



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

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CHEMISTRY 0620/12

Paper 1 Multiple Choice May/June 2012

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.

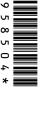
Read the instructions on the Answer Sheet very carefully.

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

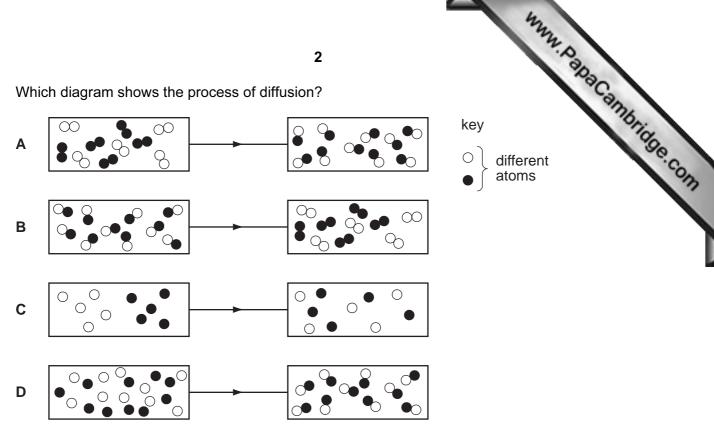
Any rough working should be done in this booklet.

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

You may use a calculator.



1 Which diagram shows the process of diffusion?



- 2 Which method would be most suitable for the separation of a mixture of sand and water to obtain the sand?
 - Α chromatography
 - crystallisation В
 - C distillation
 - D filtration
- A student investigates how the concentration of an acid affects the speed of reaction with a 0.5 g mass of magnesium at 30 °C.

The student has a beaker, concentrated acid, water and the apparatus below.

- Ρ a balance
- Q a clock
- R a measuring cylinder
- S a thermometer

Which pieces of apparatus does the student use?

- P, Q and R only
- P, Q and S only
- C Q, R and S only
- **D** P, Q, R and S

4 An element Y has the proton number 18.

The next element in the Periodic Table is an element Z.

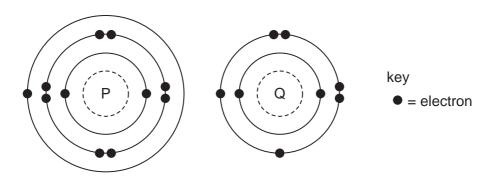
Which statement is correct?

- A Element Z has one more electron in its outer shell than element Y.
- **B** Element Z has one more electron shell than element Y.
- **C** Element Z is in the same group of the Periodic Table as element Y.
- **D** Element Z is in the same period of the Periodic Table as element Y.
- 5 Which atom has twice as many neutrons as protons?
 - **A** ¹₁H
- \mathbf{B} ${}_{1}^{2}\mathbf{H}$
- **C** ³₁+
- \mathbf{D} $_{2}^{4}$ He
- 6 The table contains information about four substances.

Which substance is potassium chloride?

	melting point	conduction of electricity			
	/°C	when molten	in aqueous solution		
Α	11	no	yes		
В	98	yes	yes		
С	772	yes	yes		
D	1410	no	insoluble		

7 The electronic structures of atoms P and Q are shown.

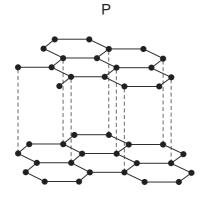


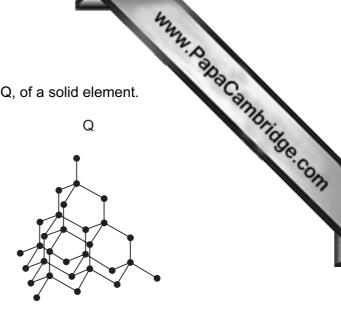
P and Q react to form an ionic compound.

What is the formula of this compound?

- A PQ_2
- $\mathbf{B} \quad \mathsf{P}_2\mathsf{Q}$
- \mathbf{C} P_2Q_6
- $\mathbf{D} \quad \mathsf{P}_6\mathsf{Q}_2$

8 The diagrams show the structures of two forms, P and Q, of a solid element.





What are suitable uses of P and Q, based on their structures?

	use of solid P	use of solid Q
Α	drilling	drilling
В	lubricating	drilling
С	drilling	lubricating
D	lubricating	lubricating

9 Methane, CH₄, burns in the air to form carbon dioxide and water.

What is the balanced equation for this reaction?

A
$$CH_4(g) + O_2(g) \rightarrow CO_2(g) + 2H_2O(g)$$

B
$$CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(g)$$

C
$$CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + H_2O(g)$$

$$D \quad CH_4(g) \ + \ 3O_2(g) \ \to \ CO_2(g) \ + \ 2H_2O(g)$$

10 In which reaction is lead(II) oxide, PbO, oxidised?

A PbO + C
$$\rightarrow$$
 Pb + CO

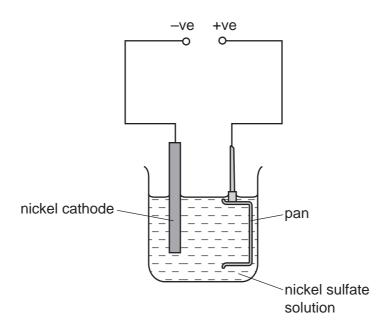
B PbO + CO
$$\rightarrow$$
 Pb + CO₂

$$\textbf{C} \quad \text{PbO} \, + \, \text{H}_2 \, \rightarrow \, \text{Pb} \, + \, \text{H}_2 \text{O}$$

$$\textbf{D} \quad 2\text{PbO} \, + \, \text{O}_2 \, \rightarrow \, 2\text{PbO}_2$$

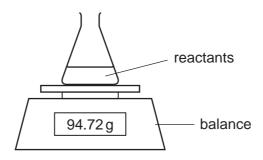
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11 The diagram shows an unsuccessful experiment to nickel plate a pan.



Which change is necessary to plate the pan with nickel?

- A Add more nickel sulfate to the solution.
- **B** Heat the solution to 100 °C.
- C Increase the current in the circuit.
- **D** Make the pan the negative electrode.
- **12** The rates of some chemical reactions can be measured by using the apparatus shown.



For which reaction is this apparatus suitable?

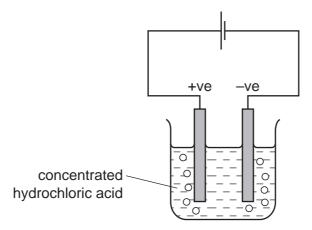
A MgCO₃ + 2HC
$$l$$
 \rightarrow MgC l_2 + CO₂ + H₂O

B Mg +
$$ZnCl_2 \rightarrow MgCl_2 + Zn$$

C
$$MgCl_2 + 2NaOH \rightarrow Mg(OH)_2 + 2NaCl$$

D MgO + 2HC
$$l \rightarrow$$
 MgC l_2 + H₂O

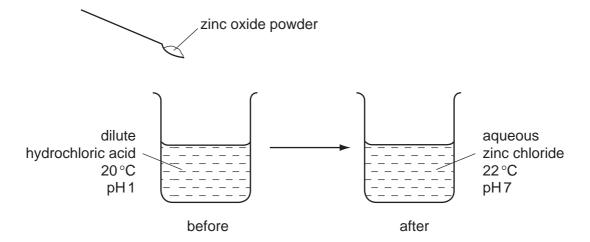
www.papaCambridge.com 13 The diagram shows that two gases are formed when concentrated hydrochia electrolysed using inert electrodes.



Which row correctly describes the colours of the gases at the electrodes?

	anode (+ve)	cathode (-ve)
Α	colourless	colourless
В	colourless	yellow-green
С	yellow-green	colourless
D	yellow-green	yellow-green

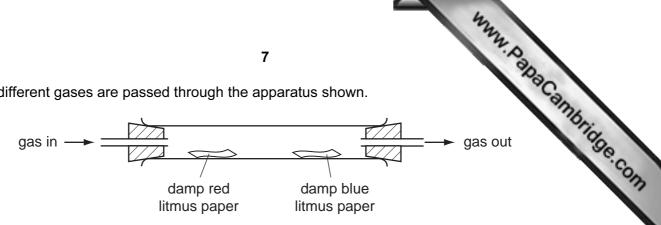
14 The diagram shows the reaction between zinc oxide and dilute hydrochloric acid.



Which terms describe the reaction?

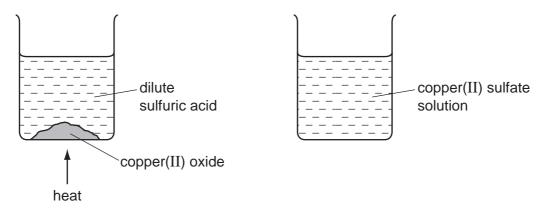
	endothermic	neutralisation
Α	✓	✓
В	✓	X
С	x	✓
D	X	x

15 Four different gases are passed through the apparatus shown.



Which gas has no effect on either piece of litmus paper?

- ammonia
- В carbon dioxide
- C chlorine
- D hydrogen
- 16 An aqueous solution of copper(II) sulfate was made by adding excess copper(II) oxide to dilute sulfuric acid. The mixture was heated, stirred and then filtered.



What was the pH of the acid before adding the copper(II) oxide and of the solution after filtration?

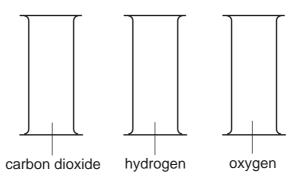
	pH of acid before adding copper(II) oxide	pH of solution after filtration
Α	greater than 7	7
В	greater than 7	less than 7
С	less than 7	7
D	less than 7	greater than 7

17 Aqueous potassium iodide is added to aqueous silver nitrate.

What are the colours of the final precipitate and solution?

	precipitate	solution
Α	brown	colourless
В	white	yellow
С	yellow	colourless
D	yellow	white

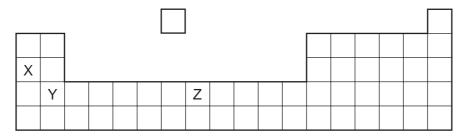
18 Three gas jars contain carbon dioxide, hydrogen and oxygen, as shown.



Which one of the following tests could be used to discover which gas is in each jar?

- A a glowing splint
- **B** a lighted splint
- c damp blue litmus paper
- **D** limewater

19 The diagram shows an outline of part of the Periodic Table.



Which statement about elements X, Y and Z is **not** correct?

- A All are metals.
- **B** All conduct electricity.
- **C** All form coloured compounds.
- **D** All react with oxygen.

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20 Elements X, Y and Z are in Group VII of the Periodic Table.

X is a gas.

Y is less reactive than Z

Z is a red liquid.

When X, Y and Z are put in order of increasing proton number, which order is correct?

- $A X \to Y \to Z$
- $\mathbf{B} \quad \mathsf{X} \to \mathsf{Z} \to \mathsf{Y} \qquad \mathbf{C} \quad \mathsf{Y} \to \mathsf{X} \to \mathsf{Z}$
- $D Y \to Z \to X$

21 Which properties of the element titanium, Ti, can be predicted from its position in the Periodic Table?

	can be used as a catalyst	conducts electricity when solid	has low density	forms coloured compounds	
Α	✓	✓	X	✓	
В	✓	✓	✓	x	
С	✓	×	✓	✓	
D	X	✓	✓	✓	

22 Five elements have proton numbers 10, 12, 14, 16 and 18.

What are the proton numbers of the three elements that form oxides?

- 10, 12 and 14
- 10, 14 and 18
- C 12, 14 and 16
- 14, 16 and 18 D
- 23 Which statement about aluminium is **not** correct?
 - Α It is resistant to corrosion.
 - В It is strong and has a high density.
 - C It is used in food containers.
 - It is used in the manufacture of aircraft. D

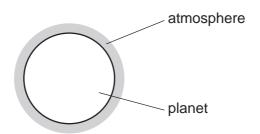
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							10				Day .	
24	Ма	ny metals	s are ex	tract	ed from their	ores b	y heating t	he met	al d	oxide with carbon.	Lag .	
	Wh	ich meta	canno	t be	extracted us	ing this	method?				MATE	
	Α	aluminiu	um								36	1
	В	copper										M
	С	iron									`	
	D	zinc										
25	A n	netal has	the follo	owin	g properties.							
		•	It does	not	react with co	old wate	er.					
		•	It react	s wi	th dilute hydi	ochlor	ic acid.					
		•	It cann	ot be	e extracted f	om its	oxide usin	g carbo	n.			
	Bet	ween wh	ich two	met	als in the rea	ctivity	series shou	ıld it be	pla	aced?		
	Α	calcium	and ma	igne	sium							
	В	iron and	d copper	•								
	С	magnes	sium and	d zin	С							
	D	zinc and	d iron									
26	Wh	ich state	ments a	bout	t the general	proper	ties of meta	als are	coı	rect?		
		1	conduc	ct ele	ectricity wher	n solid						
		2	form a	cidic	oxides							
		3	high m	eltin	g point							
	A	1 and 3		В	1 only	С	2 and 3		D	2 only		
27	Wa	iter for hu	ıman us	e is	treated by fil	tration	then chlorir	nation.				
	Wh	ich uses	do not	need	d water of thi	s qualit	ty?					
		1	water f	or c	ooling in indu	ıstry						
		2	water f	or fl	ushing toilets	in the	home					
		3	water f	or d	rinking							
	Α	1, 2 and	13	В	1 and 2 only	, c	1 and 3 c	only	D	2 and 3 only		

ear engine. ARANDATIGAR. COM

28 Carbon monoxide is an air pollutant produced when petrol is burned in a car engine.

Why is carbon monoxide considered to be an air pollutant?

- A It causes global warming.
- **B** It causes the corrosion of buildings.
- C It is a greenhouse gas.
- **D** It is poisonous.
- 29 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
- **30** Acetylene, C₂H₂, is a hydrocarbon. When acetylene and oxygen react, the hot flame produced can be used to weld steel.

Which statement is correct?

- **A** Acetylene and oxygen react exothermically.
- **B** Acetylene is saturated.
- **C** Oxygen and steel react endothermically.
- **D** Oxygen is a gaseous fuel.

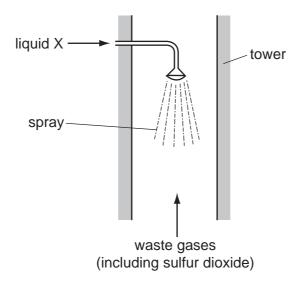
31 Fertilisers are used to provide three elements needed to increase the yield of crops.

www.papaCambridge.com Which two compounds, when used together, would provide all three of these elements?

- ammonium nitrate and calcium phosphate Α
- В ammonium nitrate and potassium sulfate
- C potassium nitrate and calcium phosphate
- D potassium nitrate and potassium sulfate
- 32 Carbon dioxide and methane are 'greenhouse gases' which contribute to global warming.

Which process does **not** increase global warming?

- burning fossil fuels
- В decay of organic waste
- C farming cattle for beef
- **D** growing crops such as sugar cane
- 33 When coal and oil burn in power stations, the acidic gas sulfur dioxide is formed. Sulfur dioxide is removed by absorbing it in a liquid sprayed down a tower.



What is liquid X?

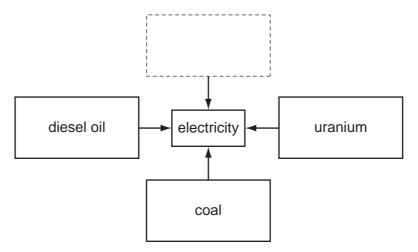
- calcium hydroxide solution
- sodium chloride solution В
- C dilute hydrochloric acid
- D water

www.PapaCambridge.com 34 The table shows bonds that are present and bonds that are not present in compound

bond	
C–C	✓
C=C	X
C–H	✓
C-O	✓
C=O	✓
O–H	✓

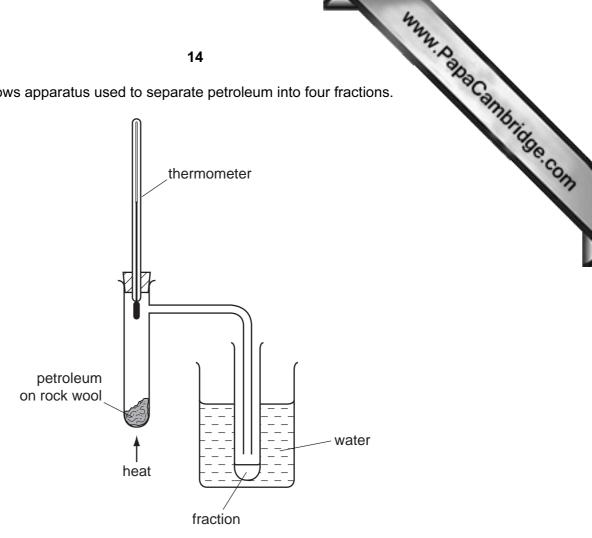
What type of compound is X?

- a carboxylic acid
- an alcohol В
- C an alkane
- D an alkene
- 35 The diagram shows different fuels from which electricity can be generated.



Which box completes the diagram?

C Α В D ammonia bitumen natural gas steam 36 The diagram shows apparatus used to separate petroleum into four fractions.



Which fraction contains the smallest hydrocarbon molecules?

fraction	boiling point range/°C	
Α	up to 70	
В	70 to 120	
С	120 to 170	
D	over 170	

37 Ethanol is a fuel used in cars. It can be made from petroleum.

Compounds of how many homologous series appear in these equations?

A 1

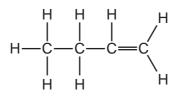
B 2

C 3

D 4

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38 Butene is an alkene which is manufactured by cracking hydrocarbons.



Which hydrocarbon can be cracked to make butene?

- A ethane, C₂H₆
- **B** decane, C₁₀H₂₂
- C methane, CH₄
- **D** propane, C₃H₈
- 39 Which substance does not produce carbon dioxide when it burns in oxygen?
 - **A** butane
 - **B** ethanol
 - C ethene
 - **D** hydrogen
- **40** Ethanol is an important chemical produced by the1..... of2......

Which words correctly complete gaps 1 and 2?

	1	2
Α	combustion	ethane
В	combustion	glucose
С	fermentation	ethane
D	fermentation	glucose

The Periodic Table of the Elements DATA SHEET

	0	Helium	20 Neon	40 Ar Argon	4 7 to	131 Xe Xenon	Rn Radon		175 Lu .utetium
)	2 Heli	10	8	84 Kr Krypton 36		98		- 1
	IIA		19 Fluorine	35.5 C1 Chlorine	80 Br Bromine	127 	At Astatine 85		Yb Ytterbium
	IN		16 Oxygen	32 S Sulfur	79 Se Selenium 34	128 Te Tellurium			169 Tm
	>		14 N itrogen 7	31 Phosphorus	As Arsenic	122 Sb Antimony 51	209 Bi Bismuth		167 Er Erbium
	ΛΙ		12 Carbon 6	28 Si Silicon	73 Ge Germanium 32	Sn Tin 50	207 Pb Lead		165 Ho Holmium
	III		11 Boron 5	27 A1 Aluminium 13	70 Ga Gallium 31	115 n	204 T t Thallium		Dy Dysprosium
					65 Zn Zinc 30	112 Cd Cadmium 48	201 Hg Mercury 80		159 Tb
					64 Copper	108 Ag Silver 47	197 Au Gold		157 Gd Gadolinium
Group					59 Nickel 28	106 Pd Palladium 46	195 Pt Platinum 78		152 Eu Europium
Gre					59 Co Cobalt	103 Rh Rhodium 45	192 r r r		Samarium
		1 T Hydrogen			56 Fe Iron	Ruthenium	190 Os Osmium 76		Pm
					Mn Manganese	Tc Technetium 43	186 Re Rhenium 75		Neodymium
					52 Cr Chromium 24	96 Mo Molybdenum 42	184 W Tungsten 74		141 Praseodymium
					51 V Vanadium 23	93 Nb Niobium	181 Ta Tantalum 73		140 Cerium
					48 T	91 Zr Zirconium 40	178 # Hafnium 72		
					Scandium	89 ×	139 La Lanthanum 57 *	227 Ac Actinium †	series eries
	=		Be Beryllium	24 Mg Magnesium	40 Ca Calcium	Strontium	137 Ba Barium 56	226 Ra Radium 88	*58-71 Lanthanoid series 190-103 Actinoid series
	ı		7 Li Lithium 3	23 Na Sodium	39 K Potassium 19	Rb Rubidium 37	133 CS Caesium 55	Fr Francium 87	*58-71 Le
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3															
*58-71 Lanthanoid series 190-103 Actinoid series	140 Cerium 58	Pr Praseodymium 59	144 Nd Neodymium 60	Pm Promethium 61	Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	Lu Lutetium	
x a = relative atomic mass Key X = atomic symbol b = proton (atomic) number	Th Thorium	Pa Protactinium 91	238 U Uranium 92	Neptunium	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	Nobelium 102	Lr Lawrencium 103	mn.
	The	The volume of one mole of any	one mole	of any ga	ıs is 24 dr.	n³ at roor	\prime gas is 24 dm 3 at room temperature and pressure (r.t.p.).	ature and	pressure	(r.t.p.).				Cal	DanaCar
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