Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CHEMISTRY **0620/13**

Paper 1 Multiple Choice **October/November 2014**

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, 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.
DO **NOT** WRITE IN ANY BARCODES.

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.
Electronic calculators may be used.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **14** printed pages and **2** blank pages.

1 A few drops of perfume were spilt on the floor. A few minutes later the perfume could be smelt a few metres away.

Which two processes had taken place?

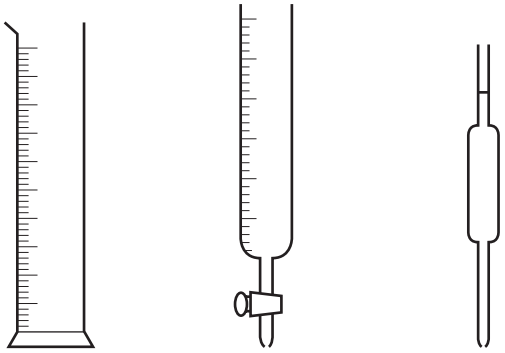
A distillation and condensation

B distillation and diffusion

C evaporation and condensation

D evaporation and diffusion

2 The diagram shows three pieces of apparatus that are used for measuring the volume of a liquid.

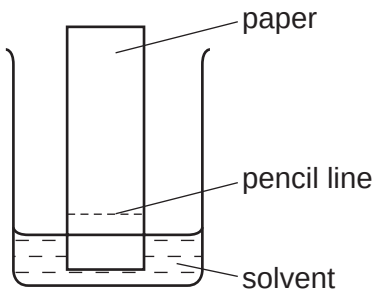


1 2 3

What are these pieces of apparatus?

	1	2	3
A	burette	measuring cylinder	pipette
B	burette	pipette	measuring cylinder
C	measuring cylinder	burette	pipette
D	measuring cylinder	pipette	burette

3 A student is investigating a coloured mixture using chromatography.



Where should he place the coloured mixture?

A in the solvent

B just above the pencil line

C just below the pencil line

D on the pencil line

4 Which statement about a neutron is **not** correct?

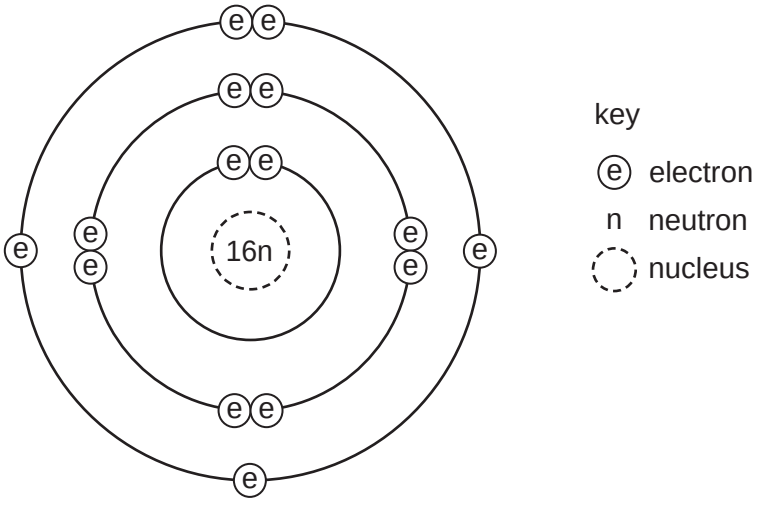
A It can be present in different numbers in atoms of the same element.

B It has no electrical charge.

C It is always found in the nucleus of an atom.

D It weighs much less than a proton.

5 Which element has the atomic structure shown?

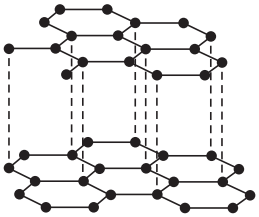


A A*l** **B** P **C** S **D** Si

6 Slate has a layered structure and can easily be split into thin sheets.

Which diagram shows a structure most like that of slate?

A



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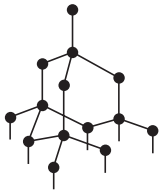

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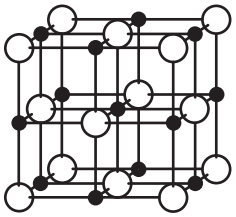

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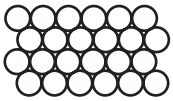


7 Element X, $^{19}_{9}X$, forms a compound with element Y, $^{39}_{19}Y$.

Which statement describes the bonding in the compound formed?

A X and Y share electrons.

B X gives away one electron to Y.

C Y gives away one electron to X.

D Y gives away two electrons to X.

8 Which substance is methane?

	volatility	electrical conductivity at room temperature	solubility in water
A	high	good	soluble
B	high	poor	insoluble
C	low	good	soluble
D	low	poor	insoluble

9 The table shows the numbers of atoms present in the formula of some compounds.

Which row is **not** correct?

	numbers of atoms	formula
A	1 × calcium, 1 × carbon, 3 × oxygen	$CaCO_3$
B	1 × carbon, 5 × hydrogen, 1 × oxygen	C_2H_5OH
C	1 × hydrogen, 1 × oxygen, 1 × sodium	NaOH
D	2 × hydrogen, 4 × oxygen, 1 × sulfur	H_2SO_4

10 An element, X, can be represented as $^{a}_{b}X$.

Which statement is correct?

A The number of protons in an atom of X is **a**.

B The exact position of X in the Periodic Table can be found from **a**.

C The relative atomic mass of X is **b**.

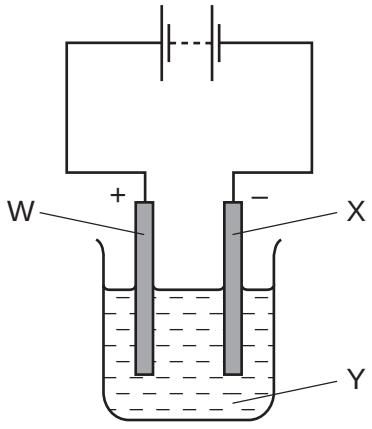
D The total number of electrons in one atom of X is **b**.

11 A student wishes to electroplate an object with copper.

Which row is correct?

	object is made the	a suitable electrolyte is
A	anode	CuO(s)
B	anode	$CuSO_4$(aq)
C	cathode	CuO(s)
D	cathode	$CuSO_4$(aq)

12 In the electrolysis shown, chlorine is produced at W and sodium at X.



Which labels are correct?

	W	X	Y
A	anode	cathode	NaC*l* (l)
B	anode	cathode	NaC*l* (aq)
C	cathode	anode	NaC*l* (l)
D	cathode	anode	NaC*l* (aq)

13 What occurs when a fuel burns?

	fuel reacts with oxygen	energy change
A	no	endothermic
B	no	exothermic
C	yes	endothermic
D	yes	exothermic

14 Which fuel does **not** produce air pollution when it burns?

A coal

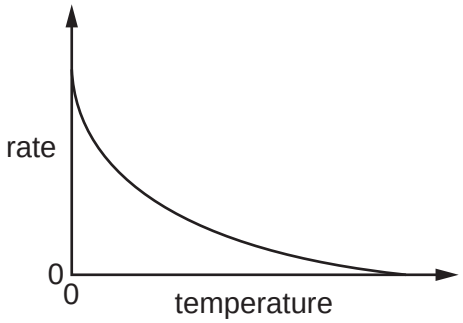
B diesel oil

C hydrogen

D gasoline (petrol)

15 Which graph shows the effect of increasing temperature on the rate of reaction of calcium carbonate with dilute hydrochloric acid?

A



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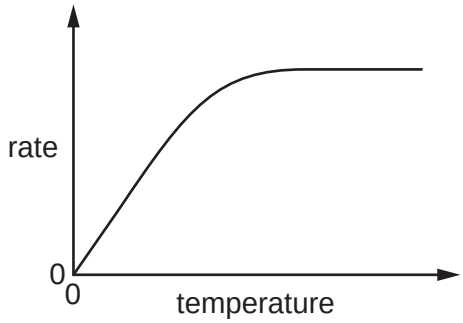

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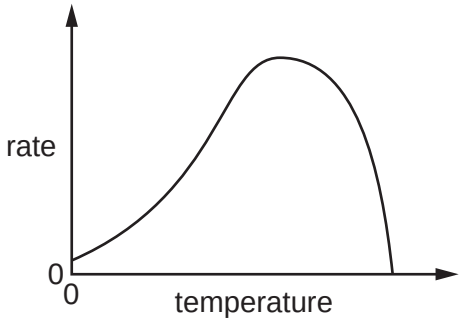

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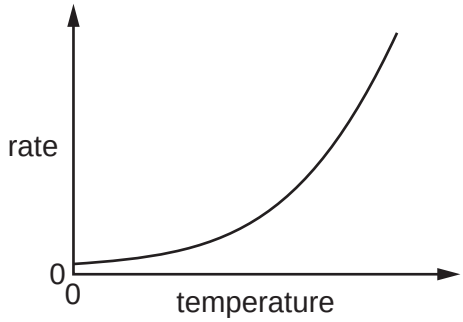
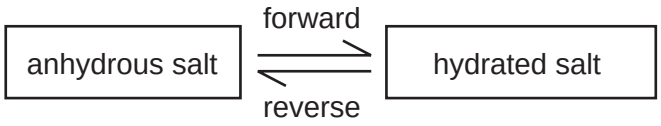


16 The diagram shows the change from an anhydrous salt to its hydrated form.



Which statement is correct?

A forward reaction requires heat and water

B forward reaction requires water only

C reverse reaction requires heat and water

D reverse reaction requires water only

17 The equations for two reactions P and Q are given.

P $2\underline{NaNO_2} + O_2 \rightarrow 2NaNO_3$

Q $2\underline{HgO} \rightarrow 2Hg + O_2$

In which of these reactions does oxidation of the underlined substance occur?

	P	Q
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

18 Which changes decrease the rate of reaction between magnesium and air?

1 heating the magnesium to a higher temperature

2 using a higher proportion of oxygen in the air

3 using magnesium ribbon instead of powdered magnesium

A 1, 2 and 3 **B** 1 only **C** 2 only **D** 3 only

19 A colourless solution is tested by the following reactions.

Which reaction is **not** characteristic of an acid?

A A piece of magnesium ribbon is added. Bubbles are seen and the magnesium disappears.

B A pungent smelling gas is produced when ammonium carbonate is added.

C Copper oxide powder is added and the mixed is warmed. The solution turns blue.

D The solution turns blue litmus red.

20 Which statement about oxides is correct?

A A solution of magnesium oxide will have a pH less than 7.

B A solution of sulfur dioxide will have a pH greater than 7.

C Magnesium oxide will react with nitric acid to make a salt.

D Sulfur dioxide will react with hydrochloric acid to make a salt.

21 Which salt preparation uses a burette and a pipette?

A calcium nitrate from calcium carbonate and nitric acid

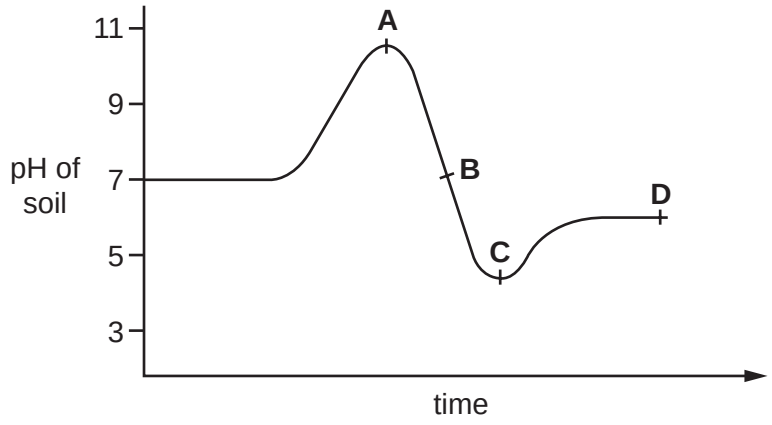
B copper(II) sulfate from copper(II) hydroxide and sulfuric acid

C potassium chloride from potassium hydroxide and hydrochloric acid

D zinc chloride from zinc and hydrochloric acid

22 The graph shows how the pH of soil in a field changes over time.

At which point was the soil neutral?



23 Which statement about the elements of Group I is correct?

A Lithium is more dense than sodium.

B Potassium has a higher density than lithium.

C Potassium is less reactive than sodium.

D Sodium has a higher melting point than lithium.

24 An element X has the two properties listed.

1 It acts as a catalyst.

2 It forms colourless ions.

Which of these properties suggest that X is a transition element?

	property 1	property 2
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

25 An inert gas X is used to fill weather balloons.

Which descriptions of X are correct?

	number of outer electrons in atoms of X	structure of gas X
A	2	single atoms
B	2	diatomic molecules
C	8	single atoms
D	8	diatomic molecules

26 The metal beryllium does not react with cold water.

It reacts with hydrochloric acid but cannot be extracted from its ore by using carbon.

Where should it be placed in the reactivity series?

magnesium
A
zinc
B
iron
C
copper
D

27 Which information about an element can be used to predict its chemical properties?

A boiling point

B density

C melting point

D position in the Periodic Table

28 A list of properties of aluminium is shown.

1 It conducts heat.

2 It has a low density.

3 It is resistant to corrosion.

Which properties make aluminium useful for making food storage containers?

A 1, 2 and 3 **B** 1 and 3 only **C** 1 only **D** 3 only

29 Which metal is commonly used to form alloys with a non-metallic element?

A copper

B iron

C magnesium

D zinc

30 Which object is **least** likely to contain aluminium?

A a bicycle frame

B a hammer

C a saucepan

D an aeroplane body

31 Which process does **not** involve oxidation?

A burning a fossil fuel

B conversion of iron from the blast furnace into steel

C distillation of crude oil

D rusting of iron

32 Which pair of compounds would make a N, P, K fertiliser?

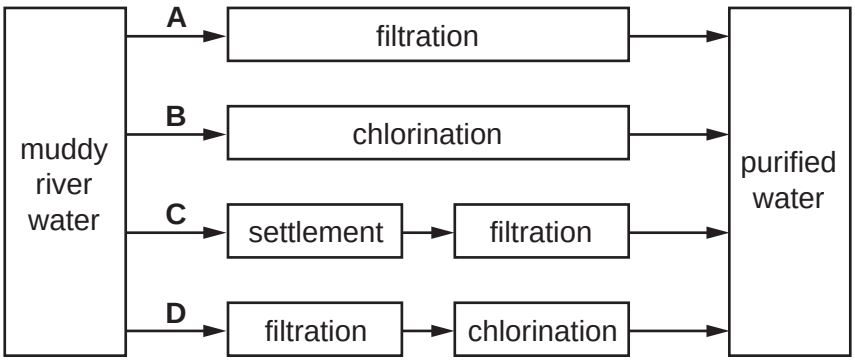
A ammonium sulfate and potassium phosphate

B calcium hydroxide and ammonium nitrate

C calcium phosphate and potassium chloride

D potassium nitrate and ammonium sulfate.

33 Which method of purification would produce water **most** suitable for drinking?



34 Which statement about methane is **not** correct?

A It is a liquid produced by distilling petroleum.

B It is produced as vegetation decomposes.

C It is produced by animals, such as cows.

D It is used as a fuel.

35 A man blows up a balloon.

What is the approximate composition of his exhaled air in the balloon?

	% composition		
	carbon dioxide	oxygen	nitrogen
A	0.03	20	79
B	0.03	79	20
C	4	16	79
D	4	20	75

36 Increasing the number of atoms in one molecule of a hydrocarbon increases the amount of energy released when it burns.

What is the correct order?

	less energy released →		more energy released
A	ethene	ethane	methane
B	ethene	methane	ethane
C	methane	ethane	ethene
D	methane	ethene	ethane

37 The list gives the names of four organic compounds.

ethane

ethanoic acid

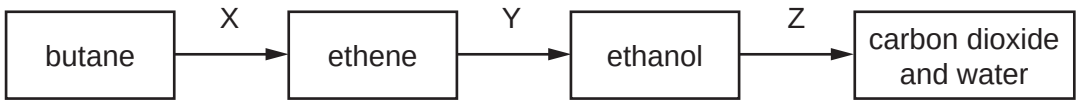
ethanol

ethene

Which bond do all four compounds contain?

A C–C **B** C=C **C** C–H **D** C–O

38 The diagram shows a reaction sequence.



Which row names the processes X, Y and Z?

	X	Y	Z
A	cracking	fermentation	respiration
B	cracking	hydration	combustion
C	distillation	fermentation	respiration
D	distillation	hydration	combustion

39 The main constituent of natural gas is hydrocarbon X.

To which homologous series does X belong and how many **atoms** are in one molecule of X?

	homologous series	number of atoms in one molecule
A	alkane	1
B	alkane	5
C	alkene	1
D	alkene	5

40 The equation shows an industrial process.

$$H_2O + C_2H_4 \xrightarrow{\text{catalyst}} \text{compound X}$$

What is the name of compound X?

A ethane

B ethanoic acid

C ethanol

D methanol

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DATA SHEET
The Periodic Table of the Elements

Group																		
I	II										III	IV	V	VI	VII	0
																4 He Helium 2
					1 H Hydrogen 1											
7 Li Lithium 3	9 Be Beryllium 4										11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12										27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	35.5 Cl Chlorine 17	40 Ar Argon 18
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57 *	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 †																

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	Pm Promethium 61	150 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	175 Lu Lutetium 71
232 Th Thorium 90	Pa Protactinium 91	238 U Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	No Nobelium 102	Lr Lawrencium 103

*58-71 Lanthanoid series
†90-103 Actinoid series

Key: a = relative atomic mass; X = atomic symbol; b = proton (atomic) number

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