

CHEMISTRY

Paper 1 Multiple Choice

0620/12 October/November 2009

45 Minutes

Additional Materials:

Multiple Choice Answer Sheet Soft clean eraser Soft pencil (type B or HB is recommended)

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

13682

Do not use staples, paper clips, highlighters, glue or correction fluid.

Write your name, Centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.

There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers A, B, C and D.

Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer. Any rough working should be done in this booklet. A copy of the Periodic Table is printed on page 16. You may use a calculator.

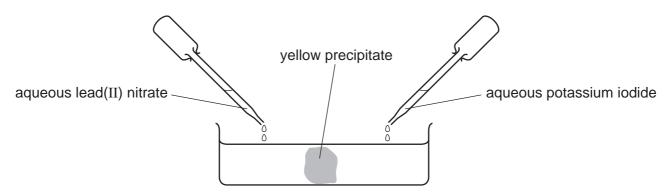
This document consists of **16** printed pages.



1 A student separates salt from a mixture of salt and sand.

What is the correct order of steps for the student to take?

- **A** filter \rightarrow evaporate \rightarrow shake with water
- **B** filter \rightarrow shake with water \rightarrow evaporate
- **C** shake with water \rightarrow evaporate \rightarrow filter
- $\textbf{D} \quad \text{shake with water} \rightarrow \text{filter} \rightarrow \text{evaporate}$
- **2** Aqueous lead(II) nitrate and aqueous potassium iodide are added to a dish containing water, as shown.



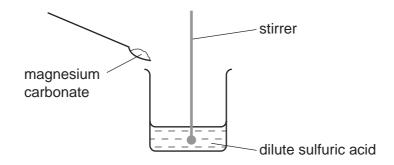
A yellow precipitate forms after a few minutes.

Which process occurs before the precipitate forms?

- A diffusion
- **B** distillation
- **C** fermentation
- **D** filtration

3 A student carries out an experiment to prepare pure magnesium sulfate crystals.

The diagram shows the first stage of the preparation.



He adds magnesium carbonate until no more reacts.

Which process should he use for the next stage?

- A crystallisation
- **B** evaporation
- **C** filtration
- D neutralisation
- 4 Which change to an atom occurs when it forms a positive ion?
 - A It gains electrons.
 - B It gains protons.
 - C It loses electrons.
 - D It loses protons.
- 5 Statements 1, 2 and 3 are about diamond and graphite.
 - 1 They are different solid forms of the same element.
 - 2 They each conduct electricity.
 - 3 They have atoms that form four equally strong bonds.

Which statements are correct?

Α	1 only	В	3 only	C 1 and 3	D 2 and 3
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6 Covalent bonds are formed when electrons are1...... Covalent compounds have2..... electrical conductivity.

Which words correctly complete gaps 1 and 2?

	1	2
Α	shared	high
В	shared	low
С	transferred	high
D	transferred	low

7 Atom X has 8 more electrons than atom Y.

Student 1 says they are in the same group.

Student 2 says they are unreactive.

Which students can be correct?

	student 1	student 2		
Α	\checkmark	\checkmark		
в	\checkmark	x		
С	x	\checkmark		
D	X	X		

- 8 Which number is different for isotopes of the same element?
 - A number of electrons
 - **B** number of full shells
 - **C** number of nucleons
 - **D** number of protons
- 9 Which atom has two more electrons than an atom of a noble gas?
 - **A** aluminium
 - **B** bromine
 - C calcium
 - D rubidium

10 For each atom of carbon present in a molecule, there is an equal number of atoms of oxygen but twice as many atoms of hydrogen.

What is the formula of the molecule?

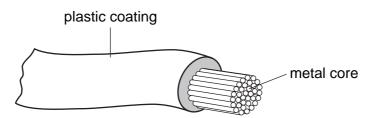
 $\label{eq:constraint} \textbf{A} \quad C_2H_2O_2 \qquad \textbf{B} \quad C_2H_2O_4 \qquad \textbf{C} \quad C_2H_4O_2 \qquad \textbf{D} \quad C_2H_6O$

11 Water is formed when 48 g of oxygen combine with 6 g of hydrogen.

What mass of oxygen combines with 2g of hydrogen?

A 12g **B** 16g **C** 96g **D** 144g

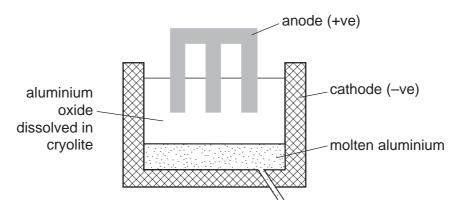
12 The diagram shows an electrical cable.



Which statement about the substances used is correct?

- **A** The coating is plastic because it conducts electricity well.
- **B** The core is copper because it conducts electricity well.
- **C** The core is copper because it is cheap and strong.
- **D** The core is iron because it is cheap and strong.

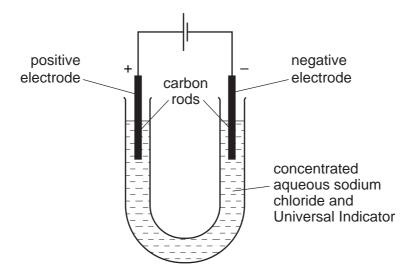
13 The diagram shows how aluminium is manufactured by electrolysis.



What are the anode and cathode made of?

	anode	cathode
Α	aluminium	aluminium
В	aluminium	graphite
С	graphite	aluminium
D	graphite	graphite

14 The diagram shows the electrolysis of concentrated aqueous sodium chloride.



What is the colour of the Universal Indicator at each electrode after five minutes?

	colour at anode (+ electrode)	colour at cathode (– electrode)	
Α	blue/purple	red	
в	red	blue/purple	
С	red	colourless	
D	colourless	blue/purple	

15 When an acid is added to an alkali the temperature rises.

Which words describe this reaction?

- **A** decomposition and endothermic
- **B** decomposition and exothermic
- **C** neutralisation and endothermic
- **D** neutralisation and exothermic
- **16** Substance X requires oxygen in order to produce energy.

It does **not** form carbon dioxide as a result of this energy production.

What is substance X?

- A hydrogen
- B natural gas
- **C** petrol
- **D** ²³⁵U
- **17** Which change does **not** increase the speed of reaction between zinc and hydrochloric acid?
 - A adding a catalyst
 - **B** decreasing the temperature
 - **C** decreasing the particle size of the zinc
 - D using more concentrated acid
- 18 When blue copper(II) sulfate is heated, a white solid and water are formed.

The white solid turns blue and gives out heat when water is added to it.

Which terms describe the blue copper(II) sulfate and the reactions?

	the blue copper(II) sulfate is	reaction
Α	a mixture	can be reversed
в	a mixture	cannot be reversed
С	hydrated	can be reversed
D	hydrated	cannot be reversed

19 The equations represent redox reactions.

In which equation is the underlined substance acting as a reducing agent?

- $\textbf{A} \quad \underline{\text{CaO}} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2$
- $\textbf{B} \quad \underline{CO}_2 + C \rightarrow 2CO$
- $\mathbf{C} \quad \underline{CuO} + H_2 \rightarrow Cu + H_2O$
- $\textbf{D} \quad 3\underline{CO} + Fe_2O_3 \rightarrow 2Fe + 3CO_2$
- 20 An aqueous solution Y contains both barium ions and silver ions.

In separate experiments, dilute sulfuric acid and dilute hydrochloric acid are added to solution Y.

Which of these acids causes a precipitate to form in solution Y?

	dilute sulfuric acid	dilute hydrochloric acid
Α	\checkmark	1
в	\checkmark	×
С	X	\checkmark
D	×	×

21 The diagram shows the pH values of four solutions.

1	2	3	4	5	6	7	8	9	10	11	12	13	14
			\uparrow			\uparrow		\uparrow				\uparrow	
			Р			Q		R				S	

Which of these solutions are alkaline?

- A Ponly
- B P and Q only
- C Q, R and S only
- D R and S only

- 22 Salts can be prepared by reacting a dilute acid
 - 1 with a metal;
 - 2 with a base;
 - 3 with a carbonate.

Which methods could be used to prepare copper(II) chloride?

- A 1 and 2 only
- **B** 1 and 3 only
- C 2 and 3 only
- **D** 1, 2 and 3
- **23** The diagram shows the position of an element X in the Periodic Table.

	· · · · · · · · · · · · · · · · · · ·	
X		

What is the correct classification of element X and its oxide?

	Х	oxide of X
Α	metal	acidic
в	metal	basic
С	non-metal	acidic
D	non-metal	basic

24 Elements in Group 0 of the Periodic Table have uses.

These noble gases are1..... and this explains why argon2..... be used in lamps. Which words correctly complete gaps 1 and 2?

	1	2
Α	reactive	can
в	reactive	cannot
С	unreactive	can
D	unreactive	cannot

25 Astatine is an element in Group VII of the Periodic Table. It has only ever been produced in very small amounts.

What is the best description of its likely properties?

	colour	state	reaction with aqueous potassium iodide
Α	black	solid	no reaction
в	dark brown	gas	brown colour
С	green	solid	no reaction
D	yellow	liquid	brown colour

- 26 Which property do all metals have?
 - **A** They are soluble in water.
 - **B** They conduct electricity.
 - **C** They have high melting points.
 - **D** They react with dilute sulfuric acid.

27 The table gives information about four elements.

Which element is a transition metal?

	colour of element	electrical conductivity of element	colour of oxide
Α	black	high	colourless
в	colourless	low	white
С	grey	high	red
D	yellow	low	colourless

28 Some reactions of three metals are listed in the table.

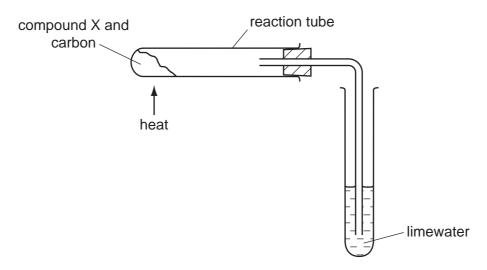
metal	reacts with dilute hydrochloric acid	metal oxide is reduced by carbon
Р	yes	yes
Q	no	yes
R	yes	no

What is the order of reactivity of the metals?

	most reactive		least reactive
Α	Р	R	Q
в	R	Р	Q
С	R	Q	Р
D	Q	Р	R

- 29 Which object is least likely to contain aluminium?
 - **A** a bicycle frame
 - B a hammer
 - **C** a saucepan
 - **D** an aeroplane body
- 30 Which statement about alloys is not correct?
 - **A** Alloys are more expensive than the metals they are made from.
 - **B** Alloys are mixtures of different metals.
 - **C** Alloys are not as strong as the metals they are made from.
 - D Alloys conduct electricity well.

31 Compound X is heated with carbon using the apparatus shown.



A brown solid is formed in the reaction tube and the limewater turns cloudy.

What is compound X?

- A calcium oxide
- **B** copper(II) oxide
- C magnesium oxide
- D sodium oxide
- **32** Water must be purified before it is suitable for use in the home.

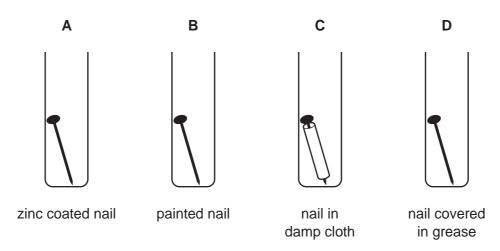
Which processes are used to remove solid impurities and bacteria?

	to remove solid impurities	to remove bacteria
Α	chlorination	chlorination
в	chlorination	filtration
С	filtration	chlorination
D	filtration	filtration

- **33** A newspaper article claims that carbon dioxide is formed as follows.
 - 1 during respiration
 - 2 when calcium carbonate reacts with hydrochloric acid
 - 3 when methane burns in air

Which statements are correct?

- **A** 1, 2 and 3
- B 1 and 2 only
- C 1 and 3 only
- D 2 and 3 only
- 34 Which iron nail rusts?

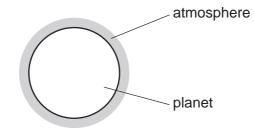


35 Fertilisers are used to provide three of the elements needed for plant growth.

Which two compounds would give a fertiliser containing all three of these elements?

- A $Ca(NO_3)_2$ and $(NH_4)_2SO_4$
- **B** $Ca(NO_3)_2$ and $(NH_4)_3PO_4$
- C KNO₃ and (NH₄)₂SO₄
- **D** KNO₃ and (NH₄)₃PO₄

36 A new planet has been discovered and its atmosphere has been analysed.



The table shows the composition of the atmosphere.

gas	percentage by volume
carbon dioxide	4
nitrogen	72
oxygen	24

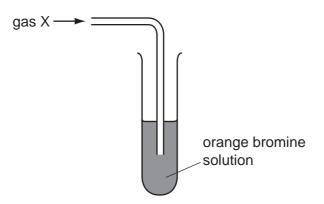
Which gases are present in the atmosphere of the planet in a higher percentage than they are in the Earth's atmosphere?

- A carbon dioxide and oxygen
- **B** carbon dioxide only
- **C** nitrogen and oxygen
- D nitrogen only
- 37 Butene and hexene belong to the same homologous series.

What is the same for butene and hexene?

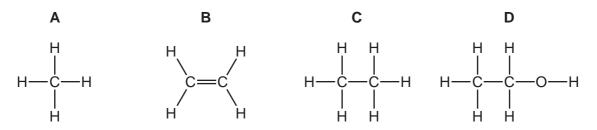
- **A** boiling point
- B functional group
- C number of hydrogen atoms per molecule
- D relative molecular mass
- 38 Which statement about petroleum is not correct?
 - A It can be separated into useful substances by fractional distillation.
 - **B** It consists mainly of hydrocarbons.
 - **C** It is found underground in many parts of the world.
 - **D** Its main use is for making lubricants and polishes.

39 The apparatus shows an experiment used to test gas X.



The bromine solution quickly becomes colourless.

What is the structure of gas X?



40 The table shows the formulae of members of the alkane series.

name of compound	formula
methane	CH₄
ethane	C_2H_6
propane	?
butane	C_4H_{10}
pentane	C_5H_{12}

What is the formula of propane?

Α	C ₂ H ₈	B C ₃ H ₇	C C ₃ H ₈	\mathbf{D} C_3H_9
	- •	U	00	

	0	4 Helium	2	20	Ne	Neon 10	40	Ar	Argon 18	84	Kr	Krypton 36	131	Xe	Xenon 54		Rn	Radon 86				175	Lu	71		Ļ	Lawrencium 103
	H			19	ш	Fluorine 9	35.5	CI	Chlorine 17	80	Ŗ	Bromine 35	127	Ι	lodine 53		At	Astatine 85				173	۲b	70		No	Nobelium 102
	⊳			16	0	Oxygen 8	32	S	Sulfur 16	79	Se	Selenium 34	128	Te	Tellurium 52		Ро	Polonium 84				169	Tm Thui			Md	Mendelevium 101
	>			14	z	Nitrogen 7	31	₽	Phosphorus 15	75	As	Arsenic 33	122	Sb	Antimony 51	209	Bi	Bismuth 83				167 	Er Brium	Eroum 68		Еm	Fermium 100
	2			12	ပ	Carbon 6	28	Si	Silicon 14	73	Ge	Germanium 32	119	Sn	Tin 50	207	Pb	Lead 82				165	Holmium Molmium	нотит 67		Es	Einsteinium 99
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2113											Zn	Zinc 30	112	ပိ	Cadmium 48	201	Hg	Mercury 80				159	Tb Terbium	lerolum 65			Berkelium 97
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		Hydrogen	1							56	Fe	lron 26	101	Ru	Ruthenium 44	190	os	Osmium 76				1	Panethium Banadhium	Promemium 61		dN	Neptunium 93
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										51	>	Vanadium 23	93	qN	Niobium 41	181	Та	Tantalum 73				140	Ce	Cerium 58	232	Ч	Thorium 90
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	=			6	Be	Beryllium 4	24	Mg	Magnesium 12	40	Ca	Calcium 20	88	S	Strontium 38	137	Ba	Barium 56	226	Radium Radium	88	anthan	190-103 Actinoid series	ſ		×	

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