



## UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

SECOM

CHEMISTRY 0620/11

Paper 1 Multiple Choice 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.

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.

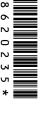
## Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

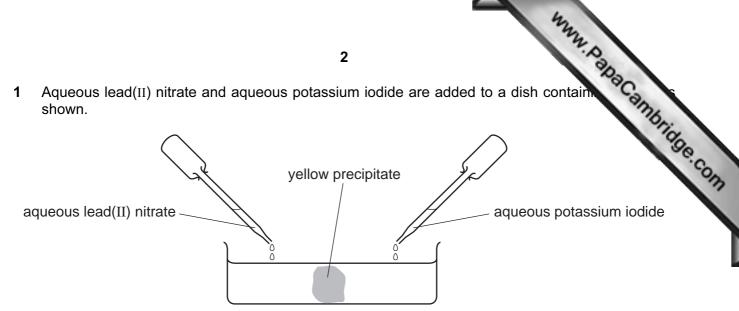
Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 16.

You may use a calculator.



Aqueous lead(II) nitrate and aqueous potassium iodide are added to a dish contain. 1 shown.

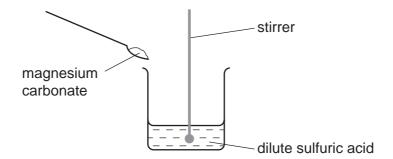


A yellow precipitate forms after a few minutes.

Which process occurs before the precipitate forms?

- diffusion
- distillation В
- fermentation C
- D filtration
- 2 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?

- crystallisation
- В evaporation
- C filtration
- neutralisation D

3 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
- **D** shake with water  $\rightarrow$  filter  $\rightarrow$  evaporate
- 4 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	✓	✓
В	✓	X
С	X	✓
D	X	X

- 5 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
- 6 Which atom has two more electrons than an atom of a noble gas?
  - **A** aluminium
  - **B** bromine
  - **C** calcium
  - **D** rubidium

mpounds have .....2.....

7 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?

A 1 only

**B** 3 only

**C** 1 and 3

**D** 2 and 3

**8** Covalent bonds are formed when electrons are .....1..... Covalent compounds have .....2..... electrical conductivity.

Which words correctly complete gaps 1 and 2?

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

- 9 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.
- **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?

 $A C_2H_2O_2$ 

 $\mathbf{B} \quad C_2H_2O_4$ 

 $\mathbf{C}$   $C_2H_4O_2$ 

 $C_2H_6O$ 

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

What mass of oxygen combines with 2g of hydrogen?

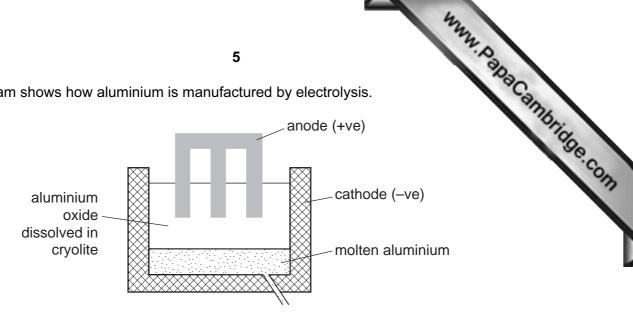
**A** 12g

**B** 16g

**C** 96 g

**D** 144 g

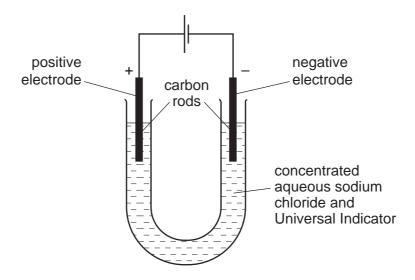
12 The diagram shows how aluminium is manufactured by electrolysis.



What are the anode and cathode made of?

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

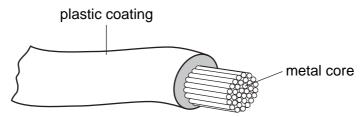
13 The diagram shows the electrolysis of concentrated aqueous sodium chloride.



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

14 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.
- **15** 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
- 16 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

17 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

**18** The equations represent redox reactions.

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

**A** 
$$CaO + H_2O \rightarrow Ca(OH)_2$$

**B** 
$$CO_2 + C \rightarrow 2CO$$

$$\textbf{C} \quad \underline{\text{CuO}} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2 \text{O}$$

**D** 
$$3\underline{CO} + Fe_2O_3 \rightarrow 2Fe + 3CO_2$$

- 19 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

are added to solution to the contract of the c

**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 solu.

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

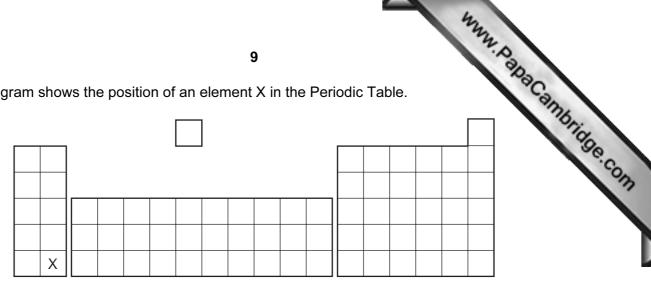
	dilute sulfuric acid	dilute hydrochloric acid
Α	✓	✓
В	✓	x
С	X	✓
D	x	X

**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



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

	X	oxide of X
Α	metal	acidic
В	metal	basic
С	non-metal	acidic
D	non-metal	basic

- 23 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

www.PapaCambridge.com 24 Astatine is an element in Group VII of the Periodic Table. It has only ever been production 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

**25** Elements in Group 0 of the Periodic Table have uses.

These noble gases are .....1..... and this explains why argon .....2..... 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

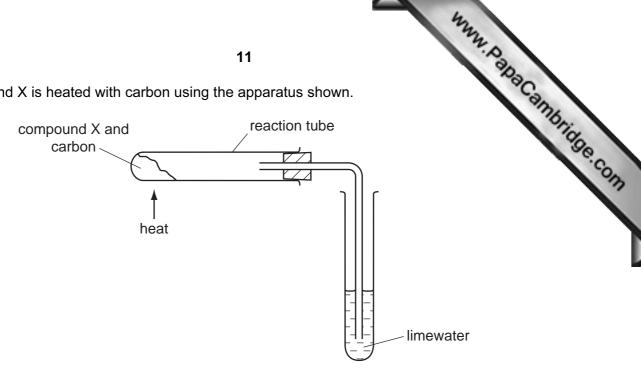
**26** The table gives information about four elements.

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	

- **27** Which statement about alloys is **not** correct?
  - Alloys are more expensive than the metals they are made from. Α
  - Alloys are mixtures of different metals.
  - С Alloys are not as strong as the metals they are made from.
  - D Alloys conduct electricity well.

**28** 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?

- calcium oxide
- В copper(II) oxide
- C magnesium oxide
- D sodium oxide
- 29 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

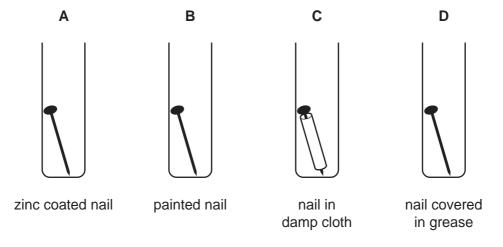
What is the order of reactivity of the metals?

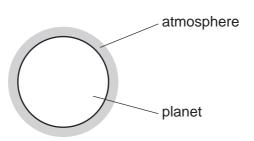
	most reactive		least reactive
Α	Р	R	Q
В	R	Р	Q
С	R	Q	Р
D	Q	Р	R

- 30 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.
- 31 Which object is least likely to contain aluminium?
  - A a bicycle frame
  - B a hammer
  - C a saucepan
  - **D** an aeroplane body
- **32** 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
- 33 Which iron nail rusts?





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
- **35** Water must be purified before it is suitable for use in the home.

Which processes are used to remove solid impurities and bacteria?

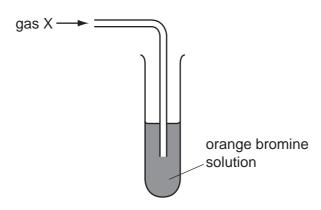
	to remove solid impurities	to remove bacteria
Α	chlorination	chlorination
В	chlorination	filtration
С	filtration	chlorination
D	filtration	filtration

**36** 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?

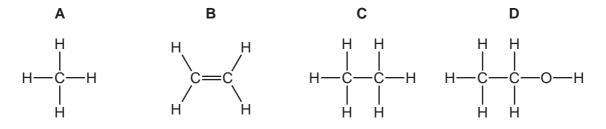
- A  $Ca(NO_3)_2$  and  $(NH_4)_2SO_4$
- **B**  $Ca(NO_3)_2$  and  $(NH_4)_3PO_4$
- C KNO<sub>3</sub> and (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub>
- **D** KNO<sub>3</sub> and (NH<sub>4</sub>)<sub>3</sub>PO<sub>4</sub>

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



The bromine solution quickly becomes colourless.

What is the structure of gas X?



- 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** 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

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

name of compound	formula
methane	CH₄
ethane	C <sub>2</sub> H <sub>6</sub>
propane	?
butane	C <sub>4</sub> H <sub>10</sub>
pentane	C <sub>5</sub> H <sub>12</sub>

What is the formula of propane?

- $\mathbf{A}$   $C_2H_8$
- $\mathbf{B} \quad \mathsf{C}_3\mathsf{H}_7$
- **C** C<sub>3</sub>H<sub>8</sub>
- **D** C<sub>3</sub>H<sub>9</sub>

www.PapaCambridge.com

The Periodic Table of the Elements **DATA SHEET** 

	0	4 <b>He</b> Helium	20 <b>Ne</b> Neon	40 <b>Ar</b> Argon	84 <b>K</b> rypton 36	X Xenon 54	Radon 86		175 <b>Lu</b> Lutetium
	II/		19 Fluorine	35.5 <b>C1</b> Chlorine	80 <b>Br</b> Bromine 35	127 <b>I</b> lodine 53	At Astatine 85		173 <b>Yb</b> Ytterbium
	<b>I</b>		16 Oxygen 8	32 Sulfur 16	Selenium	128 <b>Te</b> Tellurium	Po Polonium 84		169 <b>Tm</b>
	>		14 <b>N</b> itrogen 7	31 Phosphorus 15	75 <b>AS</b> Arsenic	122 <b>Sb</b> Antimony 51	209 <b>Bi</b> Bismuth 83		167 <b>Er</b> Erbium
	>		12 Carbon 6	28 <b>Si</b> Silicon	73 <b>Ge</b> Germanium	119 <b>Sn</b> Tin	207 <b>Pb</b> Lead		165 <b>Ho</b>
	=		11 Boron 5	27 <b>A1</b> Auminium	70 <b>Ga</b> Gallium 31	115 <b>In</b> Indium	204 <b>T 1</b> Thallium		162 <b>Dy</b> Dysprosium
					65 <b>Zn</b> Zinc	112 <b>Cd</b> Cadmium	201 <b>Hg</b> Mercury 80		159 <b>Tb</b>
					Copper 29	108 <b>Ag</b> Silver 47	197 <b>Au</b> Gold		157 <b>Gd</b> Gadolinium
Group					59 Nickel	106 <b>Pd</b> Palladium 46	195 <b>Pt</b> Platinum 78		152 <b>Eu</b> Europium
ษิ					59 Cobalt	Rhodium 45	192 <b>Ir</b> Iridium		150 <b>Sm</b> Samarium
		T Hydrogen			56 <b>F.e.</b> Iron	Ruthenium 44	190 <b>Os</b> Osmium 76		<b>Pm</b> Promethium
					Mn Manganese 25	Tc Technetium 43	186 <b>Re</b> Rhenium 75		144 Neodymium
					Chromium	96 Mo Molybdenum 42	184 <b>W</b> Tungsten 74		141 <b>Pr</b> Praseodymium
					51 V Vanadium 23	Nobium A1	181 <b>Ta</b> Tantalum 73		140 <b>Cer</b> ium
					48 <b>T</b> Titanium	2r Zirconium	178 <b>Hf</b> Hafnium		1
					Scandium 21	89 <b>×</b>	139 <b>La</b> Lanthanum 57 *	227 <b>AC</b> Actinium 89	l series eries
	=		Berylium	Magnesium	40 <b>Ca</b> Calcium	Strontium	137 <b>Ba</b> Barium 56	226 <b>Ra</b> Radium 88	*58-71 Lanthanoid series 190-103 Actinoid series
	_		7 <b>Li</b> Lithium 3	23 <b>Na</b> Sodium	39 <b>K</b> Potassium 19	Rb Rubidium 37	133 <b>CS</b> Caesium 55	<b>Fr</b> Francium 87	*58-71 L;

1 68															
ceries	140	141	144		150	152	157	159	162	165	167	169	173	175	
Scrics	ပီ	Ą	N <sub>Q</sub>	Pm	Sm	En	gq	욘	ò	운	ш	Т	Υb	3	
S D D D D D D D D D D D D D D D D D D D	Cerium 58	Praseodymium 59	Neodymium 60	Promethium 61	Samarium 62	Europium 63	Gadolinium 64	Terbium 65	Dysprosium 66	Holmium 67	Erbium 68	Thulium 69	Ytterbium 70	Lutetium 71	
relative atomic mass	232		238												
atomic symbol	Т	Ра	<b>-</b>	ď	Pu	Am	CB	æ	ర	Es	Fm	Md	٩	۲	n
proton (atomic) number	Thorium 90	Protactinium 91	Uranium 92	Neptunium 93	Plutonium 94	Americium 95	Curium 96	Berkelium 97	Californium 98	Einsteinium 99	Fermium 100	Mendelevium 101	Nobelium 102	Lawrencium 103	w.
	The v	The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).	one mole	of any ga	is is 24 dn	اع at roon	n tempera	ature and	pressure	(r.t.p.).		13	age con	Cambridge	SapaCambridge.com

Key

The volume of one mole of any gas is 24 dm<sup>3</sup> at room temperature and pressure (r.t.p.).

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.