do the molecules have the highest average number of carbon atoms?

A U
B W
C Y
D Z

31. Which fraction is the easiest to ignite?

A U
B W
C X
D Z

32. Fractions from crude oil are used as fuels.
Which of these is used as a fuel in the engines of both cars and lorries?

A kerosene
B diesel oil
C bitumen
D fuel oil

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33. Which of the following statements about the fractional distillation of crude oil is **not** correct?

A crude oil is a mixture of different compounds
B crude oil enters the fractionating column as a liquid
C each fraction contains more than one hydrocarbon
D each fraction boils over a different temperature range than other fractions

34. This balanced equation shows the reaction occurring when a hydrocarbon burns.
The formula of the molecule of this hydrocarbon is represented by **M**.

$$2\mathbf{M} + 19O_2 \rightarrow 12CO_2 + 14H_2O$$

M is

A C_6H_{12}
B C_6H_{14}
C $C_{12}H_{26}$
D $C_{12}H_{28}$

35. Incomplete combustion of a hydrocarbon can produce carbon monoxide.
Carbon monoxide is toxic because it

A contains oxygen
B contains carbon
C is odourless and colourless
D reduces the ability of blood to carry oxygen

36. Nitrogen can be obtained from air by fractional distillation.
Which of the following statements about this process are correct?

1 air is liquefied before it is fractionally distilled
2 the gases in air are separated because their liquids have different boiling points

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

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New fuels

37. Hydrogen can be used as a fuel for cars.
Which of the statements about hydrogen used as a fuel for cars are correct?

1 hydrogen fuel requires a heavier fuel tank than is needed for petrol
2 a toxic product is formed when hydrogen is burnt

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

38. The equation for the combustion of hydrogen in oxygen is

A $2H + O \rightarrow H_2O$
B $H_2 + O_2 \rightarrow H_2O_2$
C $H_2 + O \rightarrow H_2O$
D $2H_2 + O_2 \rightarrow 2H_2O$

39. Ethanol can be used as a fuel.
It can be made from sugar.
Which of the following conditions are required to convert sugar into ethanol?

1 the presence of water
2 the presence of yeast
3 a temperature of 80 °C

A 1 only
B 2 only
C 1 and 2 only
D 1, 2 and 3

40. Which is the equation for the reaction occurring when ethanol is made from sugar with the formula, $C_6H_{12}O_6$?

A $C_6H_{12}O_6 + H_2O \rightarrow 2C_2H_4OH + 2CO_2 + H_2$
B $C_6H_{12}O_6 + 2H_2O \rightarrow 2C_2H_5OH + 2H_2CO_3$
C $C_6H_{12}O_6 \rightarrow 2C_2H_4OH + 2CO_2 + H_2O$
D $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

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Mark Scheme (Results)

November 2011

360Science

GCSE Science
Multiple Choice Paper C1b (5008)

GCSE Chemistry
Multiple Choice Paper C1b (5036)

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5008 & 5036 (C1b) Mark Scheme
November 2011

Unit C1b – 5008/5036	
Topics 1 & 2	
1	A
2	C
3	B
4	C
5	D
6	A
7	A
8	A
9	B
10	A
11	A
12	B
13	A
14	D
15	A
16	B

Unit C1b – 5008/5036	
Topics 1 & 2	
17	B
18	C
19	D
20	C
21	C
22	C
23	D
24	A

Unit C1b – 5008/5036	
Topics 1 & 2	
25	A
26	D
27	D
28	A
29	D
30	D
31	A
32	B
33	B
34	B
35	D
36	C
37	A
38	D
39	C
40	D

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Paper Reference(s)

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Edexcel GCSE

Science (5008)

Chemistry (5036)

C1b – Topics 7 and 8

Foundation and Higher Tier

Friday 17 June 2011 – Afternoon

Time: 20 minutes

Materials required for examination
Multiple Choice Answer Sheet
HB pencil, eraser and calculator

Items included with question papers
Nil

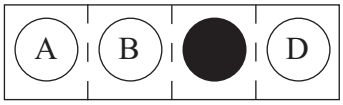
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Burning fuels



1. Methane is a hydrocarbon which is used as a fuel.
Hydrocarbons are compounds containing

A carbon and oxygen only
B carbon and hydrogen only
C carbon, hydrogen and oxygen
D carbon, hydrogen and nitrogen

2. Incomplete combustion of a hydrocarbon can form carbon monoxide.
Carbon monoxide is formed in this reaction because there is not enough

A heat
B hydrocarbon
C oxygen
D nitrogen

3. If a gas-fired boiler is not checked regularly, it can be dangerous to use it.
The biggest danger is that using a boiler that has not been checked may

A release waste gases
B release a toxic gas
C waste fossil fuel
D waste heat energy

4. Burning hydrogen produces

A water only
B carbon dioxide only
C water and carbon dioxide
D water and carbon monoxide

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5. Which of these is a fossil fuel?

A hydrogen
B natural gas
C oxygen
D water

6. Bio-fuels are produced from plants.
A disadvantage of using bio-fuels instead of fossil fuels is that

A growing plants, from which they are made, uses large areas of fertile land
B growing plants, from which they are made, produces large amounts of carbon dioxide
C they always burn with a sooty flame
D they produce no energy when burnt

Kevlar

A comfortable, protective jacket has been made for use by police in dangerous situations.
The jacket has a Kevlar lining.

7. What properties does Kevlar have that make it suitable for this use?

A lightweight and magnetic
B odourless and colourless
C hard and transparent
D stab resistant and flexible

8. Steel could be used instead of Kevlar.
Kevlar is preferred to steel.
This is because Kevlar is

A less flexible
B less dense
C more expensive
D heavier

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Food

9. When vegetable oil and vinegar are mixed, shaken and left for some time, they separate. When egg yolk is mixed with these two liquids, they do not separate after shaking and mayonnaise is formed.
Mayonnaise is

A a compound
B a salt
C an element
D an emulsion

10. Foods can be preserved by removing

A carbon dioxide
B nitrogen
C salt
D water

11. A gas is put into some packets of peanuts before the packets are sealed.



The gas keeps the peanuts in good condition.
The best gas for this purpose is

A carbon monoxide
B hydrogen
C oxygen
D nitrogen

12. A new lunchbox has been designed which has a special coloured spot on it.
The spot changes colour, as the temperature rises.
The coloured spot must be made of a material that is

A soluble
B smart
C toxic
D breathable

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Alcohol

Beer is an alcoholic drink.

13. Beer is made by

A combustion
B desalination
C fermentation
D fractional distillation

14. Most of the alcohol in beer is

A ethanol
B glucose
C methanol
D water

15. Drinking alcohol can damage your health.
Government information states that

a healthy, adult male should not drink more than 4 units of alcohol a day
a healthy, adult female should not drink more than 3 units of alcohol a day

The table shows the alcohol in some drinks.

drink	volume of drink (cm^3)	number of units of alcohol in the glass
small glass of wine	125	1.5
large glass of wine	250	3.0
large glass of standard lager	568	2.3
small glass of strong cider	284	2.3

A healthy, adult male would drink more than the stated daily amount of alcohol, in one day, if he drank

A two small glasses of wine
B one large glass of wine
C one large glass of standard lager
D two small glasses of strong cider

16. One effect of drinking too much beer is

A faster response times
B improved awareness
C improved vision
D slower reactions

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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.

Using substances

17. Hydrogen could be a useful fuel in the future.
An advantage of using hydrogen as a fuel is that

A it is a bio-fuel obtained from plants
B it is easily obtained from liquid air
C no energy is used to produce it
D the raw material from which it is obtained is readily available

Use the following information to answer questions 18 and 19.

Manufacturers make paper from wood pulp obtained from trees.

18. Some manufacturers plant three trees for every tree they cut down.
By doing this, these manufacturers are making sure that their product is

A high quality paper
B easy to recycle
C non-renewable
D sustainable

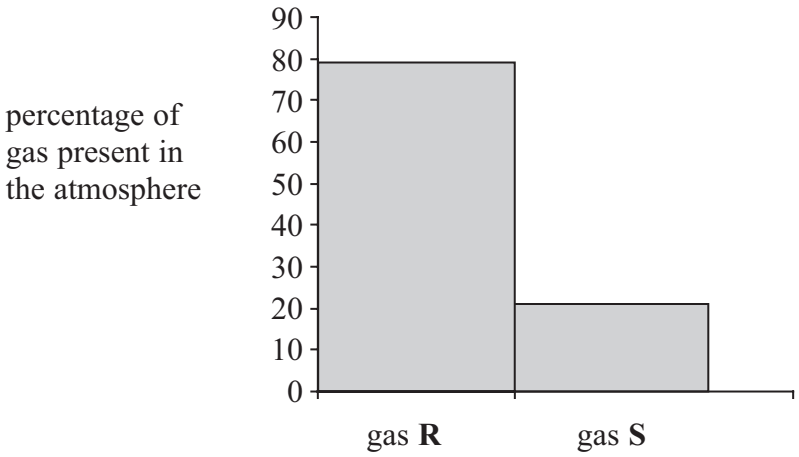
19. Many companies now recycle paper.
A reason for recycling paper, rather than making new paper from raw materials, is that

A paper is not biodegradable
B paper is made from non-renewable substances
C recycling conserves raw materials
D recycling uses no energy

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The Earth

20. The bar chart shows the percentage of the atmosphere which is gas R and the percentage of the atmosphere which is gas S.



What is the name of gas **R**?

A oxygen
B argon
C nitrogen
D hydrogen

21. Which of the following gases in the atmosphere is most likely to contribute to global warming?

A carbon dioxide
B hydrogen
C nitrogen
D oxygen

22. Oxygen is obtained from liquid air by

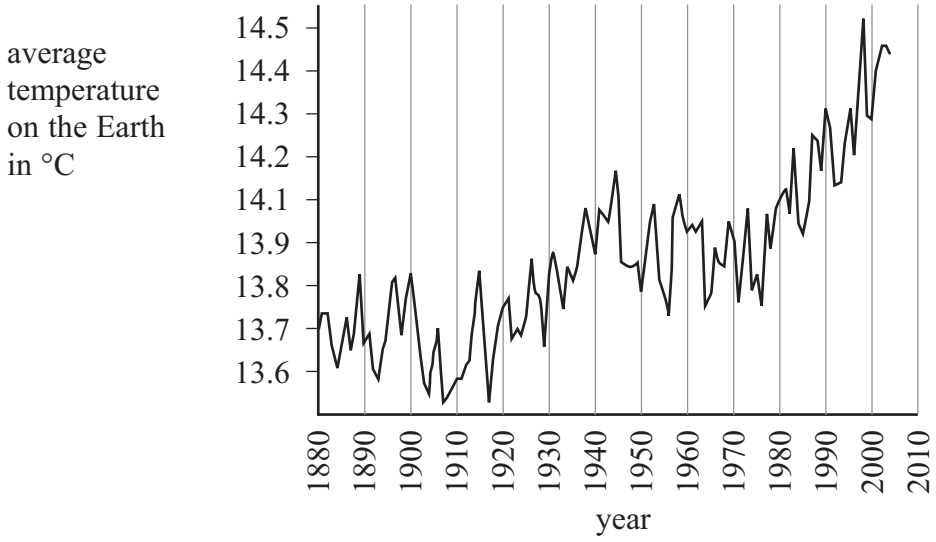
A combustion
B desalination
C fermentation
D fractional distillation

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23. Which row of the table shows how the amounts of carbon dioxide and oxygen in the Earth's atmosphere have changed since the Earth was formed?

	amount of	
	oxygen	**carbon dioxide**
A	increased	increased
B	increased	decreased
C	decreased	increased
D	decreased	decreased

24. The graph shows the average temperature on the Earth from 1880 to 2005.



Using the graph, scientists can be certain that, during this period, the average temperature on Earth has

A decreased every year
B increased every year
C increased overall
D increased because of the increased use of fossil fuels

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

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

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

Useful materials

25. Chemists have investigated coatings for the underside of skis.
The ideal coating needs to be very slippery.
Which of these would make the best coating?

A Gore-Tex
B Kevlar
C Lycra
D Teflon

26. Jackie buys a new jacket for skiing.
The jacket is made of waterproof and breathable fabric.
The fabric is waterproof and breathable because it has

A loosely packed fibres which trap air
B small molecules with strong bonds between the atoms
C a membrane with microscopic pores not much bigger than a water molecule
D a membrane with pores much bigger than a water molecule

27. When Jackie goes skiing she buys a bottle of sunscreen.
The sunscreen contains an emulsifier.
Molecules of the emulsifier have a hydrophilic part and a hydrophobic part.
Which row of the table gives a correct description of hydrophilic or hydrophobic?

A	hydrophobic	water loving	attracted to oil	repels water
B	hydrophobic	water hating	attracted to water	repels oil
C	hydrophilic	water loving	attracted to water	repels oil
D	hydrophilic	water hating	attracted to oil	repels water

28. Some sunscreens contain nanoparticles, others do not.
An advantage of sunscreens containing nanoparticles is

A nanoparticles are a new technology
B all nanoparticles are known to be safe
C the nanoparticles do not absorb UV light
D the nanoparticles give good protection from the sun but do not leave a white covering on the skin

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29. Which of the following statements about nanotechnology are correct?

1 a material that has nanoparticles used in combination with another material is known as a nanocomposite
2 nanoparticles are bigger than individual atoms

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

Crude oil

Fractions are obtained from crude oil by fractional distillation.

30. Which of the following is a use of the gaseous fraction?

A fuel for aeroplanes
B fuel for some cars
C fuel for ships
D fuel for some diesel engines

31. Fraction **Y** is obtained from the top of the fractionating column and fraction **Z** is obtained from the bottom of the fractionating column.
Which row of the table correctly compares fraction **Y** with fraction **Z**?

	boiling point of fraction Y	**average length of carbon chain in fraction Y**
A	lower	shorter
B	higher	longer
C	lower	longer
D	higher	shorter

32. Which of the following statements about the viscosity of fractions are true?

1 fractions containing longer chain hydrocarbon molecules have higher viscosities than fractions containing shorter chain hydrocarbon molecules
2 a fraction with a higher viscosity will be harder to ignite than a fraction with a lower viscosity

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

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33. Propane is a fuel.
Which is the balanced equation for the complete combustion of propane?

A $C_3H_8 + 2O_2 \rightarrow 3C + 4H_2O$
B $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$
C $2C_3H_8 + 7O_2 \rightarrow 6CO + 8H_2O$
D $C_3H_8 + 7O_2 \rightarrow 3CO_2 + 8H_2O$

34. Incomplete combustion of hydrocarbons can form carbon monoxide.
Which of the following statements about carbon monoxide are correct?

1 carbon monoxide is a colourless gas with a pungent odour
2 carbon monoxide is toxic because it prevents oxygen being carried around the body

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

35. Incomplete combustion of hydrocarbons can also produce carbon in the form of soot.
What is the correct atomic symbol, with its state symbol, for carbon in the form of soot?

A c (g)
B C (g)
C c (s)
D C (s)

Salt

36. Sodium chloride and pure water can be obtained from seawater by

A desalination
B electrolysis
C fermentation
D filtration

37. Which row of the table shows correct uses of sodium chloride and of sodium hydroxide?

	use of sodium chloride	**use of sodium hydroxide**
A	to make paper	to produce soap
B	to make paper	to absorb acidic gases
C	as a preservative	to absorb acidic gases
D	to flavour food	to absorb alkaline gases

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38. Sodium hydroxide is obtained from sodium chloride solution.
The formula of sodium hydroxide is

A Na_2OH
B $NaOH_2$
C $Na(OH)_2$
D NaOH

Fermentation

39. Ethanol is made by fermentation.
The reaction mixture for the process contains yeast.
Which of the following statements about this process are correct?

1 after a time the yeast is used up and no more ethanol is produced
2 the ideal temperature for the process is 70 °C

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

40. Which is the balanced equation for the formation of ethanol from a sugar?

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

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

END

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Mark Scheme (Results)

June 2011

360Science

GCSE Science
Multiple Choice Paper C1b (5008)

GCSE Chemistry
Multiple Choice Paper C1b (5036)

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5008 & 5036 (C1b) Mark Scheme
June 2011

Unit C1b – 5008/5036	
Topics 7 & 8	
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37	C
38	D
39	D
40	A

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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

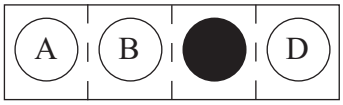
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Use an HB pencil. Do not open this booklet until you are told to do so.
Mark your answers on the separate answer sheet.

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 °C
B 0 °C
C 25 °C
D 100 °C

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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

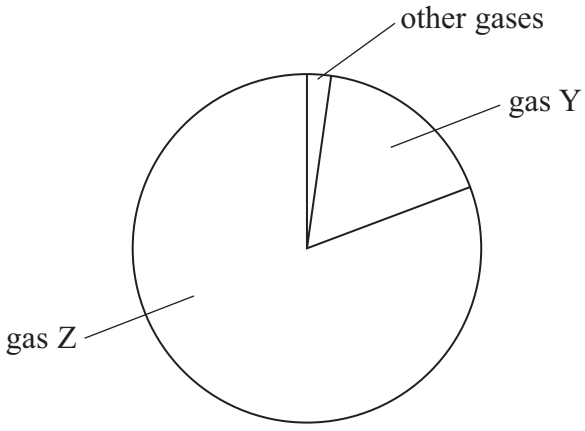
A carbon dioxide
B nitrogen
C water vapour
D oxygen

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

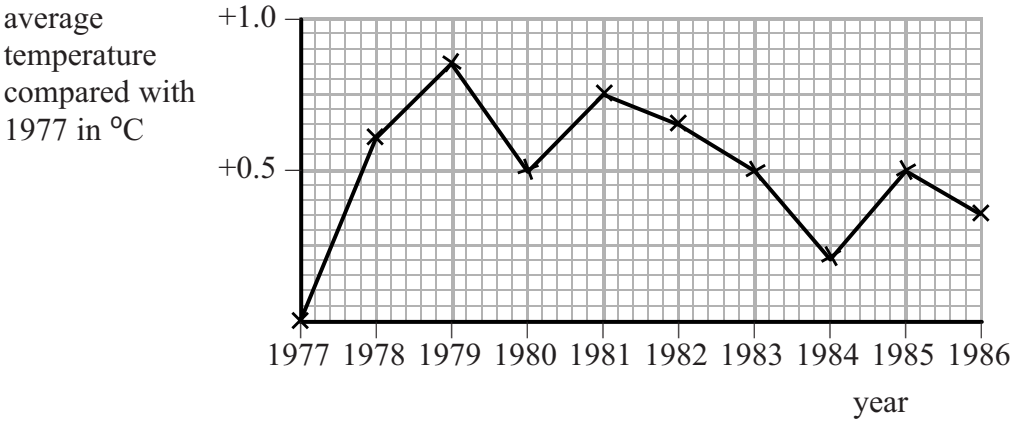
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8. Which of these gases in the Earth's atmosphere is most likely to cause global warming?

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

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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

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Fuels

14. Methane, 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

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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

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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.

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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

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

$$2C_xH_y + 19O_2 \rightarrow 12CO_2 + 14H_2O$$

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 $C_6H_{12}O_6 + 3H_2O \rightarrow 3C_2H_5OH + 3O_2$

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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?

	substances		
A	water	carbon dioxide	sugar
B	carbon dioxide	sugar	yeast
C	yeast	sugar	water
D	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 1and 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?

	hydrophilic part of lecithin molecule attracted to	**hydrophobic part of lecithin molecule attracted to**
A	oil	vinegar
B	egg	oil
C	vinegar	egg
D	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

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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

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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?

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

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

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March 2011

GCSE

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GCSE Science
Multiple Choice Paper C1b (5008/01)

GCSE Chemistry
Multiple Choice Paper C1b (5036/01)

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March 2011

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5008 & 5036 (C1b) Mark Scheme

Unit C1b – 5008/5036	
Topics 7 & 8	
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3	C
4	B
5	D
6	D
7	A
8	C
9	B
10	A
11	D
12	C
13	B
14	A
15	D
16	C

Unit C1b – 5008/5036	
Topics 7 & 8	
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21	B
22	A
23	D
24	D

Unit C1b – 5008/5036	
Topics 7 & 8	
25	D
26	C
27	B
28	B
29	B
30	C
31	A
32	C
33	C
34	D
35	D
36	A
37	D
38	C
39	A
40	B

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Paper Reference(s)

5008 5036

Edexcel GCSE

Science (5008)

Chemistry (5036)

C1b – Topics 7 and 8

Foundation and Higher Tier

Friday 12 November 2010 – Afternoon

Time: 20 minutes

Materials required for examination	**Items included with question papers**
Multiple Choice Answer Sheet HB pencil, eraser and calculator	Nil

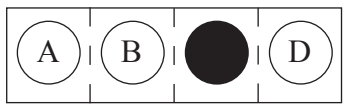
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Turn over

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

Fuels

1. Many fuels are produced from crude oil.
Crude oil is

A an element
B a mixture
C a metal
D an alloy

2. Fuels are useful because, when they are burnt, they produce

A carbon dioxide
B heat energy
C water
D soot

3. When a substance burns in oxygen, the process is

A combustion
B hydration
C distillation
D desalination

4. Hydrocarbons contain

A carbon only
B hydrogen only
C carbon and hydrogen only
D carbon, hydrogen and oxygen

5. When hydrogen burns

A the product is water
B the product is carbon dioxide
C the product is carbon monoxide
D there is no product

6. Wood is a sustainable fuel because

A trees absorb carbon dioxide
B when wood is burnt, no gases are produced
C when trees are cut down and burned, new trees can be planted
D when wood is burnt, the only product is water

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Alcoholic drinks

7. When beer is made, sugar is converted into alcohol.
What is the name of this process?

A fermentation
B combustion
C distillation
D desalination

8. Most of the alcohol in beer is

A methane
B ethane
C methanol
D ethanol

9. Drinking too much of any alcoholic drink can cause

A improved judgement
B slower reaction times
C increased awareness
D improved health

10. Drinks are often sold in cans made of aluminium.
Why is it important that the aluminium is recycled?

A aluminium is rare
B aluminium cannot be put into landfill sites
C recycling conserves aluminium ore
D recycling aluminium does not require any energy

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Useful materials

Use the following information to answer questions 11 and 12.

The table lists two properties of four different materials.

material	property 1	property 2
A	light (low density)	stretchy
B	light (low density)	stiff
C	high melting point	slippery
D	high melting point	flexible

Each material may be used once, more than once, or not at all.

11. Which material would be most suitable for the non-stick coating on a frying pan?

12. Athletes wear clothing made of Lycra.
Which material could be Lycra?

13. A new type of mug has been made which looks different when it is cold from when it is hot.



cold



hot

When it is cold, the mug is white.
When it is hot, a picture appears on the outside of the mug.
This is because part of the coating on the outside of the mug is

A toxic
B intelligent
C breathable
D smart

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The atmosphere

14. It is thought that the Earth's early atmosphere came from volcanoes.
Which gas was **not** present in this early atmosphere?

A oxygen
B carbon dioxide
C steam
D nitrogen

15. Most of the Earth's atmosphere today is

A carbon dioxide
B oxygen
C nitrogen
D hydrogen

16. Liquid oxygen is obtained from liquid air.
The process used is

A combustion
B fractional distillation
C fermentation
D desalination

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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 and its effects

17. Carbon monoxide is a product of the incomplete combustion of a hydrocarbon.
Another product of the incomplete combustion of a hydrocarbon is

A carbon dioxide
B oxygen
C carbon
D sulphur dioxide

18. Incomplete combustion of a hydrocarbon occurs because there is a shortage of

A nitrogen
B carbon dioxide
C the hydrocarbon
D oxygen

Packaging

Some salads are sold pre-packed in bags.

19. Before packing, the salad is washed using water containing chlorine.
The reason for using chlorine in the water is to

A remove dirt
B kill bacteria
C make the salad fresher
D bleach the salad

20. The symbol for an atom of chlorine is

A CL
B CL_2
C Cl
D Cl_2

21. The bags of salad are filled with nitrogen gas before they are sealed.
The nitrogen stops the salad deteriorating by preventing the reaction between the salad and

A carbon dioxide
B water
C argon
D oxygen

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22. Industrially, nitrogen and oxygen are obtained from liquid air.
This process works because

A there is more nitrogen in the air than oxygen
B nitrogen is more reactive than oxygen
C liquid nitrogen and liquid oxygen have different boiling points
D nitrogen and oxygen are the only gases in the air

23. Some salad dressings are a mixture of oil and vinegar and a substance used to stop the oil and vinegar separating.
The salad dressing is

A a pure liquid
B a suspension
C a solution
D an emulsion

24. A particle of the substance used to stop the oil and vinegar separating has a hydrophilic and a hydrophobic part.

Which row of the table shows the correct meaning of hydrophilic and hydrophobic?

	hydrophilic	**hydrophobic**
A	repelled by water	attracted to water
B	attracted to water	repelled by water
C	repelled by water	repelled by water
D	attracted to water	attracted to water

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

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

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

New materials

Nanoparticles of zinc oxide are used in some sunscreens.

25. Which of the following statements about nanotechnology are correct?

1 nanoparticles are smaller than individual atoms
2 the risks involved in the use of nanotechnology are fully understood

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

26. Nanoparticles rather than conventional-sized particles of zinc oxide are used in some sunscreens.
These nanoparticles are used because they

A are not transparent to visible light
B are able to be seen on the skin because they reflect visible light
C reflect ultraviolet light
D form an oily layer on the surface of the skin

27. This label is stitched inside a jacket which has a Gore-tex lining.



Gore-tex is waterproof and breathable.
Which of the statements about the pores in Gore-tex are correct?

1 the pores are larger than molecules in the water vapour
2 the pores are smaller than drops of water

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

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Methane

28. Methane burns in a Bunsen burner flame.
Which of the following statements about the combustion of methane are correct?

1 when complete combustion occurs, methane burns with a yellow, sooty flame
2 when methane burns in excess oxygen, incomplete combustion occurs

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

29. Which is the equation for the complete combustion of methane?

A $CH_4 + 4O \rightarrow CO_2 + 2H_2O$
B $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$
C $2CH_4 + 3O_2 \rightarrow 2CO + 4H_2O$
D $CH_4 + 3O \rightarrow CO + 2H_2O$

30. Which of the statements about carbon monoxide are correct?

1 carbon monoxide is toxic because it reduces the amount of oxygen that the blood can carry
2 carbon monoxide can be produced by faulty gas appliances

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

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Sodium chloride

31. Which row of the table shows uses of sodium chloride and sodium hydroxide?

	sodium chloride is used	**sodium hydroxide is used**
A	as a food preservative	as a food flavouring
B	in oven cleaners	in oven cleaners
C	as a food preservative	in oven cleaners
D	in oven cleaners	as a food preservative

32. Which of these is **not** obtained from seawater on an industrial scale?

A hydrogen
B sodium hydroxide
C oxygen
D chlorine

Fuels

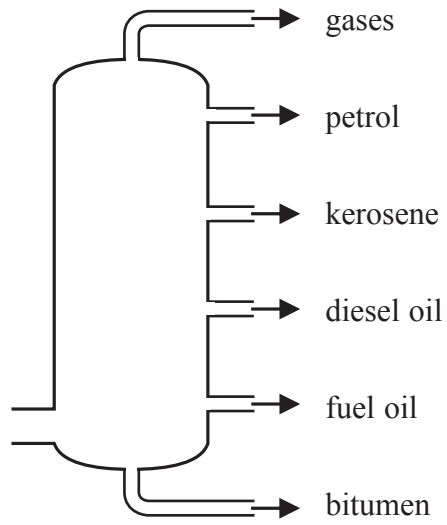
33. Crude oil is separated into fractions by fractional distillation.
Which row shows the steps of the process in the correct order?

	first step			**last step**
A	crude oil is vaporised	vapour cools	vapour passes into column	liquid fraction forms
B	vapour passes into column	vapour cools	crude oil is vaporised	liquid fraction forms
C	crude oil is vaporised	vapour passes into column	vapour cools	liquid fraction forms
D	vapour passes into column	vapour cools	liquid fraction forms	crude oil is vaporised

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Use the following information to help you answer questions 34 and 35.

The diagram shows the fractions obtained from crude oil on a fractionating column.



34. The table compares the boiling points and the average length of carbon chains in the molecules, in diesel oil with those in petrol.
Which row of the table is correct?

	boiling point of diesel oil is	**average length of carbon chains in molecules in diesel oil is**
A	lower than petrol	shorter than petrol
B	lower than petrol	longer than petrol
C	higher than petrol	longer than petrol
D	higher than petrol	shorter than petrol

35. The table shows some uses of kerosene, fuel oil and bitumen.
Which row of the table is correct?

	use of kerosene	**use of fuel oil**	**use of bitumen**
A	fuel for ships	jet engine fuel	road surfaces
B	jet engine fuel	fuel for ships	road surfaces
C	road surfaces	jet engine fuel	fuel for ships
D	jet engine fuel	road surfaces	fuel for ships

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36. Bio-ethanol can be used as an alternative to petrol.
Crops must be grown to produce bio-ethanol.
Which row of the table shows an advantage and a disadvantage of using bio-ethanol instead of petrol?

	advantage of bio-ethanol	**disadvantage of bio-ethanol**
A	does not form carbon dioxide when burnt	growing the crops removes carbon dioxide from the air
B	growing the crops removes carbon dioxide from the air	growing the crops requires large areas of land
C	does not form carbon dioxide when burnt	growing the crops requires large areas of land
D	growing the crops removes carbon dioxide from the air	does not form carbon dioxide when burnt

37. Hydrogen can be used as a fuel for cars.
Which of the statements about the use of hydrogen as a fuel for cars are correct?

1 strong, heavy tanks have to be used to store the hydrogen
2 large amounts of energy are required to make hydrogen

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

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Ethanol

Sugar, in the presence of yeast, is converted to ethanol.

38. Which is the balanced equation for this reaction?

A $C_6H_{12}O_6 + \text{yeast} \longrightarrow 2C_2H_5OH + 2CO_2$

B $C_6H_{12}O_6 + 3O_2 + \text{yeast} \longrightarrow C_2H_5OH + 3H_2O + 4CO_2$

C $C_6H_{12}O_6 + 3O_2 \xrightarrow{\text{yeast}} C_2H_5OH + 3H_2O + 4CO_2$

D $C_6H_{12}O_6 \xrightarrow{\text{yeast}} 2C_2H_5OH + 2CO_2$

39. Which of the statements about fermentation are correct?

1 the ideal temperature for fermentation is 70 °C
2 when sugar from grapes is fermented, the alcoholic drink formed is always beer

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

40. Which of the statements about the effects of ethanol on the body are correct?

1 ethanol in the body can cause quicker reaction times
2 ethanol in the body can cause permanent damage to the body

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

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

END

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Mark Scheme (Results)
November 2010

GCSE

360Science

GCSE Science
Multiple Choice Paper C1b (5008)

GCSE Chemistry
Multiple Choice Paper C1b (5036)

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November 2010

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5008 Science/ 5036 Chemistry (C1b)

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39	D
40	B

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Edexcel GCSE

Science (5008)

Chemistry (5036)

C1b – Topics 7 and 8

Foundation and Higher Tier

Thursday 24 June 2010 – Afternoon

Time: 20 minutes

Materials required for examination	**Items included with question papers**
Multiple Choice Answer Sheet HB pencil, eraser and calculator	Nil

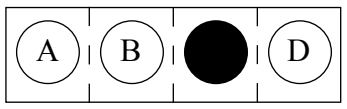
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Use an HB pencil. Do not open this booklet until you are told to do so.
Mark your answers on the separate answer sheet.

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 environment

1. Global warming is an increase in the

A number of hours of sunshine
B temperature of the Sun
C temperature of the Earth
D number of days with no rain

2. Which of these may cause an increase in global warming?

A growing more trees
B growing crops to make bio-fuels
C walking instead of travelling by car
D burning fossil fuels

3. What percentage of the Earth's atmosphere is carbon dioxide?

A 70%
B 20%
C 5%
D less than 1%

4. The formula for carbon dioxide is

A CO
B CO^2
C Co
D CO_2

5. Some people think that it would be better to use hydrogen rather than petrol as a fuel for cars. This is because

A large amounts of hydrogen gas are present in the atmosphere
B when hydrogen burns carbon dioxide is removed from the atmosphere
C when hydrogen burns the only substance formed is water
D burning hydrogen produces oxygen

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6. Some plant pots are made from bamboo plants.
The bamboo used is from a sustainable source.
The fact that bamboo is from a sustainable source means

A bamboo is a waste product
B new bamboo is grown to replace the bamboo plants cut down to make pots
C bamboo is unsuitable for other uses
D there are large amounts of bamboo available from this source

7. People are encouraged to recycle empty drink cans made of aluminium.
This is because

A aluminium is a very rare metal
B aluminium rusts quickly
C drink cans made of aluminium are refilled
D recycling reduces waste

8. Sea water contains dissolved salts.
Pure water for drinking can be obtained from sea water by

A distillation
B adding chlorine to the sea water
C filtration
D boiling the water before using it

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Modern materials

9. Instruments used by dentists can be put in a special pouch before being sterilised at a high temperature.
These pouches have a pink arrow on the outside.
The arrow turns brown when sterilisation is complete.

The arrow is likely to be made of

A a smart material
B universal indicator
C litmus
D Thinsulate

10. Tom likes to go sea fishing.



Tom's fishing rod is reinforced with fibres.
The best fibres for this reinforcing would be

A carbon fibres that are strong and light
B Nomex fibres that are flame resistant
C steel fibres that are strong and dense
D Dacron fibres that provide good thermal insulation

11. Tom wears a coat to keep him warm.
Which of these is the most important property of the material used to make this coat?

A flame retardant
B strong
C good thermal insulator
D brightly coloured

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12. Tom's boots have a waterproof, breathable lining.
This lining could be made from

A Kevlar
B Gore-Tex
C Lycra
D Thinsulate

Drinks

This is part of a label from a pack containing coffee.

> This packet contains coffee in a protective atmosphere of an unreactive gas.

13. The coffee is packed in a protective atmosphere to

A prevent the pack being damaged by sharp objects
B prevent oxygen causing the coffee to deteriorate
C make the packaging smart
D reduce the amount of caffeine in the coffee

14. The gas used in the packaging is likely to be

A nitrogen
B air
C hydrogen
D carbon monoxide

15. Alcoholic drinks are made by converting sugars into ethanol.
This process is

A distillation
B nanotechnology
C emulsification
D fermentation

16. Drinking alcoholic drinks can cause

A improved thinking
B faster reactions
C liver damage
D clearer vision

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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

Food products and cooking

17. Common salt is often added to food.
This salt is

A sodium
B sodium hydroxide
C sodium carbonate
D sodium chloride

18. Hydrogen is used in the food industry.
An important use of hydrogen is

A as a solvent
B in the sterilisation of milk
C in the manufacture of margarine
D as an oven cleaner

19. Mayonnaise is made from egg yolks, oil and vinegar.
If the egg yolks are not added to the mixture, the oil and vinegar

A react
B separate
C deteriorate
D solidify

20. Beer is made using hops and malt.
Sugar from the malt is converted into ethanol by yeast.
The complete word equation for the reaction that takes place is

A sugar + yeast → ethanol
B sugar → ethanol
C sugar → ethanol + carbon dioxide
D sugar + carbon dioxide → ethanol

21. Some saucepans have a non-stick coating made of Teflon.
Teflon

A was first produced as a coating for saucepans
B is a natural substance
C has uses which only became apparent some time after it was first made
D is only used for coating saucepans

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Fuels

22. Bio-ethanol can be used as a fuel for cars.
An advantage of using bio-ethanol instead of petrol is

A growing plants to produce bio-ethanol removes carbon dioxide from the atmosphere
B incomplete combustion of bio-ethanol cannot produce carbon monoxide
C complete combustion of bio-ethanol does not produce carbon dioxide
D growing plants to produce bio-ethanol does not affect the amount of land available for food production

23. Nanotechnology is being used to produce catalysts which make diesel fuel burn more efficiently.
Use of these catalysts will

A prevent waste products being produced
B reduce the percentage of toxic gases in exhaust fumes
C allow diesel-fuelled cars to use petrol as a fuel
D allow diesel-fuelled cars to travel more safely at high speeds

24. Kerosene fuel is a mixture of hydrocarbons.
The complete combustion of kerosene will produce

A carbon monoxide only
B carbon dioxide only
C carbon monoxide and water
D carbon dioxide and water

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

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

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

Nanotechnology

Nanotechnology is used to produce nanoparticles.

25. Scientists are interested in nanoparticles because the nanoparticles

A are the major cause of global warming, when released into the atmosphere
B are intelligent
C can make copies of themselves
D have some unusual properties

26. Nanoparticles of titanium(IV) oxide are used in some sunscreens.
These particles are

A just visible to the naked eye
B smaller than atoms of titanium
C smaller than molecules of oxygen but larger than atoms of titanium
D smaller than conventional particles of titanium(IV) oxide

27. Which of these statements are correct?

1 the media always produce reliable reports about nanotechnology
2 the risks involved in the use of nanotechnology are fully understood

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

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Food and drink

Some food substances are emulsions.

28. An emulsion consists of an emulsifier in a mixture of

A two liquids
B a soluble solid and a liquid
C an insoluble gas and a liquid
D two aqueous solutions

29. Lecithin is a common emulsifier.
Which of these statements are correct?

1 lecithin molecules have a hydrophilic part and a hydrophobic part
2 the hydrophilic part of a lecithin molecule is attracted to oil

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

30. Some food packaging has a special coloured spot on it.
This spot changes colour to show when the food is no longer fresh enough to eat.
This method of packaging

A stops the food from decaying
B makes the packaging microbe resistant
C makes the packaging easier to recycle
D is intelligent packaging

31. These ingredients are used to brew beer.

1 hops
2 water
3 sugar
4 yeast

Which of these must be present to produce the ethanol in the beer?

A 3 and 4 only
B 1, 3 and 4 only
C 2, 3 and 4 only
D 1, 2, 3 and 4

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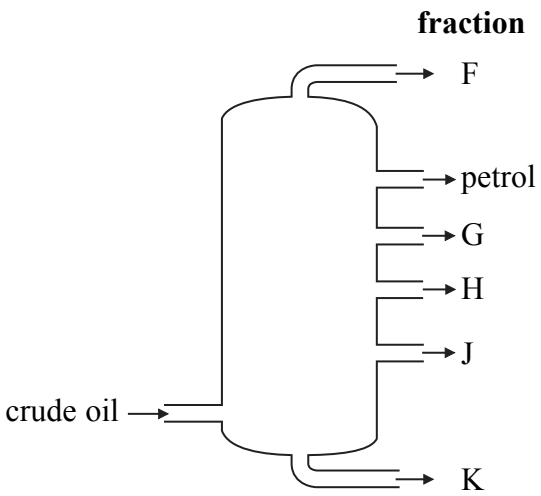
Industrial processes

32. In industry, oxygen is obtained from air.
This is done by

A cooling the air until the oxygen separates as a liquid
B liquefying the air and then raising the temperature to boil the liquid air
C reacting the nitrogen in air with hydrogen and removing the ammonia formed
D passing the air into sodium hydroxide solution to remove all gases except oxygen

Use this information to answer questions 33 to 35.

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



33. Which of these statements is **not** correct?

A crude oil enters the bottom of the column as a liquid
B each fraction contains more than one compound
C different fractions condense at different temperatures
D different crude oils have different compositions

34. The table gives names, average numbers of carbon atoms in a molecule and uses of the fractions F, H, J and K.
The average number of carbon atoms in the molecules in the petrol fraction is 8.

Which row of the table is correct?

	fraction	name	average number of carbon atoms in the molecules	used as a fuel for
A	F	gases	15	camping stoves
B	H	bitumen	20	lorries
C	J	fuel oil	45	ships
D	K	kerosene	13	aeroplanes

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35. Compare fractions J and H.

Which row of the table is correct?

	boiling point of J	**viscosity of J**
A	higher than H	lower than H
B	higher than H	higher than H
C	lower than H	lower than H
D	lower than H	higher than H

Burning fuels

36. Butane is used as a fuel.
Which of these equations are for reactions involving the incomplete combustion of butane?

1 $2C_4H_{10} + 5O_2 \rightarrow 8C + 10H_2O$
2 $C_4H_{10} + 2O_2 \rightarrow 4CO + 5H_2$
3 $2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O$

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

37. Some cars use hydrogen as a fuel.
Which of these statements about the use of hydrogen as a fuel are correct?

1 waste products are not released into the environment
2 hydrogen can be produced from water but large amounts of energy are required

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

38. The incomplete combustion of fuels can produce carbon monoxide.
This occurs with

A fossil fuels only
B fuels obtained from crude oil only
C all fuels
D any fuel containing carbon

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39. Ethanol can be used as a fuel.
Which of these is the balanced equation for the complete combustion of ethanol?

A $2C_2H_5OH + 5O_2 \rightarrow 2CO_2 + 2CO + 6H_2O$
B $2C_2H_5OH + 7O_2 \rightarrow 4CO_2 + 6H_2O$
C $C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O$
D $C_2H_5OH + O_2 \rightarrow CH_3COOH + H_2O$

40. Carbon monoxide is very dangerous because it is difficult to detect and toxic.
Which row of the table explains why carbon monoxide is difficult to detect and toxic?

	difficult to detect because it is	**toxic because it combines with**
A	colourless and odourless	oxygen
B	heavier than air	oxygen
C	colourless and odourless	haemoglobin in the blood
D	heavier than air	haemoglobin in the blood

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

END

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360Science

GCSE Science
Multiple Choice Paper C1b (5008)

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5008 Science/ 5036 Chemistry (C1b)

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10	A
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13	B
14	A
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16	C

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30	D
31	C
32	B
33	A
34	C
35	B
36	A
37	B
38	D
39	C
40	C

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Edexcel GCSE

Science (5008)

Chemistry (5036)

C1b – Topics 7 and 8

Foundation and Higher Tier

Friday 5 March 2010 – Morning

Time: 20 minutes

Materials required for examination	**Items included with question papers**
Multiple Choice Answer Sheet HB pencil, eraser and calculator	Nil

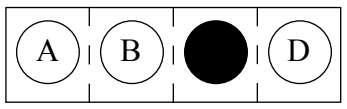
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Use an HB pencil. Do not open this booklet until you are told to do so.
Mark your answers on the separate answer sheet.

Foundation tier candidates: answer questions 1 – 24.
Higher tier candidates: answer questions 17 – 40.
All candidates are to answer questions 17 – 24.

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How to answer the test:
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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 Earth's atmosphere

The composition of the Earth's atmosphere has changed over time.

1. The amount of carbon dioxide in the atmosphere is increasing.
Carbon dioxide is produced by

A burning fossil fuels
B throwing away empty glass bottles
C planting more trees
D burning hydrogen

2. Our atmosphere contains approximately 78% of one gas.
This gas is

A carbon dioxide
B nitrogen
C oxygen
D water vapour

3. The Earth's early atmosphere was formed by gases emitted from volcanoes.
It is thought that this early atmosphere did not contain

A ammonia
B carbon dioxide
C water vapour
D oxygen

4. Some scientists are concerned about global warming.
Global warming is an increase in the

A temperature of the Sun
B number of hours of daylight
C temperature of the Earth
D size of the Earth's atmosphere

5. Scientists make predictions about future global warming.
Which row of the table is correct for these predictions?

	the predictions are made	**the predictions are**
A	using computer models	uncertain
B	using computer models	certain
C	without using computer models	uncertain
D	without using computer models	certain

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A more litter
B fewer natural resources used up
C more energy used for recycling
D more waste going into landfill sites

7. Paper bags can be used instead of plastic bags.
Paper bags are made from wood obtained from trees.
The use of paper is a sustainable development if

A paper bags are burnt to dispose of them
B only trees cut down to clear land for building are used
C people use fewer bags when shopping
D trees cut down to make the bags are replaced by planting new trees

8. Glass bottles can be recycled by melting the glass to make new products.
One problem with recycling glass in this way is

A there are too many glass bottles available for recycling
B the cost of recycling
C glass burns easily
D glass rots easily

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Modern materials

9. Kevlar is used to reinforce racing-bike tyres.
Kevlar is especially suitable for this use because it

A is a natural material
B has a low density and is strong
C has a low cost
D is not flammable

10. Some frying pans are coated with Teflon.
This use of Teflon

A was the reason for the invention of Teflon
B was discovered after Teflon was first made
C is the only use for Teflon
D can make the food stick to the pan

11. Thinsulate is a material which traps air.
It is likely to be used to make

A bullet proof vests
B hats to keep the head dry when it rains
C gloves to keep the hands warm
D beach towels

12. Gore-Tex is a ‘breathable’ waterproof fabric.
Which of these is **not** likely to contain Gore-Tex?

A jackets for hill-walkers
B hiking boots
C swimming shorts
D ski gloves

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Ethanol

Ethanol is found in alcoholic drinks.

13. The alcoholic drink usually made from grapes is

A beer
B whisky
C wine
D cider

14. Beer and wine are made by

A fermentation
B distillation
C combustion
D desalination

15. Which of these **cannot** be caused by drinking alcoholic drinks?

A antisocial behaviour
B liver damage
C clearer vision
D slower reactions

16. Ethanol is also used as a fuel.
An advantage of using ethanol, instead of petrol, as a fuel for cars is that

A ethanol does not produce carbon dioxide when burnt
B ethanol does not produce water when burnt
C the only waste product of burning ethanol is water
D ethanol made from sugar is a renewable fuel

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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

Food and drink

17. E322 is an emulsifier used in mayonnaise.
It is used to

A stop the mayonnaise mixture separating
B make the mayonnaise less viscous
C add colour to the mayonnaise
D act as a preservative

18. Chocolate bars are often packaged in sealed wrappers made of plastic.
Plastic is used to help prevent

A water vapour escaping from the chocolate
B oxygen escaping from the chocolate
C nitrogen reacting with the chocolate
D oxygen reacting with the chocolate

19. One plastic used to make the wrappers for chocolate bars is poly(ethene).
Poly(ethene) is a hydrocarbon.
The products of the complete combustion of poly(ethene) are

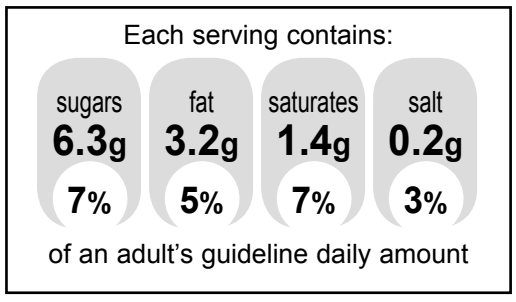
A carbon and hydrogen
B carbon and water
C carbon dioxide and water
D ethene and carbon dioxide

20. Some seafood has a special label on the packet.
This label changes colour to indicate how fresh the food is.
This label

A helps to keep the food fresh
B gives an example of intelligent packaging
C must be made of a nanocomposite
D must be biodegradable

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21. This shows part of a label on some food.



The salt most often present in food is

A sodium hydroxide
B sodium hydrogencarbonate
C sodium carbonate
D sodium chloride

22. Nitrogen is used in some food packaging.
Nitrogen can be obtained from liquid air by

A combustion
B reacting air with another substance
C fractional distillation
D desalination

23. When alcoholic drinks are produced, sugar is converted into ethanol.
The word equation for this reaction is

A sugar + oxygen → ethanol
B sugar + yeast → ethanol
C sugar + yeast → ethanol + carbon dioxide
D sugar → ethanol + carbon dioxide

24. Desalination can be used to obtain drinking water from sea water.
Desalination

A can be achieved by filtration
B can be achieved by distillation
C requires no energy
D can only be carried out in hot countries

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

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

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

New materials

25. John is on holiday.
To protect his skin, he uses a sunscreen.
The sunscreen contains nanoparticles of zinc oxide.
To protect his eyes, he wears sunglasses.
The lenses in the sunglasses become darker as the light becomes brighter.

Which row of the table describes the nature of the sunscreen and of the lenses in the sunglasses?

	the sunscreen is made from a material that is	**the lenses are made from a material that is**
A	smart	smart
B	not smart	not smart
C	not smart	smart
D	smart	not smart

26. Nanoparticles, rather than larger particles, are present in some sunscreens.
Two possible reasons for using nanoparticles, rather than larger particles, are

1 the nanoparticles do not stop UV radiation
2 the nanoparticles do not reflect visible light

Which of these are correct?

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

27. Which of these is the smallest particle?

A an atom of silicon
B a molecule of ethanol
C a particle of sand from a beach
D a nanoparticle of zinc oxide

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28. The Royal Society published a report in which they recommended that the release into the environment of manufactured nanoparticles and nanotubes should be avoided as far as possible.

This recommendation was probably made because

A nanoparticles have unusual properties which are not fully understood
B all nanoparticles are toxic
C nanoparticles released into the environment could multiply
D nanoparticles increase global warming

29. Gore-Tex fabric contains a 'breathable' waterproof membrane.
Which of these statements about Gore-Tex are correct?

1 The membrane has very small holes in it
2 Water molecules cannot pass through the membrane

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

30. Two types of glass which stay clean have been developed using nanotechnology.
Glass **X** has a coating which prevents water droplets sticking to the glass.
Glass **Y** has a coating which attracts water causing the water to spread out in a thin layer on the surface.

Which row of the table describes the nature of the coating on these two types of glass?

	coating on	
	glass X	**glass Y**
A	hydrophilic	hydrophobic
B	hydrophobic	hydrophilic
C	hydrophobic	hydrated
D	hydrated	hydrophilic

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Fuels

31. Butane, C_4H_{10}, is present in a fraction obtained by the fractional distillation of crude oil.
Which of these statements about this fraction are correct?

1 This fraction is obtained from the top of the fractionating column
2 In this fraction, butane is present mixed with other substances

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

32. The incomplete combustion of butane produces carbon monoxide.
Which of these is the balanced equation for this reaction?

A $C_4H_{10} + 2O_2 \rightarrow 4CO + 5H_2$
B $C_4H_{10} + 5O_2 \rightarrow 4CO + 5H_2O$
C $C_4H_{10} + 4O_2 \rightarrow 4CO + 4H_2O + H_2$
D $2C_4H_{10} + 9O_2 \rightarrow 8CO + 10H_2O$

33. Which line shows some fractions obtained from crude oil in order of their increasing boiling points?

	lowest boiling point →			**highest boiling point**
A	fuel oil	diesel oil	kerosene	petrol
B	petrol	kerosene	diesel oil	fuel oil
C	petrol	diesel oil	kerosene	fuel oil
D	kerosene	petrol	fuel oil	diesel oil

34. The table shows some fractions obtained from crude oil and two suggested uses of each fraction.
Which row of the table is correct?

	fraction	**use 1**	**use 2**
A	gases	fuel for cars	fuel for aircraft
B	kerosene	fuel for aircraft	fuel for central heating boilers
C	diesel oil	fuel for cars	in road surfaces
D	bitumen	in road surfaces	fuel for central heating boilers

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35. Ethanol produced from sugar cane is used as a fuel in some countries.
Which of these statements are correct?

1 Ethanol produced from sugar cane is a bio-fuel
2 Growing sugar cane removes carbon dioxide from the atmosphere

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

36. Carbon monoxide is emitted in vehicle exhaust fumes.
Carbon monoxide

A causes death by forming blood clots
B reacts with oxygen in the lungs
C increases the amount of carbon dioxide produced by the body
D reduces the amount of oxygen carried in the bloodstream

37. Other gases are also emitted in vehicle exhaust fumes.
These gases include carbon dioxide and hydrocarbons.

Which of these statements are correct?

1 The carbon dioxide is produced during combustion
2 The hydrocarbons are produced during combustion

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

38. Hydrogen can be used as a fuel for cars.
The balanced equation for the complete combustion of hydrogen is

A $H_2 + O \rightarrow H_2O$
B $H_2 + O_2 \rightarrow H_2O_2$
C $H_2 + O_2 \rightarrow H_2O + O$
D $2H_2 + O_2 \rightarrow 2H_2O$

39. One disadvantage of using hydrogen as a fuel is that

A the product of combustion is a pollutant
B toxic products can be formed by incomplete combustion
C making hydrogen requires energy
D there is a lack of raw material for producing hydrogen

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40. Research has been carried out into the use of diethyl ether (DEE) as a fuel.
The equation shows the complete combustion of DEE.

$$(C_2H_5)_2O + 6O_2 \rightarrow 4CO_2 + 5H_2O$$

DEE could be useful as a fuel because

A it is a hydrocarbon that burns to produce heat energy
B it would not produce any products which would cause environmental problems
C during complete combustion it burns producing heat energy and no solid residue
D it does not produce gases during complete combustion

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

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Mark Scheme (Results)
March 2010

GCSE

360Science

GCSE Science
Multiple Choice Paper C1b (5008)

GCSE Chemistry
Multiple Choice Paper C1b (5036)

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March 2010

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5008 Science/ 5036 Chemistry (C1b)

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Science (5008)

Chemistry (5036)

C1b – Topics 7 and 8

Foundation and Higher Tier

Friday 20 November 2009 – Morning

Time: 20 minutes

Materials required for examination
Multiple Choice Answer Sheet
HB pencil, eraser and calculator

Items included with question papers
Nil

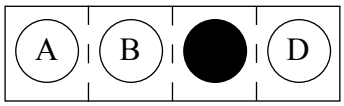
Instructions to Candidates

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.

Modern materials

1. Tom works as a lumberjack and uses a chain saw to cut down trees.
He wears protective trousers to prevent injury from the chain saw.
Which row of the table shows two important properties of a suitable material for these trousers?

	resistance to tearing	**flexibility of material**
A	high	flexible
B	low	rigid
C	low	flexible
D	high	rigid

2. In cold weather, Tom wears a hat.
To keep his head warm, the material of the hat must

A trap air
B have high tensile strength
C be porous
D be breathable

3. Tom wears a jacket made of Gore-Tex fabric.
All Gore-Tex fabric has

A a waterproof inner coating
B a breathable membrane
C a layer of nanoparticles of poly(ethene)
D a high visibility outer coating

4. The frames of Tom's spectacles are made from a shape memory alloy.
If the frames are bent, they return to their original shape when warm.
The material used to make the frames

A must have a low melting point
B must have low tensile strength
C is smart
D is brittle

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Alcoholic drinks

The NHS (National Health Service) has published information about these alcoholic drinks.



	A	B	C	D
alcoholic drink	cider	rum and coke	sambuca	wine
volume of drink (cm^3)	275	200	25	175
alcohol in drink (%)	5.5	10	42	13
units of alcohol in drink	1.5	2.0	1.1	2.3

1.0 unit of alcohol is 10 cm^3 of the pure alcohol.

5. Which glass contains the largest amount of the alcohol?

6. The alcohol in alcoholic drinks is

A ethene
B propanol
C ethanol
D propane

7. The NHS has published this information because

A drinking large amounts of the alcohol can damage your health
B drinking large amounts of the alcohol is good for relieving stress
C drinking the alcohol makes you more alert
D drinking the alcohol helps to prevent infections

8. Wine is made from grape juice.
The process used is

A distillation
B hydration
C dehydration
D fermentation

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Global warming

The idea that the Earth is becoming warmer is known as global warming**.**

9. Global warming

A is an idea that is not supported by any evidence
B is now a widely accepted idea
C can only be caused by carbon dioxide in the atmosphere
D can be prevented by cutting down trees

10. Burning fossil fuels may cause global warming because

A smoke escapes into the atmosphere
B carbon dioxide is formed
C methane is formed
D fossil fuels are non-renewable

11. When making predictions about future warming of the Earth, scientists

A monitor earthquakes and make predictions which are uncertain
B monitor earthquakes and make predictions which are certain to happen
C use computer models and make predictions which are uncertain
D use computer models and make predictions which are certain to happen

12. Which of these websites is most likely to provide unbiased information about global warming?

A the ‘convert to hydrogen fuel’ website
B a national weather centre website
C the ‘fly with us’ airline website
D the ‘bio-fuels are great’ website

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Useful substances

13. Which of these is added to water supplies to kill bacteria?

A sodium chloride
B sodium hydroxide
C chlorine
D sodium

14. Which of these is **not** obtained from rock salt?

A calcium oxide
B sodium chloride
C sodium hydroxide
D chlorine

15. Which of these is obtained, in large volume, from liquid air?

A hydrogen
B oxygen
C carbon dioxide
D water

16. Methane is a useful fuel.
When it burns completely in air it produces heat and

A a yellow flame
B soot
C a solid residue
D waste gases

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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

Food

17. On some packets of salted nuts it states that the packet contains nitrogen gas.
This gas is in the packet to prevent

A carbon dioxide reacting with oil in the nuts
B carbon dioxide reacting with salt on the nuts
C oxygen reacting with oil in the nuts
D oxygen reacting with salt on the nuts

18. The nitrogen can be obtained from liquid air by

A dehydration
B using nanotechnology
C chemical reaction
D fractional distillation

19. Some food products are emulsions.
An emulsion is a mixture of

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

20. Emulsifiers have a hydrophilic part and a hydrophobic part.
Which row of the table describes both parts correctly?

	hydrophilic part is	**hydrophobic part is**
A	water loving	water hating
B	water hating	water loving
C	water hating	water hating
D	water loving	water loving

21. Food is often sold in paper bags.
Paper is made from wood.
It is important to recycle paper because

A paper is not biodegradable
B paper is made from non-renewable materials
C recycling paper saves resources
D recycled paper is of better quality than that made from new raw materials

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Propane

Some stoves use propane, C_3H_8, as a fuel.

22. Incomplete combustion of propane can cause the formation of carbon monoxide.
Which of these is also a product of the incomplete combustion of propane?

A oxides of nitrogen
B sulphur dioxide
C carbon
D carbon dioxide

23. Carbon monoxide is dangerous because it

A forms choking fumes
B is heavier than air
C combines with haemoglobin in the blood
D combines with oxygen in the blood

24. Which of these word equations shows all the products of the complete combustion of propane?

A propane + oxygen → carbon dioxide
B propane + oxygen → carbon monoxide + water
C propane + oxygen → carbon dioxide + hydrogen
D propane + oxygen → carbon dioxide + water

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

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

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

Scientific developments

25. This question is about bio-diesel.
Which of these statements is **not** correct?

A burning bio-diesel causes no changes in the atmosphere
B the plants used to produce bio-diesel remove carbon dioxide from the atmosphere as they grow
C bio-diesel is a renewable fuel
D using bio-diesel reduces the demand for crude oil

26. A product has been developed which keeps the vegetable oil in deep fat fryers fresh for longer.
This product contains nanoparticles.
Nanoparticles are

A smaller than protons
B smaller than electrons
C larger than atoms
D larger than 0.1 mm in diameter

27. Some people are concerned about the increased use of nanoparticles.
The most valid reason for these concerns is that

A nanoparticles make copies of themselves
B the unusual properties of nanoparticles are not fully understood
C the nanoparticles are too small to see
D all nanoparticles are made by scientists

Sea water

28. In some hot countries, drinking water is obtained from sea water.

The process used is

A hydration
B dehydration
C salination
D desalination

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29. Sodium and chlorine can be obtained from sodium chloride.
Which row of the table shows correct uses for these two elements?

	sodium	**chlorine**
A	in street lights	making hydrochloric acid
B	in oven cleaners	as a food flavouring
C	in oven cleaners	making some polymers
D	in street lights	as a food flavouring

Useful materials

30. Ethanol obtained from plants is a bio-fuel.
Here are two statements about bio-fuels.

1 When ethanol is used as a fuel no carbon dioxide is released into the atmosphere
2 The plants used to make bio-fuels are grown on land that is unsuitable for growing food crops

Which of these statements are correct?

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

31. A chemist was trying to make a strong adhesive.
He made an adhesive that allowed things to be separated easily after they had been stuck together.
This adhesive was

A never used because it was too weak
B put into immediate use to make Post-it notes
C developed into a weaker adhesive
D used to make Post-it notes a few years later

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32. Some car air bags have a sensor made of a material which produces an electric current when it is deformed.
The current causes particles of solid sodium azide to decompose.
The nitrogen gas released in this reaction inflates the airbag.

Which row of the table describes the sensor material and the sodium azide?

	sensor material	sodium azide
A	smart	not smart
B	smart	smart
C	not smart	smart
D	not smart	not smart

Use the following information to answer questions 33 and 34.

Beer is made using malted barley.
Sugars from the malted barley are converted into ethanol by fermentation.

33. Here are two statements about the process.

1 Yeast is needed to convert the sugars into ethanol
2 The process of producing ethanol works well at temperatures between 15 °C and 27 °C.

Which of these statements are correct?

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

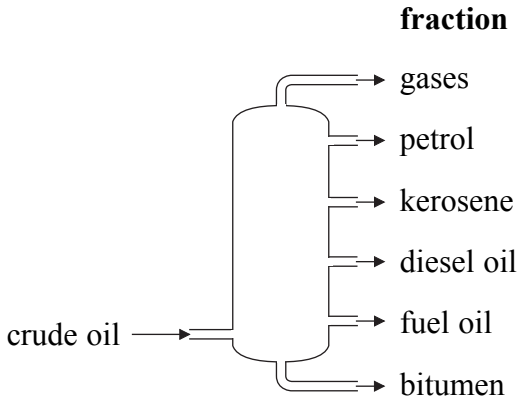
34. Which of these is the balanced equation for a reaction that takes place when ethanol is produced by fermentation?

A $C_2H_4 + H_2O \rightarrow C_2H_5OH$
B $C_6H_{12}O_6 \rightarrow 2C_2H_4OH + CO_2 + H_2O$
C $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$
D $C_5H_{12}O_4 \rightarrow 2C_2H_5OH + CO_2$

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Crude oil and fuels

The diagram shows a fractionating column and the fractions obtained from crude oil.



35. Which of these statements is **not** correct?

A each fraction contains a mixture of compounds
B some molecules in the petrol fraction contain eight carbon atoms
C petrol has a higher boiling point than diesel oil
D kerosene ignites more easily than diesel oil

36. Which of these statements are correct?

1 Crude oil is vaporised before it enters the column
2 Crude oil is a compound containing many different hydrocarbons

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

37. The table shows two properties of fuel oil compared with the same properties of diesel oil. Which row of the table is correct?

	average length of carbon chain in molecules in fuel oil	**viscosity of fuel oil at room temperature**
A	shorter than diesel oil	lower than diesel oil
B	longer than diesel oil	higher than diesel oil
C	shorter than diesel oil	higher than diesel oil
D	longer than diesel oil	lower than diesel oil

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38. The gases produced at the top of the column contain butane.
Which is the balanced equation for the complete combustion of butane?

A $C_4H_{10} + 9O_2 \rightarrow 4CO_2 + 5H_2O$
B $C_4H_{10} + 6O_2 \rightarrow 3CO_2 + CO + 5H_2O$
C $2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O$
D $C_4H_{10} + 13O \rightarrow 4CO_2 + 5H_2O$

39. The table shows some of the fractions with two suggested uses for each named fraction.
Which row of the table is correct?

	fraction	**use 1**	**use 2**
A	petrol	fuel for cars	fuel for patio heaters
B	kerosene	fuel for aircraft	painting fences
C	fuel oil	fuel for ships	fuel for trains
D	bitumen	road surfacing	waterproofing roofs

40. Some buses now use hydrogen as a fuel.
Which of these statements are correct?

1 Storing hydrogen requires a heavier fuel tank than is needed to store diesel
2 When hydrogen is burnt, no waste product is released into the atmosphere

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

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

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November 2009

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5008 Science/ 5036 Chemistry (C1b)

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7	A
8	D
9	B
10	B
11	C
12	B
13	C
14	A
15	B
16	D

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19	D
20	A
21	C
22	C
23	C
24	D

Unit C1b – 5008/5036	
Topics 7 & 8	
25	A
26	C
27	B
28	D
29	A
30	D
31	D
32	A
33	C
34	C
35	C
36	A
37	B
38	C
39	D
40	A

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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

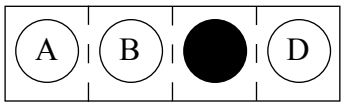
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Mark your answers on the separate answer sheet.

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:
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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.

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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

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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

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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

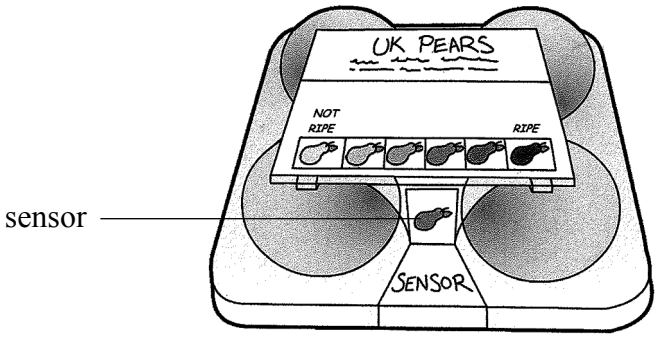
12. Plastics are made from crude oil.
Making plastic containers from recycled plastic is an example of

A combustion
B conserving a non-renewable resource
C using a renewable resource
D using nanotechnology

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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

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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

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Ski clothing

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

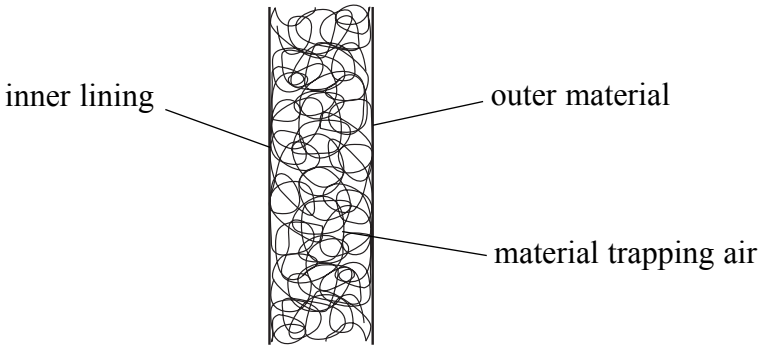


21. The frames of the sunglasses are made of Flexon.
Wayne bent the frame of his sunglasses.
The frame returned to its original shape when warmed.

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

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Use the following information to answer questions 23 and 24.

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

material	description of material
A	stretchable, lightweight and low strength
B	slippery, brittle and average strength
C	flexible and high strength
D	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

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

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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

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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
A	seawater	electrolysis
B	air	electrolysis
C	seawater	fractional distillation
D	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 $2H_2 + 2O_2 \rightarrow 2H_2O$
B $H_2 + O_2 \rightarrow H_2O_2$
C $2H_2 + O_2 \rightarrow 2H_2O$
D $H_2 + O \rightarrow H_2O$

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

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

A	to make ammonia	in food packaging
B	to make sulphuric acid	to make margarine
C	to make sulphuric acid	in food packaging
D	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?

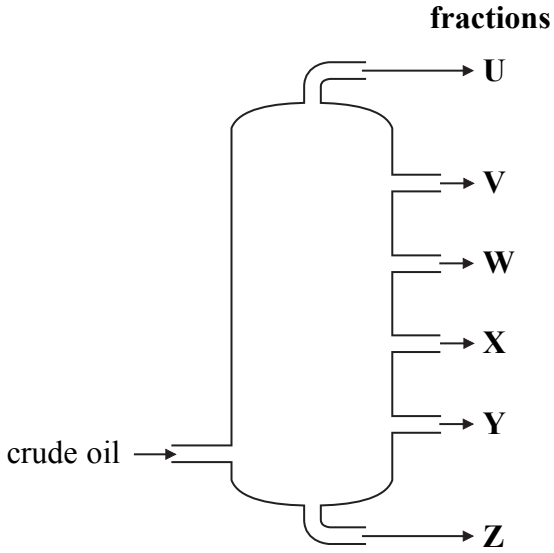
A 1 only
B 2 only
C 3 only
D 2 and 3 only

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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?

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

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

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

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

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

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

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Science (5008)

Chemistry (5036)

C1b – Topics 7 and 8

Foundation and Higher Tier

Friday 6 March 2009 – Morning

Time: 20 minutes

Materials required for examination
Multiple Choice Answer Sheet
HB pencil, eraser and calculator

Items included with question papers
Nil

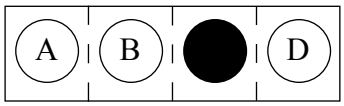
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Questions 1 to 16 must be answered by Foundation tier candidates only.
Higher tier candidates start at question 17.

Barbecues

Charcoal is used as a fuel for some barbecues.



1. Fuels are used because they produce

A smoke
B soot
C waste
D heat energy

2. Charcoal is made from wood obtained from trees.
This means that it is

A dangerous
B a bio-fuel
C toxic
D a fossil fuel

3. The wood for making charcoal is often obtained from sustainable forests.
In a sustainable forest

A no trees are cut down
B when trees are cut down no new trees are planted
C new trees are grown to replace trees that have been cut down
D all animals and birds are kept out

4. The charcoal on barbecues is often lit using ‘lighting fluid’.
Lighting fluid contains hydrocarbons.
Hydrocarbons

A are all liquids at room temperature
B are a mixture of carbon and hydrogen
C are compounds of carbon and hydrogen only
D produce soot during complete combustion

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5. At some barbecues people drink wine.
The alcohol in wine is mainly

A propanol
B ethanol
C ethanoic acid
D propane

6. The production of wine involves

A fermentation and distillation
B distillation
C fermentation
D neither fermentation nor distillation

7. The process in which sugars are converted into alcohol is carried out at a temperature of about

A 0 °C
B 30 °C
C 70 °C
D 100 °C

8. Drinking wine can cause

A faster reactions
B clearer vision
C better judgement
D slurred speech

9. After the barbecue, the empty glass wine bottles are recycled.
The main raw material for making glass is sand.
It is important to recycle glass because

A sand is a very expensive material
B glass cannot be put in landfill sites
C making glass from raw materials uses large amounts of energy
D glass decomposes to produce methane

10. Gloves can be made suitable for use when barbecuing by using Nomex fibres to make them.
The most likely reason for using Nomex is that these fibres

A are fireproof
B are breathable
C keep the hands warm
D make the gloves stiff

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11. Some of the food is cooked on a baking tray coated with Teflon.
The Teflon is used because it

A reflects heat
B is a naturally occurring material
C prevents the food from sticking to the baking tray
D improves the flavour of the food

Jane's new car



Jane's new car can use liquefied petroleum gas (LPG) as a fuel.
This fuel is a mixture of hydrocarbons obtained from crude oil.

12. The complete combustion of LPG will produce

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

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Use the following information to answer questions 13 and 14.

These four fuels are often described as 'alternative' fuels

LPG
bio-diesel,
hydrogen
E85 (a fuel containing 85% bio-ethanol and 15% petrol)

13. Which of these statements is correct?

A LPG is a bio-fuel
B The raw material for bio-diesel is crude oil
C Crude oil is not needed to produce E85
D Large areas of fertile land are needed to produce large quantities of E85

14. Crude oil is used to produce a material used for road surfaces.
Which row of the table shows the name of this material and the process used to obtain it?

	name of material	**process used**
A	naptha	fractional distillation
B	bitumen	fractional distillation
C	naptha	cracking
D	bitumen	cracking

15. A disadvantage of using hydrogen as a fuel is

A burning it causes pollution
B raw materials to make it are in short supply
C it is difficult to ignite
D making hydrogen needs large amounts of energy

16. Scotchgard protects fabrics from becoming stained.
It was discovered by scientists when a liquid they were using to make a type of rubber was splashed onto some canvas shoes.
They found that the part of the shoes on which the liquid was spilt resisted staining.

Scotchgard was discovered because scientists

A were trying to make a fabric protector
B ignored the accident
C knew the liquid had these unusual properties
D were observant after the liquid was spilt

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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

Materials from the Earth

17. Many people add common salt to food.
Common salt is

A sodium hydroxide
B sodium hydrogencarbonate
C sodium chloride
D sodium chlorate

18. Common salt can be obtained from

A sea water and rock salt
B sea water only
C rock salt only
D neither sea water nor rock salt

19. Nitrogen can be obtained from liquid air.
The process involves

A a chemical reaction
B nanotechnology
C fractional distillation
D a high temperature

20. Nitrogen is put in some packets containing food.
It is used because it

A is smart
B is intelligent
C is inert
D has a high boiling point

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Protection from the weather

Use the following information to answer questions 21 and 22.

John investigated three different fabrics used to make trousers for outdoor activities.

21. To find out how hardwearing each fabric was, he rubbed a sample of each fabric on sandpaper.
To ensure a fair test he should rub each sample

A on the same piece of sandpaper for the same number of times
B on a different type of sandpaper for the same number of times
C on a new piece of sandpaper of the same type for a different number of times
D on a new piece of sandpaper of the same type for the same number of times

22. Which of these cannot be measured in a meaningful, scientific experiment?

A which fabric is most waterproof
B which fabric is the strongest
C which fabric is the lightest in mass
D which fabric is the best for outdoor use

23. Gore-tex is used to make outdoor jackets which keep the people wearing them dry but allow their sweat to escape.

Gore-tex is a

A waterproof coating applied to the inside of the jacket
B waterproof coating applied to the outside of the jacket
C membrane containing small holes
D fibre that strengthens the jacket

24. A new sun-protection product that is completely transparent has been made.
This product

A does not reflect or absorb UV radiation
B does not reflect visible light
C forms a white deposit on the skin
D is unlikely to contain nanoparticles

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

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

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

Possible health hazards

CORGI is an organisation that advises on safety in the gas industry.
CORGI lists the following as danger signs with gas appliances.

- soot on or around the appliance
- a yellow or orange flame
- condensation in the room

25. The formation of soot shows that

A carbon is being produced by incomplete combustion
B carbon monoxide is being produced by incomplete combustion
C carbon is being produced by complete combustion
D carbon dioxide is being produced by complete combustion

26. Natural gas contains methane, CH_4.
Which of these equations show reactions that involve the incomplete combustion of methane?

1 $CH_4 + O_2 \rightarrow C + 2H_2O$
2 $2CH_4 + 3O_2 \rightarrow 2CO + 4H_2O$
3 $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

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

27. Condensation in a room containing a gas central heating boiler suggests that

A carbon dioxide is being formed
B carbon monoxide is being formed
C the fumes from the burning gas are leaking into the room
D the supply of oxygen is insufficient

28. Carbon monoxide is toxic to humans because it

A pollutes the atmosphere
B is acidic
C is absorbed through the skin
D combines with haemoglobin in the blood

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29. Nanotechnology is used to produce very small particles called nanoparticles.
Nanoparticles of a given substance often have different properties from larger particles of the same substance.

Which of these statements are correct?

1 nano-sized particles existed before scientists started to make them using nanotechnology
2 scientists fully understand the risks involved in the use of nanotechnology

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

Chemistry and health

30. Nitinol is a shape memory alloy.
Shape memory alloys can be squashed but when they are warmed they return to their original shape.
Nitinol is combined with a polyester to form a tube that is used to hold open blocked veins and arteries.
The Nitinol is squashed to allow the tube to be put in place.
When the Nitinol is warmed by the body it returns to its original shape holding the polyester tube open.
Body heat does not affect the polyester.



Which row of the table describes nitinol and polyester?

	nitinol	**polyester**
A	smart	smart
B	smart	not smart
C	not smart	smart
D	not smart	not smart

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31. Decayed food can cause illness.
Scientists have developed a food-wrapping material that will remove a gas from the contents of the package.
The gas which must be removed to prevent the food decaying is

A nitrogen
B oxygen
C argon
D carbon monoxide

32. Some wound dressings have a hydrophilic adhesive.
This means that when a dressing is stuck on the skin

A the skin must be dry because the hydrophilic adhesive repels water
B moisture on the skin is not a problem because the hydrophilic adhesive repels moisture
C the skin must be dry because the hydrophilic adhesive attracts water
D moisture on the skin is not a problem because the hydrophilic adhesive attracts moisture

33. Here are three statements about the effect of ethanol on the human body.

1 a small amount of ethanol has no effect at all on the human body
2 alcoholic drinks can make a person more self-confident and daring
3 large amounts of ethanol in the blood can lead to coma and death

Which of these statements are correct?

A 1 and 2 only
B 1 and 3 only
C 2 and 3 only
D 1, 2 and 3

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Fuels

34. Ethanol is used as a fuel in some countries.
Which of these statements are correct?

1 growing crops to produce ethanol reduces the land available for food production
2 growing plants use carbon dioxide
3 burning ethanol produces carbon dioxide

A 1 only
B 1 and 2 only
C 2 and 3 only
D 1, 2 and 3

35. Hydrogen can be used as a fuel.
Which is the balanced equation for burning hydrogen in air?

A $H_2 + O_2 \rightarrow H_2O_2$
B $H_2 + O \rightarrow H_2O$
C $H_2 + O_2 \rightarrow H_2O + O$
D $2H_2 + O_2 \rightarrow 2H_2O$

36. Two fuels that can be used for cars are petrol and diesel.
Which of the following statements is **false**?

A the waste products produced during complete combustion are the same for both fuels.
B loss of diesel from the fuel tank by evaporation in warm weather would be greater than for petrol
C diesel is more likely to solidify in very cold weather than petrol
D diesel is more difficult to ignite than petrol

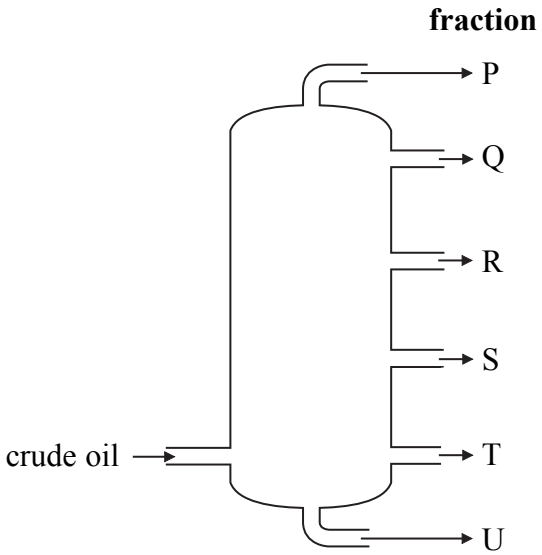
37. Some cars use autogas as a fuel.
Autogas is liquefied petroleum gas (LPG). It is mainly a mixture of propane and butane.
Which of these is the balanced equation for the complete combustion of butane?

A $C_4H_{10} + 9O_2 \rightarrow 4CO_2 + 5H_2O$
B $2C_4H_{10} + 9O_2 \rightarrow 8CO + 10H_2O$
C $2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O$
D $C_4H_{10} + 6O_2 \rightarrow 3CO_2 + CO + 5H_2O$

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Use the following information to answer questions 38 to 40.

The diagram shows a fractionating column used to obtain useful products from crude oil.



38. Which of these statements are correct?

1 Crude oil enters the bottom of the tower as a liquid
2 Each fraction contains only one compound

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

39. Comparing fraction Q with fraction P, which row of the table is correct?

	average length of carbon chain in molecules of Q	**boiling point of Q**	**viscosity of Q**
A	shorter than P	lower than P	greater than P
B	longer than P	higher than P	greater than P
C	shorter than P	lower than P	less than P
D	longer than P	higher than P	less than P

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40. Which row of the table correctly identifies R, S and T?

	R	S	T
A	kerosene	fuel oil	diesel oil
B	fuel oil	diesel oil	kerosene
C	diesel oil	kerosene	fuel oil
D	kerosene	diesel oil	fuel oil

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