

Surname	Initial(s)
Signature	

Paper Reference(s)

5017 5037

Edexcel GCSE

Additional Science (5017)

Chemistry (5037)

C2 – Topics 5 to 8

Foundation and Higher Tier

Thursday 3 March 2011 – Morning

Time: 20 minutes

Materials required for examination

Multiple Choice Answer Sheet
HB pencil, eraser and calculator

Items included with question papers

Nil

Instructions to Candidates

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

Foundation tier candidates: answer questions 1 – 24.

Higher tier candidates: answer questions 17 – 40.

All candidates are to answer questions 17 – 24.

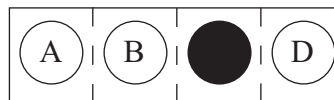
Before the test begins:

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

How to answer the test:

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

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



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

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

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

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Turn over

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

Metals

1. Most metals
 - A are brittle
 - B are poor conductors of electricity
 - C are good conductors of heat
 - D have low melting points

2. Magnesium is added to molten aluminium to make magnalium.
Magnalium is
 - A a covalent compound
 - B an alloy
 - C an element
 - D an ionic compound

3. Magnalium is sometimes used to make parts of aeroplanes.
Magnalium is used instead of pure aluminium for this purpose because it is
 - A stronger
 - B denser
 - C more reactive
 - D softer

4. The symbol for an atom of magnesium is
 - A M
 - B Ma
 - C Mg
 - D Mn

Atomic structure

Use the following information to answer questions 5 to 7.

An atom of sodium contains 11 protons, 11 electrons and 12 neutrons.

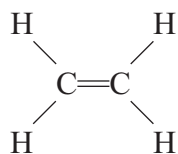
5. The particles in the nucleus of the atom are
- A protons and electrons
 - B electrons and neutrons
 - C protons and neutrons
 - D neutrons only
6. The relative mass of this sodium atom is
- A 11
 - B 12
 - C 22
 - D 23
7. The electronic configuration of the sodium atom is
- A 1.8.2
 - B 2.1.8
 - C 2.8.1
 - D 8.1.2
8. All atoms of sodium contain the same number of
- A bonds
 - B molecules
 - C neutrons
 - D protons

Propane

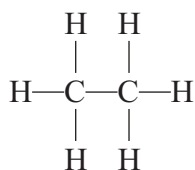
9. The formula of a molecule of propane is
- A CH_4
 - B C_2H_6
 - C C_3H_8
 - D C_4H_{10}
10. Propane is
- A an alkane
 - B a polymer
 - C a monomer
 - D an alkene
11. When propane is burnt in oxygen, heat energy is given out. The reaction taking place is
- A polymerisation
 - B endothermic
 - C cracking
 - D exothermic
12. Atoms in a propane molecule are joined by covalent bonds. Each covalent bond contains a pair of
- A electrons
 - B protons
 - C neutrons
 - D ions

Polymers

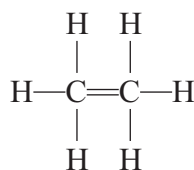
13. The structure of a molecule of ethene is



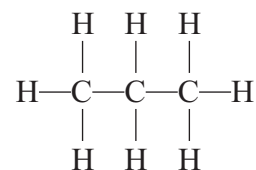
A



B



C



D

14. Ethene can be converted to poly(ethene).

In this reaction, ethene is a

- A** polymer
- B** monomer
- C** thermosetting substance
- D** thermoplastic substance

15. A manufacturer makes a rigid polymer.

He wants to make a more flexible form of this polymer.

In the manufacturing process, he should

- A** add a plasticiser
- B** increase the cross-links between the molecules
- C** increase the average length of the molecules
- D** add a preservative

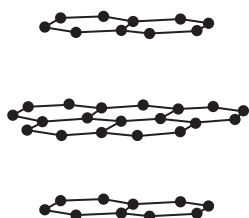
16. The disposal of polymers into landfill sites can cause problems because they

- A** are biodegradable
- B** do not rot
- C** are toxic
- D** burn readily

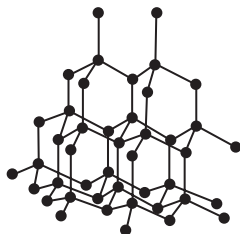
Higher tier candidates start at question 17 and answer questions 17 to 40.
Questions 17 to 24 must be answered by all candidates: Foundation tier and Higher tier.

Carbon

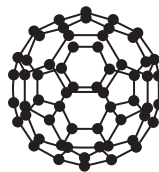
17. The diagrams show the structures of four forms of carbon.
Which diagram is the structure of diamond?



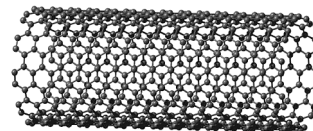
A



B



C



D

18. Diamond is a form of carbon.
It is hard material and has a very high melting point.
It does not conduct electricity when solid.
The structure of diamond is

- A ionic
- B metallic
- C giant molecular covalent
- D simple molecular covalent

19. Graphite conducts electricity.
This is because graphite

- A has big molecules that can easily slide over each other
- B has electrons which are free to move through the structure
- C contains ionic bonds
- D is an element

Rates of reaction

Use the following information to answer questions 20 to 22.

A student carried out four experiments W, X, Y and Z.

In each experiment she added the same mass of calcium carbonate to the same volume of hydrochloric acid.

The reaction produced a gas.

Every minute, for five minutes, she measured the volume of gas that had been given off.

The conditions in all experiments were kept the same, except that different sized pieces of calcium carbonate were used.

The following is a table of the student's results.

experiment	volume of gas produced (cm ³) after					
	0 minutes	1 minute	2 minutes	3 minutes	4 minutes	5 minutes
W	0	22	31	38	40	40
X	0	16	26	35	40	40
Y	0	8	15	25	32	40
Z	0	4	6	8	10	12

20. Which reaction has the fastest rate in the first minute?

- A W
- B X
- C Y
- D Z

21. Which reaction did **not** finish within five minutes?

- A W
- B X
- C Y
- D Z

22. To increase the rate of reaction in experiment X, the student should

- A decrease the concentration of the acid
- B use bigger pieces of calcium carbonate
- C increase the temperature of the acid
- D use a smaller volume of the same acid

23. A catalyst can be added to a reaction mixture to change the rate of the reaction.

Which row of the table shows the effect that a catalyst has on the rate of a reaction and how the mass of the catalyst after the reaction compares with the mass of catalyst added.

	effect on rate of reaction	change in mass of catalyst
A	increases	unchanged
B	increases	decreases
C	decreases	unchanged
D	decreases	decreases

24. The formula of calcium carbonate is CaCO_3 .
What is the relative formula mass of calcium carbonate?
(Relative atomic masses: C = 12, Ca = 40, O = 16)

- A** 68
B 100
C 124
D 204

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

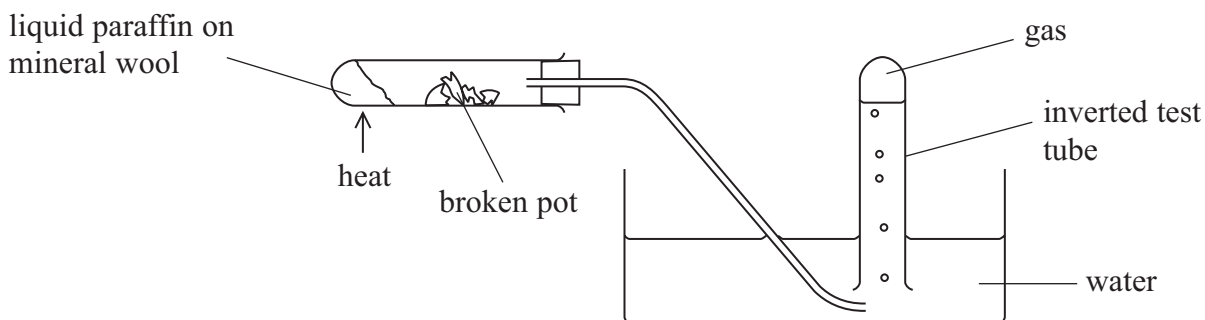
Foundation tier candidates do not answer any more questions after question 24.

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

Action of heat on liquid paraffin

Use the following information to answer questions 25 to 27.

In an experiment liquid paraffin vapour is passed over heated broken pot.



25. The gas produced in this reaction contains ethene.
This shows that the liquid paraffin has been
- A cracked
 - B distilled
 - C hydrogenated
 - D polymerised
26. The formula of a molecule of a hydrocarbon present in liquid paraffin is $C_{12}H_{26}$.
Which of the following could **not** be an equation for the reaction of this molecule in this experiment?
- A $C_{12}H_{26} \rightarrow C_2H_4 + C_{10}H_{22}$
 - B $C_{12}H_{26} \rightarrow C_4H_{10} + C_8H_{18}$
 - C $C_{12}H_{26} \rightarrow C_2H_6 + C_4H_8 + C_6H_{12}$
 - D $C_{12}H_{26} \rightarrow C_9H_{18} + C_3H_8$
27. The gas collected reacts with bromine water.
Which of these statements about the gas are correct?
- 1 the gas will decolourise the bromine water
 - 2 the gas contains an unsaturated hydrocarbon
- A 1 only
 - B 2 only
 - C both 1 and 2
 - D neither 1 nor 2

Oil

28. Some vegetable oils are monounsaturated.
This means that each of their molecules has
- A single bonds only
 - B double bonds only
 - C only one carbon-carbon double bond
 - D more than one carbon-carbon double bond
29. Liquid vegetable oil can be reacted with hydrogen to form a solid fat.
This is an example of
- A polymerisation
 - B hydrogenation
 - C cracking
 - D dehydrogenation

Electrolysis

30. Lead bromide is a salt.
This salt contains lead ions, Pb^{2+} , and bromide ions, Br^- .
What is the formula of lead bromide?
- A Pb_2Br
 - B PbBr
 - C PbBr_2
 - D Pb2Br
31. Molten lead bromide can be decomposed using electrolysis.
The half equation for the reaction at the negatively charged electrode is
- A $\text{Pb}^{2+} + 2\text{e} \rightarrow \text{Pb}$
 - B $\text{Pb} \rightarrow \text{Pb}^{2+} + 2\text{e}$
 - C $2\text{Br}^- \rightarrow \text{Br}_2 + 2\text{e}$
 - D $\text{Br}_2 + 2\text{e} \rightarrow 2\text{Br}^{2-}$

Carbon dioxide

Use the following information to answer questions 32 and 33.

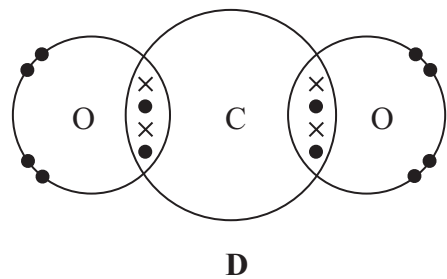
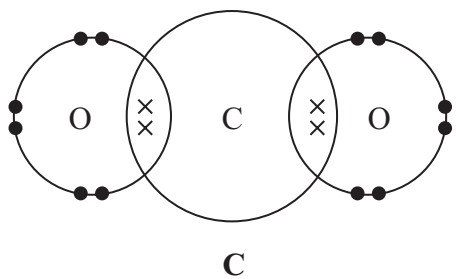
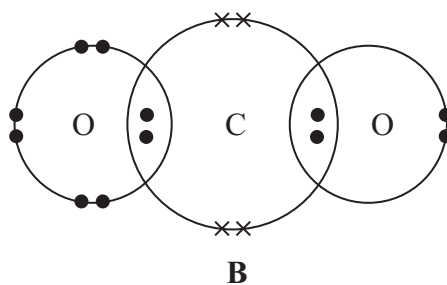
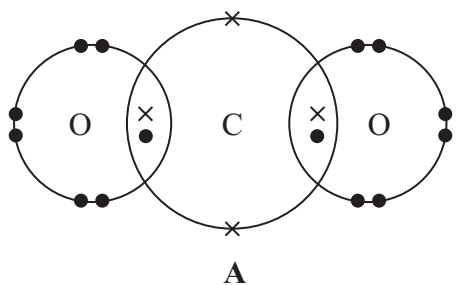
The electronic configurations of carbon and oxygen are

carbon 2.4
oxygen 2.6

32. Which row of the table shows the numbers of the groups in the periodic table in which carbon and oxygen are placed?

	number of group containing	
	carbon	oxygen
A	4	2
B	2	3
C	4	6
D	6	4

33. Which of the following is the correct dot and cross diagram for a molecule of carbon dioxide?



34. Carbon dioxide is a simple molecular, covalent compound.
Which row of the table shows the relative melting point and electrical conductivity of carbon dioxide?

	relative melting point	electrical conductivity
A	low	good
B	low	poor
C	high	good
D	high	poor

Atoms and isotopes

35. The atomic number of chlorine is 17.
The symbols for four different atoms, W, X, Y and Z, are shown.



Which atoms are isotopes of chlorine?

- A W and X
B W and Y
C X and Z
D X and Y
36. A chlorine atom, Cl, forms a chloride ion, Cl⁻, by
- A losing an electron
B losing a proton
C gaining an electron
D gaining a proton
37. Element S exists as two isotopes, mass number 10 and 11.
A sample of S contains 20% of the isotope with mass number 10 and 80% of the isotope with mass number 11.
What is the relative atomic mass of element S?
- A 10.2
B 10.5
C 10.8
D 21

38. Which of these statements about the halogens are correct?

- 1 as the atomic numbers of the halogens increase, the boiling points of the halogens increase
- 2 as the atomic numbers of the halogens increase, the intermolecular forces of attraction increase

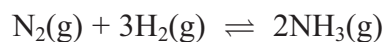
- A 1 only
B 2 only
C both 1 and 2
D neither 1 nor 2

The Haber process

Use the following information to answer questions 39 and 40.

The Haber process is used to produce ammonia.

The equation for the reaction is



The forward reaction is exothermic.

39. Which of these statements about this reaction are correct?

- 1 increasing the temperature will increase the equilibrium yield of ammonia
- 2 increasing the pressure will decrease the equilibrium yield of ammonia

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

40. What is the maximum mass of ammonia formed when 1.5g of hydrogen reacts completely with excess nitrogen?

(Relative atomic masses: H = 1; N = 14)

- A 4.5g
B 8.5g
C 17g
D 34g

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

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