



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**CHEMISTRY**

**0620/13**

Paper 1 Multiple Choice

**October/November 2010**

**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.

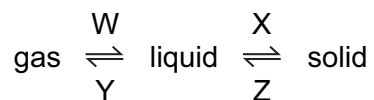
A copy of the Periodic Table is printed on page 16.

You may use a calculator.

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



1 In which changes do the particles move further apart?



- A** W and X      **B** W and Z      **C** X and Y      **D** Y and Z

2 The table shows the structure of different atoms and ions.

particle	proton number	nucleon number	number of protons	number of neutrons	number of electrons
Mg	12	24	12	W	12
Mg <sup>2+</sup>	X	24	12	12	10
F	9	19	9	Y	9
F <sup>-</sup>	9	19	9	10	Z

What are the values of W, X, Y and Z?

	W	X	Y	Z
<b>A</b>	10	10	9	9
<b>B</b>	10	12	10	9
<b>C</b>	12	10	9	10
<b>D</b>	12	12	10	10

3 Element X has a nucleon (mass) number of 19 and a proton (atomic) number of 9.

To which group in the Periodic Table does it belong?

- A** I      **B** III      **C** VII      **D** 0

4 A mixture of ethanol and methanol are separated by fractional distillation.

This method of separation depends on a difference in property X of these two alcohols.

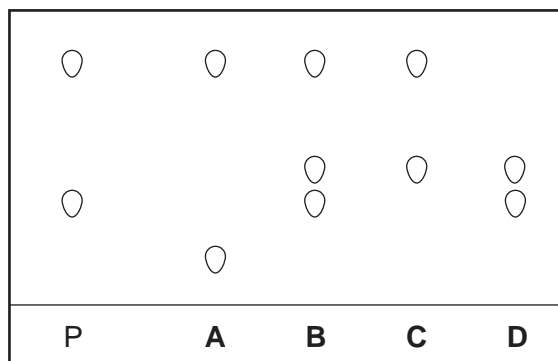
What is property X?

- A** boiling point  
**B** colour  
**C** melting point  
**D** solubility

5 Chromatography is used to find out if a banned dye, P, is present in foodstuffs.

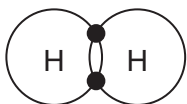
The results are shown in the diagram.

Which foodstuff contains P?

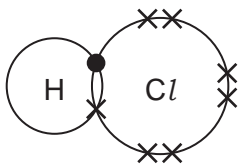


6 Which diagram does **not** show the outer shell electrons in the molecule correctly?

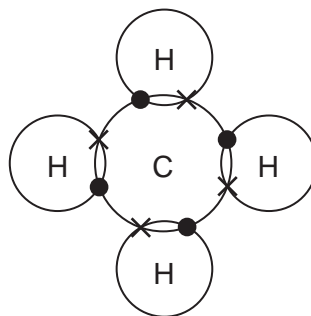
A



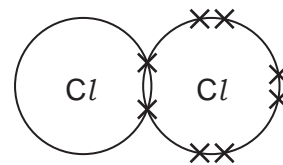
B



C

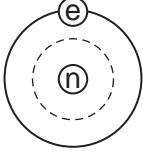
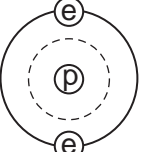
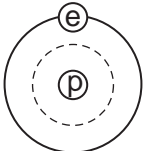
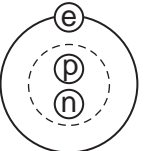
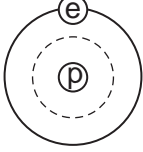
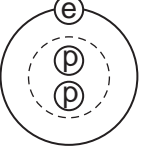
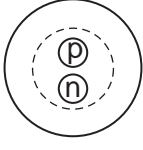
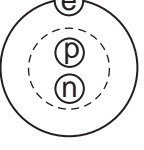


D

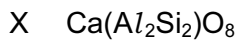
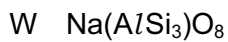


7 Two isotopes of hydrogen are  ${}^1_1\text{H}$  and  ${}^2_1\text{H}$ .

Which diagram shows the arrangement of particles in the two isotopes?

	${}^1_1\text{H}$	${}^2_1\text{H}$	
<b>A</b>			key ⊖ = an electron ⊕ = a proton ⊘ = a neutron ○ = a nucleus
<b>B</b>			
<b>C</b>			
<b>D</b>			

8 The chemical compositions of two substances, W and X, are given.



Which statements are correct?

- 1 W and X contain the same amount of oxygen.
- 2 W contains three times as much silicon as X.
- 3 X contains twice as much aluminium as W.

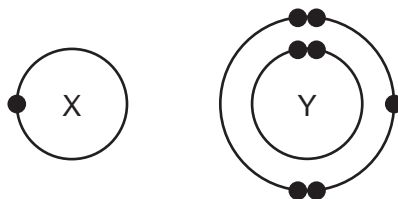
**A** 1 and 2

**B** 1 and 3

**C** 2 and 3

**D** 1, 2 and 3

- 9 The electronic structures of atoms X and Y are shown.



X and Y form a covalent compound.

What is its formula?

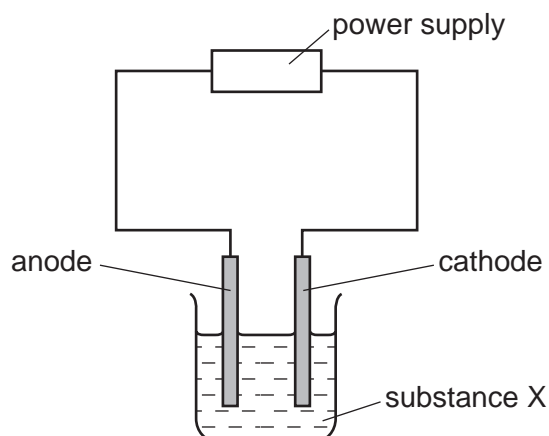
- A**  $XY_5$                       **B**  $XY_3$                       **C**  $XY$                       **D**  $X_3Y$
- 10 Element X is shiny and can be formed into a sheet by hammering.

Which row correctly describes the properties of element X?

	conducts electricity	melts below $25^\circ\text{C}$
<b>A</b>	✓	✓
<b>B</b>	✓	x
<b>C</b>	x	✓
<b>D</b>	x	x

- 11 Substance X was electrolysed in an electrolytic cell.

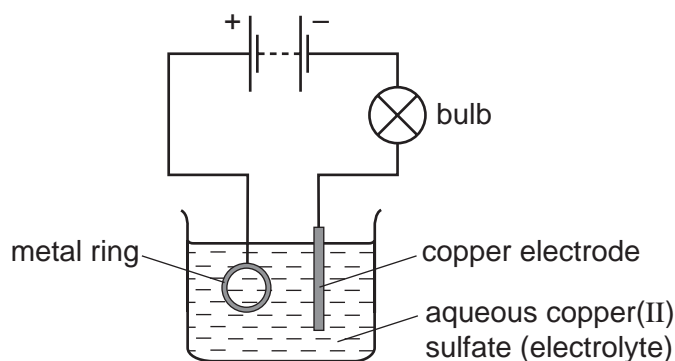
A coloured gas was formed at the anode and a metal was formed at the cathode.



What is substance X?

- A** aqueous sodium chloride  
**B** molten lead bromide  
**C** molten zinc oxide  
**D** solid sodium chloride

12 The diagram shows apparatus used in an attempt to electroplate a metal ring with copper.

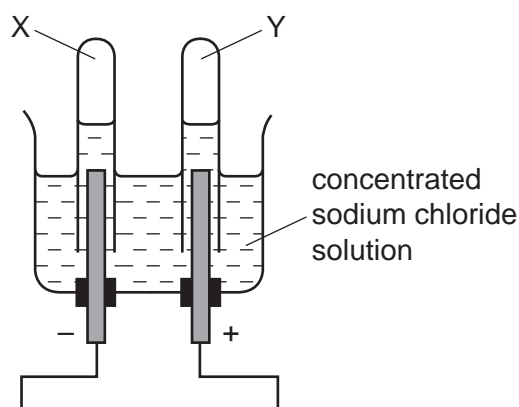


The experiment did not work.

What change is needed in the experiment to make it work?

- A Add solid copper(II) sulfate to the electrolyte.
- B Increase the temperature of the electrolyte.
- C Replace the copper electrode by a carbon electrode.
- D Reverse the connections to the battery.

13 When concentrated sodium chloride solution is electrolysed, elements X and Y are formed.

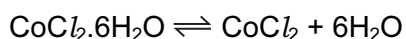


What are X and Y?

	X	Y
A	chlorine	hydrogen
B	hydrogen	chlorine
C	hydrogen	oxygen
D	oxygen	hydrogen



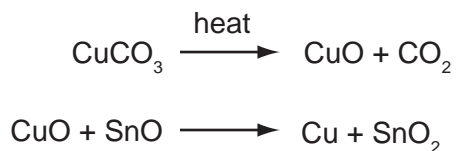
- 17 Which reaction will result in a decrease in pH?
- A** adding calcium hydroxide to acid soil
- B** adding citric acid to sodium hydrogen carbonate solution
- C** adding sodium chloride to silver nitrate solution
- D** adding sodium hydroxide to hydrochloric acid
- 18 When pink crystals of cobalt(II) chloride are heated, steam is given off and the colour of the solid changes to blue.



What happens when water is added to the blue solid?

	colour	temperature
<b>A</b>	changes to pink	decreases
<b>B</b>	changes to pink	increases
<b>C</b>	remains blue	decreases
<b>D</b>	remains blue	increases

- 19 The red colour in some pottery glazes may be formed as a result of the reactions shown.



These equations show that .....1..... is oxidised and .....2..... is reduced.

Which substances correctly complete gaps 1 and 2 in the above sentence?

	1	2
<b>A</b>	CO <sub>2</sub>	SnO <sub>2</sub>
<b>B</b>	CuCO <sub>3</sub>	CuO
<b>C</b>	CuO	SnO
<b>D</b>	SnO	CuO



20 Some barium iodide is dissolved in water.

Aqueous lead(II) nitrate is added to the solution until no more precipitate forms.

This precipitate, X, is filtered off.

Dilute sulfuric acid is added to the filtrate and another precipitate, Y, forms.

What are the colours of precipitates X and Y?

	X	Y
<b>A</b>	white	white
<b>B</b>	white	yellow
<b>C</b>	yellow	white
<b>D</b>	yellow	yellow

21 The table shows some reactions of the halogens.

Which reaction is the most likely to be explosive?

reaction	chlorine gas	bromine gas	iodine gas
reaction with hydrogen	<b>A</b>	<b>B</b>	<b>C</b>
reaction with iron	very vigorous	less vigorous	<b>D</b>

22 Which compound is likely to be coloured?

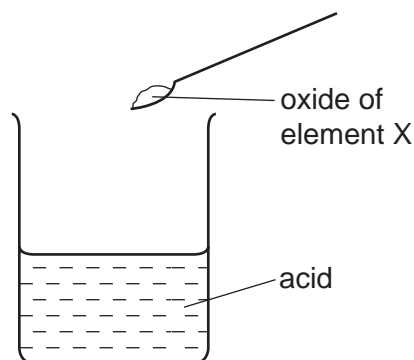
**A**  $\text{KMnO}_4$       **B**  $\text{KNO}_3$       **C**  $\text{K}_2\text{CO}_3$       **D**  $\text{K}_2\text{SO}_4$

23 A salt is made by adding an excess of an insoluble metal oxide to an acid.

How can the excess metal oxide be removed?

- A** chromatography
- B** crystallisation
- C** distillation
- D** filtration

24 The oxide of element X was added to an acid. It reacted to form a salt and water.



What is the pH of the acid before the reaction and what type of element is X?

	pH	type of element X
<b>A</b>	greater than 7	metal
<b>B</b>	greater than 7	non-metal
<b>C</b>	less than 7	metal
<b>D</b>	less than 7	non-metal

25 The diagram shows the positions of elements P, Q, R, S and T in the Periodic Table.

These letters are not the chemical symbols for the elements.

The diagram shows a simplified periodic table with the following layout:

- Row 1: Two boxes on the left, one box in the middle, and two boxes on the right.
- Row 2: Two boxes on the left (the first contains 'P'), a gap, and two boxes on the right (the first contains 'S', the second contains 'T').
- Row 3: A box containing 'Q', a box containing 'R', a gap, and a box.

Which statement about the properties of these elements is correct?

- A** P reacts more vigorously with water than does Q.
- B** P, Q and R are all metals.
- C** T exists as diatomic molecules.
- D** T is more reactive than S.

26 The table compares the properties of Group I elements with those of transition elements.

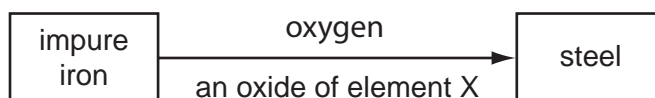
Which entry in the table is correct?

	property	Group I elements	transition elements
<b>A</b>	catalytic activity	low	high
<b>B</b>	density	high	low
<b>C</b>	electrical conductivity	low	high
<b>D</b>	melting point	high	low

27 Which pollutant, found in car exhaust fumes, does **not** come from the fuel?

- A carbon monoxide
- B hydrocarbons
- C lead compounds
- D nitrogen oxides

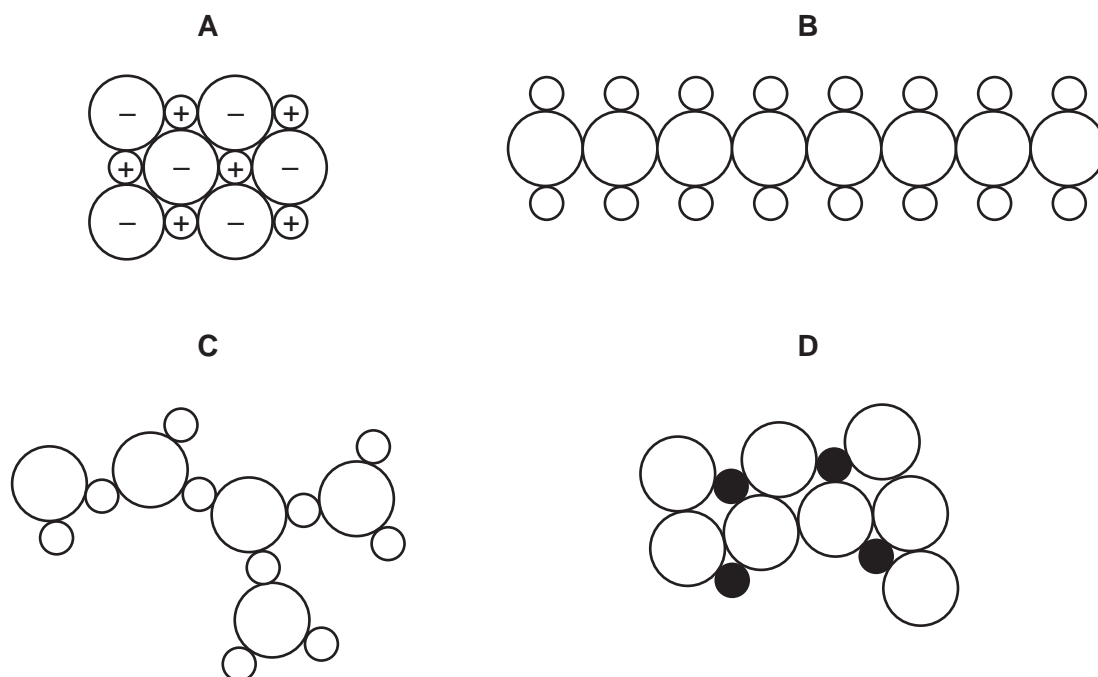
28 The diagram shows the materials used in the production of steel from impure iron.



What could element X be?

- A calcium
  - B carbon
  - C nitrogen
  - D sulfur
- 29 Which property do **all** metals have?
- A Their boiling points are low.
  - B Their densities are low.
  - C They conduct electricity.
  - D They react with water.

30 Which diagram could represent the structure of an alloy?



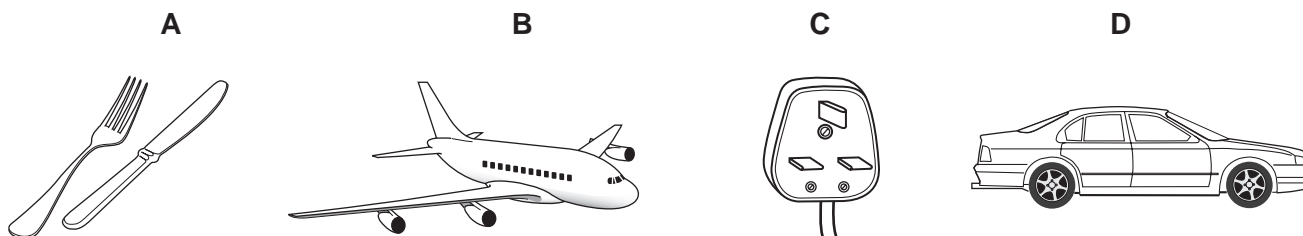
31 Some metals react readily with dilute hydrochloric acid.

Some metals can be extracted by heating their oxides with carbon.

For which metal are **both** statements correct?

- A** calcium
- B** copper
- C** iron
- D** magnesium

32 Which diagram shows a common use of stainless steel?

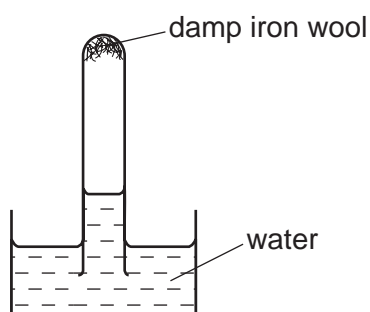


33 Why is chlorination used in water treatment?

- A to kill bacteria in the water
- B to make the water neutral
- C to make the water taste better
- D to remove any salt in the water

34 A test-tube containing damp iron wool is inverted in water.

After three days, the water level inside the test-tube has risen.



Which statement explains this rise?

- A Iron oxide has been formed.
- B Iron wool has been reduced.
- C Oxygen has been formed.
- D The temperature of the water has risen.

35 A bag of fertiliser 'Watch it grow' contains ammonium sulfate and potassium sulfate.

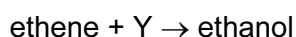
Which of the three elements N, P and K does 'Watch it grow' contain?

	N	P	K
<b>A</b>	✓	✓	x
<b>B</b>	✓	x	✓
<b>C</b>	x	✓	x
<b>D</b>	x	x	✓

36 Which information about carbon dioxide and methane is correct?

		carbon dioxide	methane
<b>A</b>	formed when vegetation decomposes	✓	✗
<b>B</b>	greenhouse gas	✓	✓
<b>C</b>	present in unpolluted air	✗	✗
<b>D</b>	produced during respiration	✗	✓

37 Ethene reacts with Y to produce ethanol.

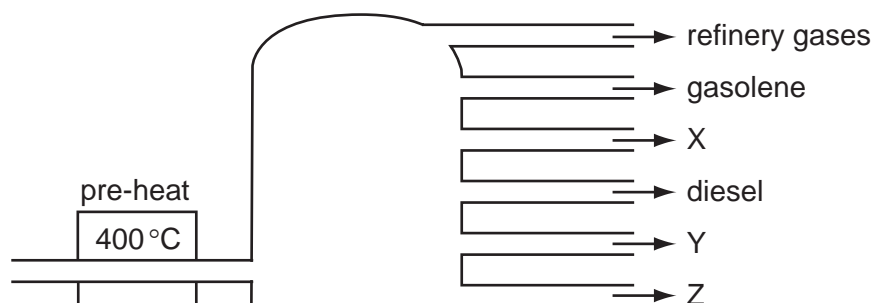


What is Y?

- A** hydrogen
- B** oxygen
- C** steam
- D** yeast

38 In an oil refinery, crude oil is separated into useful fractions.

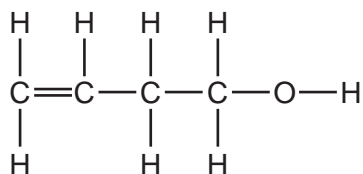
The diagram shows some of these fractions.



What are fractions X, Y and Z?

	X	Y	Z
<b>A</b>	fuel oil	bitumen	paraffin (kerosene)
<b>B</b>	fuel oil	paraffin (kerosene)	bitumen
<b>C</b>	paraffin (kerosene)	bitumen	fuel oil
<b>D</b>	paraffin (kerosene)	fuel oil	bitumen

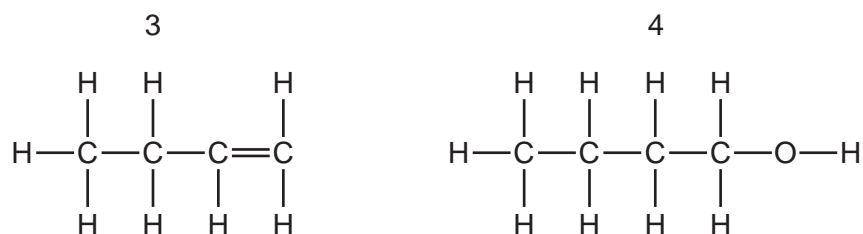
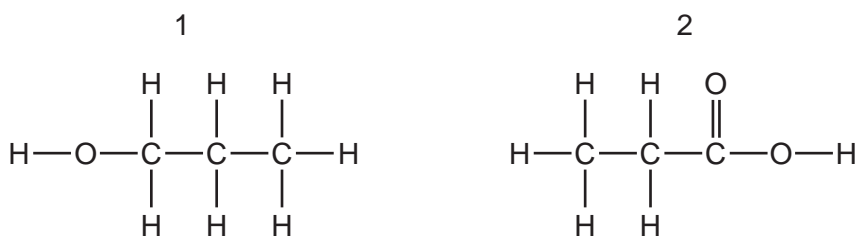
39 The diagram shows the structure of a compound.



To which classes of compound does this molecule belong?

	alkane	alkene	alcohol
<b>A</b>	no	no	no
<b>B</b>	no	yes	yes
<b>C</b>	yes	no	yes
<b>D</b>	yes	yes	yes

40 Which structures show compounds that are members of the same homologous series?



**A** 1 and 2

**B** 1 and 4

**C** 2 and 3

**D** 3 and 4

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

		Group																																																																																																																																																																																																													
		I	II	III	IV	V	VI	VII	VIII	IX	X																																																																																																																																																																																																				
		1 <b>H</b> Hydrogen 1																																																																																																																																																																																																													
7	9	<b>Li</b> Lithium 3	<b>Be</b> Beryllium 4																																																																																																																																																																																																												
23	24	<b>Na</b> Sodium 11	<b>Mg</b> Magnesium 12																																																																																																																																																																																																												
39	40	<b>K</b> Potassium 19	<b>Ca</b> Calcium 20	45 <b>Sc</b> Scandium 21	48 <b>Ti</b> Titanium 22	51 <b>V</b> Vanadium 23	52 <b>Cr</b> Chromium 24	55 <b>Mn</b> Manganese 25	56 <b>Fe</b> Iron 26	59 <b>Co</b> Cobalt 27	59 <b>Ni</b> Nickel 28	64 <b>Cu</b> Copper 29	65 <b>Zn</b> Zinc 30	70 <b>Ga</b> Gallium 31	73 <b>Ge</b> Germanium 32	75 <b>As</b> Arsenic 33	79 <b>Se</b> Selenium 34	80 <b>Br</b> Bromine 35	84 <b>Kr</b> Krypton 36																																																																																																																																																																																												
85	88	<b>Rb</b> Rubidium 37	<b>Sr</b> Strontium 38	89 <b>Y</b> Yttrium 39	91 <b>Zr</b> Zirconium 40	93 <b>Nb</b> Niobium 41	96 <b>Mo</b> Molybdenum 42	101 <b>Ru</b> Ruthenium 44	106 <b>Pd</b> Palladium 46	108 <b>Ag</b> Silver 47	112 <b>Cd</b> Cadmium 48	115 <b>In</b> Indium 49	119 <b>Sn</b> Tin 50	122 <b>Sb</b> Antimony 51	128 <b>Te</b> Tellurium 52	127 <b>I</b> Iodine 53	131 <b>Xe</b> Xenon 54																																																																																																																																																																																														
133	137	<b>Cs</b> Caesium 55	<b>Ba</b> Barium 56	139 <b>La</b> Lanthanum 57	178 <b>Hf</b> Hafnium 72	181 <b>Ta</b> Tantalum 73	184 <b>W</b> Tungsten 74	190 <b>Os</b> Osmium 76	195 <b>Pt</b> Platinum 78	197 <b>Au</b> Gold 79	201 <b>Hg</b> Mercury 80	204 <b>Tl</b> Thallium 81	207 <b>Pb</b> Lead 82	209 <b>Bi</b> Bismuth 83	210 <b>Po</b> Polonium 84	210 <b>At</b> Astatine 85	210 <b>Rn</b> Radon 86																																																																																																																																																																																														
	226	<b>Fr</b> Francium 87	<b>Ra</b> Radium 88	227 <b>Ac</b> Actinium 89									157 <b>Gd</b> Gadolinium 64	159 <b>Tb</b> Terbium 65	162 <b>Dy</b> Dysprosium 66	165 <b>Ho</b> Holmium 67	167 <b>Er</b> Erbium 68	169 <b>Tm</b> Thulium 69	173 <b>Yb</b> Ytterbium 70	175 <b>Lu</b> Lutetium 71																																																																																																																																																																																											
												152 <b>Eu</b> Europium 63	150 <b>Sm</b> Samarium 62	144 <b>Nd</b> Neodymium 60	141 <b>Pr</b> Praseodymium 59	140 <b>Ce</b> Cerium 58	137 <b>La</b> Lanthanum 57	104 <b>Rf</b> Rutherfordium 104	106 <b>Db</b> Dubnium 106	108 <b>Sg</b> Seaborgium 108	110 <b>Bh</b> Bohrium 110	112 <b>Hs</b> Hassium 112	114 <b>Cn</b> Copernicium 114	116 <b>Lv</b> Livermorium 116	118 <b>Og</b> Oganesson 118	119 <b>Uu</b> Ununennium 119	120 <b>Uub</b> Unbibium 120	121 <b>Uut</b> Untrium 121	122 <b>Uuq</b> Unquadrium 122	123 <b>Uuq</b> Unquadrium 123	124 <b>Uup</b> Unpentium 124	125 <b>Uuq</b> Unquadrium 125	126 <b>Uuh</b> Unhexium 126	127 <b>Uuq</b> Unquadrium 127	128 <b>Uuh</b> Unhexium 128	129 <b>Uuq</b> Unquadrium 129	130 <b>Uuh</b> Unhexium 130	131 <b>Uuq</b> Unquadrium 131	132 <b>Uuh</b> Unhexium 132	133 <b>Uuq</b> Unquadrium 133	134 <b>Uuh</b> Unhexium 134	135 <b>Uuq</b> Unquadrium 135	136 <b>Uuh</b> Unhexium 136	137 <b>Uuq</b> Unquadrium 137	138 <b>Uuh</b> Unhexium 138	139 <b>Uuq</b> Unquadrium 139	140 <b>Uuh</b> Unhexium 140	141 <b>Uuq</b> Unquadrium 141	142 <b>Uuh</b> Unhexium 142	143 <b>Uuq</b> Unquadrium 143	144 <b>Uuh</b> Unhexium 144	145 <b>Uuq</b> Unquadrium 145	146 <b>Uuh</b> Unhexium 146	147 <b>Uuq</b> Unquadrium 147	148 <b>Uuh</b> Unhexium 148	149 <b>Uuq</b> Unquadrium 149	150 <b>Uuh</b> Unhexium 150	151 <b>Uuq</b> Unquadrium 151	152 <b>Uuh</b> Unhexium 152	153 <b>Uuq</b> Unquadrium 153	154 <b>Uuh</b> Unhexium 154	155 <b>Uuq</b> Unquadrium 155	156 <b>Uuh</b> Unhexium 156	157 <b>Uuh</b> Unhexium 157	158 <b>Uuq</b> Unquadrium 158	159 <b>Uuh</b> Unhexium 159	160 <b>Uuq</b> Unquadrium 160	161 <b>Uuh</b> Unhexium 161	162 <b>Uuh</b> Unhexium 162	163 <b>Uuq</b> Unquadrium 163	164 <b>Uuh</b> Unhexium 164	165 <b>Uuq</b> Unquadrium 165	166 <b>Uuh</b> Unhexium 166	167 <b>Uuq</b> Unquadrium 167	168 <b>Uuh</b> Unhexium 168	169 <b>Uuq</b> Unquadrium 169	170 <b>Uuh</b> Unhexium 170	171 <b>Uuq</b> Unquadrium 171	172 <b>Uuh</b> Unhexium 172	173 <b>Uuq</b> Unquadrium 173	174 <b>Uuh</b> Unhexium 174	175 <b>Uuq</b> Unquadrium 175	176 <b>Uuh</b> Unhexium 176	177 <b>Uuq</b> Unquadrium 177	178 <b>Uuh</b> Unhexium 178	179 <b>Uuq</b> Unquadrium 179	180 <b>Uuh</b> Unhexium 180	181 <b>Uuq</b> Unquadrium 181	182 <b>Uuh</b> Unhexium 182	183 <b>Uuq</b> Unquadrium 183	184 <b>Uuh</b> Unhexium 184	185 <b>Uuq</b> Unquadrium 185	186 <b>Uuh</b> Unhexium 186	187 <b>Uuq</b> Unquadrium 187	188 <b>Uuh</b> Unhexium 188	189 <b>Uuq</b> Unquadrium 189	190 <b>Uuh</b> Unhexium 190	191 <b>Uuq</b> Unquadrium 191	192 <b>Uuh</b> Unhexium 192	193 <b>Uuq</b> Unquadrium 193	194 <b>Uuh</b> Unhexium 194	195 <b>Uuq</b> Unquadrium 195	196 <b>Uuh</b> Unhexium 196	197 <b>Uuq</b> Unquadrium 197	198 <b>Uuh</b> Unhexium 198	199 <b>Uuq</b> Unquadrium 199	200 <b>Uuh</b> Unhexium 200	201 <b>Uuq</b> Unquadrium 201	202 <b>Uuh</b> Unhexium 202	203 <b>Uuq</b> Unquadrium 203	204 <b>Uuh</b> Unhexium 204	205 <b>Uuq</b> Unquadrium 205	206 <b>Uuh</b> Unhexium 206	207 <b>Uuh</b> Unhexium 207	208 <b>Uuq</b> Unquadrium 208	209 <b>Uuh</b> Unhexium 209	210 <b>Uuh</b> Unhexium 210	211 <b>Uuq</b> Unquadrium 211	212 <b>Uuh</b> Unhexium 212	213 <b>Uuq</b> Unquadrium 213	214 <b>Uuh</b> Unhexium 214	215 <b>Uuq</b> Unquadrium 215	216 <b>Uuh</b> Unhexium 216	217 <b>Uuq</b> Unquadrium 217	218 <b>Uuh</b> Unhexium 218	219 <b>Uuq</b> Unquadrium 219	220 <b>Uuh</b> Unhexium 220	221 <b>Uuq</b> Unquadrium 221	222 <b>Uuh</b> Unhexium 222	223 <b>Uuq</b> Unquadrium 223	224 <b>Uuh</b> Unhexium 224	225 <b>Uuq</b> Unquadrium 225	226 <b>Uuh</b> Unhexium 226	227 <b>Uuh</b> Unhexium 227	228 <b>Uuh</b> Unhexium 228	229 <b>Uuq</b> Unquadrium 229	230 <b>Uuh</b> Unhexium 230	231 <b>Uuq</b> Unquadrium 231	232 <b>Uuh</b> Unhexium 232	233 <b>Uuh</b> Unhexium 233	234 <b>Uuq</b> Unquadrium 234	235 <b>Uuh</b> Unhexium 235	236 <b>Uuh</b> Unhexium 236	237 <b>Uuq</b> Unquadrium 237	238 <b>Uuh</b> Unhexium 238	239 <b>Uuq</b> Unquadrium 239	240 <b>Uuh</b> Unhexium 240	241 <b>Uuq</b> Unquadrium 241	242 <b>Uuh</b> Unhexium 242	243 <b>Uuq</b> Unquadrium 243	244 <b>Uuh</b> Unhexium 244	245 <b>Uuq</b> Unquadrium 245	246 <b>Uuh</b> Unhexium 246	247 <b>Uuq</b> Unquadrium 247	248 <b>Uuh</b> Unhexium 248	249 <b>Uuq</b> Unquadrium 249	250 <b>Uuh</b> Unhexium 250	251 <b>Uuq</b> Unquadrium 251	252 <b>Uuh</b> Unhexium 252	253 <b>Uuq</b> Unquadrium 253	254 <b>Uuh</b> Unhexium 254	255 <b>Uuq</b> Unquadrium 255	256 <b>Uuh</b> Unhexium 256	257 <b>Uuq</b> Unquadrium 257	258 <b>Uuh</b> Unhexium 258	259 <b>Uuq</b> Unquadrium 259	260 <b>Uuh</b> Unhexium 260	261 <b>Uuq</b> Unquadrium 261	262 <b>Uuh</b> Unhexium 262	263 <b>Uuq</b> Unquadrium 263	264 <b>Uuh</b> Unhexium 264	265 <b>Uuq</b> Unquadrium 265	266 <b>Uuh</b> Unhexium 266	267 <b>Uuq</b> Unquadrium 267	268 <b>Uuh</b> Unhexium 268	269 <b>Uuq</b> Unquadrium 269	270 <b>Uuh</b> Unhexium 270	271 <b>Uuq</b> Unquadrium 271	272 <b>Uuh</b> Unhexium 272	273 <b>Uuq</b> Unquadrium 273	274 <b>Uuh</b> Unhexium 274	275 <b>Uuq</b> Unquadrium 275	276 <b>Uuh</b> Unhexium 276	277 <b>Uuq</b> Unquadrium 277	278 <b>Uuh</b> Unhexium 278	279 <b>Uuq</b> Unquadrium 279	280 <b>Uuh</b> Unhexium 280	281 <b>Uuq</b> Unquadrium 281	282 <b>Uuh</b> Unhexium 282	283 <b>Uuq</b> Unquadrium 283	284 <b>Uuh</b> Unhexium 284	285 <b>Uuq</b> Unquadrium 285	286 <b>Uuh</b> Unhexium 286	287 <b>Uuq</b> Unquadrium 287	288 <b>Uuh</b> Unhexium 288	289 <b>Uuq</b> Unquadrium 289	290 <b>Uuh</b> Unhexium 290	291 <b>Uuq</b> Unquadrium 291	292 <b>Uuh</b> Unhexium 292	293 <b>Uuq</b> Unquadrium 293	294 <b>Uuh</b> Unhexium 294	295 <b>Uuq</b> Unquadrium 295	296 <b>Uuh</b> Unhexium 296	297 <b>Uuq</b> Unquadrium 297	298 <b>Uuh</b> Unhexium 298	299 <b>Uuq</b> Unquadrium 299	300 <b>Uuh</b> Unhexium 300

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

a = relative atomic mass

X = atomic symbol

b = proton (atomic) number

Key

a

X

b

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.

University of Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.