EDEXCEL GCSE SCIENCE (360SCIENCE)

SCIENCE



EXAM QUESTION PACK

UNIT C2 MULTIPLE CHOICE 5017 PAPERS

STEMUP

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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

Wednesday 15 June 2011 – Morning

Time: 20 minutes

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

Items included with question papers
Nil

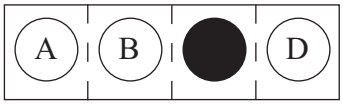
Instructions to Candidates

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

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

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

How to answer the test:
For each question, choose the right answer, A, B, C or D and mark it in HB pencil on the answer sheet.
For example, the answer C would be marked as shown.



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

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

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

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

Ammonia

1. Ammonia is formed when nitrogen reacts with hydrogen.
The equation for the reaction is

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$$

The equation shows that ammonia is formed as a

A solution
B solid
C liquid
D gas

2. The reaction to produce ammonia is exothermic.
Exothermic means

A the reaction is very slow
B there is only one product
C the reactants must be heated to start the reaction
D heat is given out during the reaction

3. A catalyst is used in the reaction to produce ammonia.
Which of the following statements about the use of a catalyst is correct?

A addition of a catalyst does not affect the speed of the reaction
B addition of a catalyst decreases the speed of the reaction
C the mass of the catalyst is unchanged at the end of a reaction
D the mass of the catalyst has decreased at the end of a reaction

4. Nitrogen has an atomic number of 7.
What is the electronic configuration of a nitrogen atom?

A 7
B 2.5
C 5.2
D 6.1

5. Nitrogenous fertilisers are made from ammonia.
Which of these is the formula of a solid, nitrogenous fertiliser?

A Ni
B HNO_3
C NH_4NO_3
D N_2

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Everyday materials

6. Metals conduct electricity because particles in their structures move to carry the current.
These particles are

A ions
B protons
C electrons
D neutrons

7. Copper is a typical metal.
It is used to make hot water pipes and boilers.
Which of these is likely to be the melting point of copper?

A 32 °C
B 78 °C
C 114 °C
D 1083 °C

8. Polymers

A are elements
B are large molecules
C are usually liquids at room temperatures
D always break down to form toxic products

9. Disposal of polymers can cause problems.
One reason for this is that they

A do not burn
B do not rot
C are soluble in water
D contain double bonds

10. Carbon forms many useful compounds.
In these compounds, each carbon atom forms

A four stable, ionic bonds
B only two stable, covalent bonds
C four unstable, covalent bonds
D four stable, covalent bonds

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11. Which compound has the formula C_3H_6?

A ethane
B propane
C ethene
D propene

12. Common salt is sodium chloride.
Sodium chloride has a

A giant ionic structure
B simple molecular, covalent structure
C giant molecular, covalent structure
D metallic structure

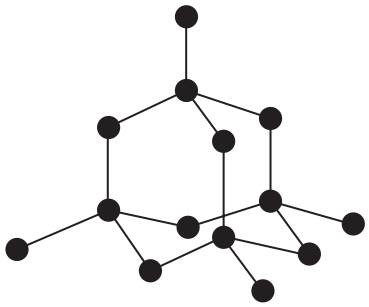
13. Helium has an atomic number of two.
It is a noble gas and forms no compounds.
Helium is very unreactive because a helium atom has

A two electrons in its outer shell
B eight electrons in its outer shell
C a full outer shell of neutrons
D a full outer shell of protons

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Carbon

14. Diamond is a form of carbon.
The diagram shows a model of the structure of diamond.



Diamond is

A a covalent compound
B an element
C an ionic compound
D a mixture

15. The structure of diamond means that it

A is hard
B melts at a low temperature
C boils at a low temperature
D conducts electricity

16. By chance, in 1985, chemists discovered another pure form of carbon.
This was

A Buckminsterfullerene
B graphite
C soot
D carbon dioxide

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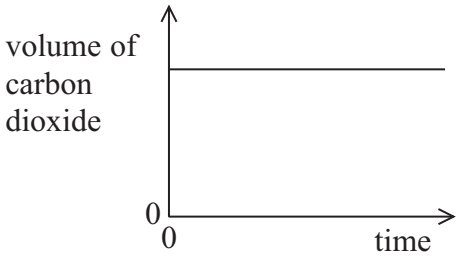
Higher tier candidates start at question 17 and answer questions 17 to 40.
Questions 17 to 24 must be answered by all candidates: Foundation tier and Higher tier.

Particles

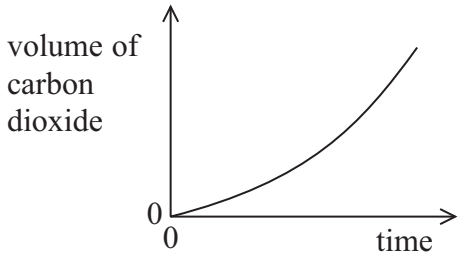
Use the following information to answer questions 17 and 18.

Excess marble chips were added to dilute hydrochloric acid at room temperature.
The total volume of carbon dioxide produced was measured every minute, until after the reaction was complete.

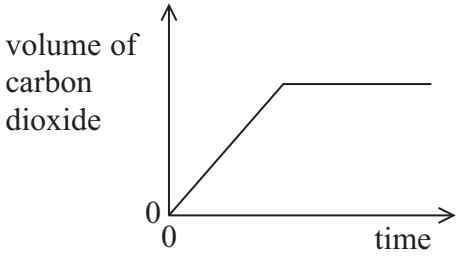
17. Which graph shows the results of this experiment?



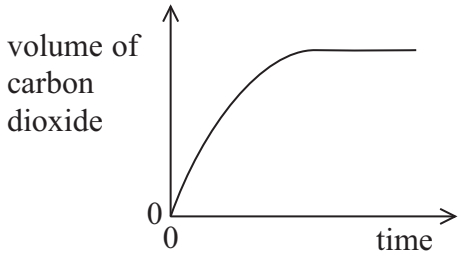
A



B



C



D

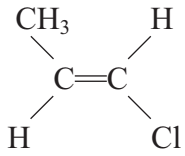
18. The experiment was repeated at a higher temperature of 40 °C using the same amounts of the reagents.
The reaction was complete in a shorter period of time because

A heating concentrated the acid
B all the marble chips were used up
C successful collisions between particles occurred more frequently
D the particles increased in size making collisions more likely

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Use the following information to answer questions 19 and 20.

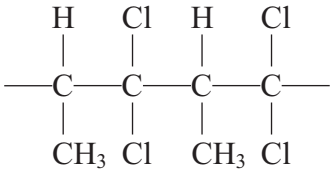
The diagram shows the structure of a molecule of substance **X**.



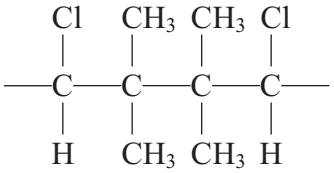
19. Which row of the table correctly describes this molecule?

	unsaturated	**hydrocarbon**
A	yes	yes
B	no	yes
C	yes	no
D	no	no

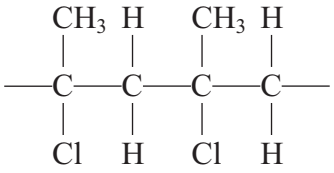
20. What is the structure of the polymer formed from **X**?



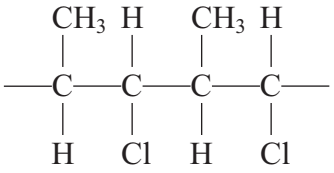
A



B



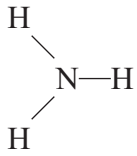
C



D

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21. The diagram shows the structure of a molecule of ammonia.



What is the total number of shared electrons in all three covalent bonds in the ammonia molecule?

A 2
B 3
C 6
D 8

22. Which of these substances could be ammonia?

substance	melting point (°C)	boiling point (°C)
A	–78	–34
B	–17	118
C	37	344
D	730	1435

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Use the following information to answer questions 23 and 24.

Magnesium and chlorine atoms can form ions.
The table gives information about the atoms of these elements and the ions they form.

	element	
	magnesium	**chlorine**
symbol of atom	Mg	Cl
number of electrons in atom	12	17
symbol of ion	Mg^{2+}	Cl^{-}

23. How many electrons are there in a magnesium ion, Mg^{2+}?

A 10
B 12
C 14
D 24

24. What is the formula of magnesium chloride?

A MgCl
B $MgCl_2$
C Mg_2Cl
D Mg2Cl

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

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

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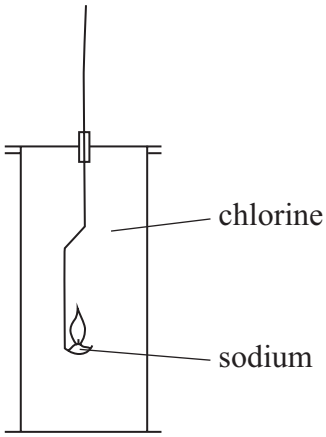
Questions 25 to 40 must be answered by Higher tier candidates only.
Foundation tier candidates do not answer questions 25 to 40.

Structures

25. Metals are malleable because

A their structures contain anions and cations
B their molecules are held together by weak intermolecular forces
C particles in their structures can slide past one another when a force is applied
D they have low melting points

26. When sodium burns in a gas jar of chlorine, sodium chloride is formed.



The equation for the reaction is

A $Na + Cl \rightarrow NaCl$
B $Na + Cl_2 \rightarrow NaCl_2$
C $2Na + 2Cl \rightarrow Na_2Cl_2$
D $2Na + Cl_2 \rightarrow 2NaCl$

27. Experiments were carried out on a solid salt.
It was found that the salt
dissolved easily in water
did not melt when heated in a Bunsen flame.

These results show that the salt has

A strong forces between molecules
B a giant molecular, covalent structure
C strong bonds between atoms
D a giant ionic structure

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28. Plasticisers are added to some polymers.
Which of these statements about plasticisers are correct?

1 plasticisers allow polymer chains to slide over one another more easily
2 plasticisers reduce the length of polymer chains

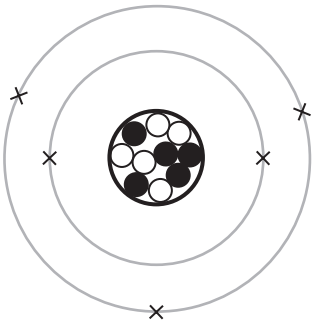
A 1 only
B 2 only
C both 1 and 2
D neither 1 nor 2

29. Diamond and graphite are two forms of carbon.
Which row of the table shows their correct properties?

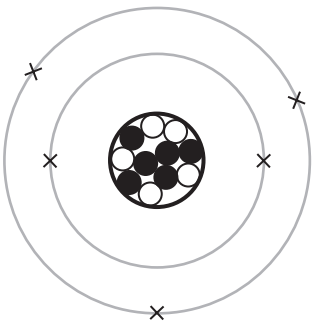
	property of diamond	property of graphite
A	contains electrons free to move through the structure	conducts electricity
B	is an electrical insulator	contains electrons free to move through the structure
C	has a structure containing layers of carbon atoms	contains electrons free to move through the structure
D	contains electrons free to move through the structure	has a structure containing layers of carbon atoms

30. Boron exists as two different atoms, **P** and **Q**.

key
○ = proton
● = neutron
× = electron



P



Q

Which row of the table shows the atomic numbers and mass numbers of the atoms **P** and **Q**?

	atomic number		mass number	
	P	**Q**	**P**	**Q**
A	5	5	15	16
B	10	11	5	5
C	5	5	10	11
D	5	6	10	11

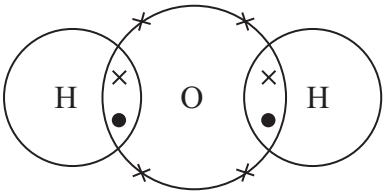
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31. Fluorine atoms are more reactive than iodine atoms.
Part of the reason for this is that

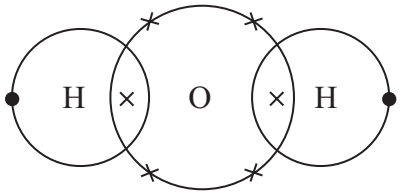
A a fluorine atom has more electrons in its outer shell than an iodine atom
B a fluorine atom has fewer shells containing electrons than an iodine atom
C fluorine atoms gain electrons less readily than iodine atoms
D fluorine exists as only one isotope but iodine exists as two isotopes

32. Which of these dot and cross diagrams correctly represents the outer shell electrons of the atoms in a water molecule?

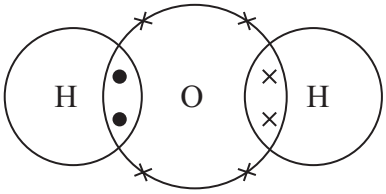
● electron of a hydrogen atom
× electron of a oxygen atom



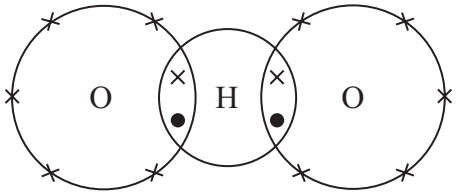
A



B



C



D

33. Methane is a simple molecular, covalent substance.
It is a gas at room temperature.
Which of these statements about methane are correct?

1 methane is a gas at room temperature because the intermolecular forces are weak
2 methane conducts electricity because its structure contains free electrons

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

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Carbon chemistry

Use the following information to answer questions 34 and 35.

This equation shows a reaction in which **X** reacts to form **Y** and **Z**.

$$\underset{\mathbf{X}}{C_{10}H_{22}} \rightarrow \underset{\mathbf{Y}}{C_2H_4} + \underset{\mathbf{Z}}{C_8H_{18}}$$

34. Which row of the table shows the type of reaction occurring and the nature of the compounds **X**, **Y** and **Z**?

	type of reaction	X is an	Y is an	Z is an
A	fractional distillation	alkene	alkene	alkane
B	fractional distillation	alkane	alkane	alkene
C	cracking	alkane	alkane	alkene
D	cracking	alkane	alkene	alkane

35. What is the maximum mass of **Z** that can be obtained from 71 g of **X**?
(Relative atomic masses: C = 12, H = 1)

A 14 g
B 28 g
C 57 g
D 114 g

36. A polyunsaturated oil is less viscous than a saturated oil of similar molecular size.
The reason for this is that the polyunsaturated oil has

A double bonds in its molecules which break open and join to other molecules
B weaker bonds between atoms in its molecules
C weaker forces between its molecules
D smaller atoms in its molecules

37. Unsaturated vegetable oils can be converted into margarine.
In this process, the vegetable oils are reacted with

A milk
B saturated fat
C hydrogen
D water

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Ammonia and its compounds

Ammonia is formed when nitrogen reacts with hydrogen.
The equation for the reaction is

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$$

The forward reaction is exothermic.

38. When the reaction reaches equilibrium

A the reaction stops
B ammonia starts to decompose into nitrogen and hydrogen
C there will be no further change in the amounts of reactants and products present
D the amounts of reactants and products are equal

39. The yield of ammonia at equilibrium is affected by changing the pressure and by changing the temperature.
Which row of the table shows the effect on the equilibrium yield of decreasing temperature and of decreasing pressure?

	effect of	
	decreasing temperature	**decreasing pressure**
A	increases yield	increases yield
B	increases yield	decreases yield
C	decreases yield	decreases yield
D	decreases yield	increases yield

40. A catalyst is used when ammonia is made.
Which of these statements about the use of this catalyst are correct?

1 the catalyst increases the equilibrium yield of ammonia
2 the catalyst increases the rate at which ammonia is converted into nitrogen and hydrogen

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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Mark Scheme (Results)

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Multiple Choice Paper C2 (5017)

GCSE Chemistry
Multiple Choice Paper C2 (5037)

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You can also telephone 0844 576 0037 to speak to a member of our Subject Advisor team.

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5017 & 5037 (C2) Mark Scheme
June 2011

Unit C2 – 5017/5037	
Topics 5, 6, 7 & 8	
1	D
2	D
3	C
4	B
5	C
6	C
7	D
8	B
9	B
10	D
11	D
12	A
13	A
14	B
15	A
16	A

Unit C2 – 5017/5037	
Topics 5, 6, 7 & 8	
17	D
18	C
19	C
20	D
21	C
22	A
23	A
24	B

Unit C2 – 5017/5037	
Topics 5, 6, 7 & 8	
25	C
26	D
27	D
28	A
29	B
30	C
31	B
32	A
33	A
34	D
35	C
36	C
37	C
38	C
39	B
40	B

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