



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

CANDIDATE  
NAME

CENTRE  
NUMBER

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CANDIDATE  
NUMBER

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**CHEMISTRY**

**0620/22**

Paper 2

**October/November 2012**

**1 hour 15 minutes**

Candidates answer on the Question Paper.

No Additional Materials are required.

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name in the spaces at the top of this page.

Write in dark blue or black pen.

You may need to use a pencil for any diagrams, graphs or rough working.

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

DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

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

At the end of the examination, fasten all your work securely together.

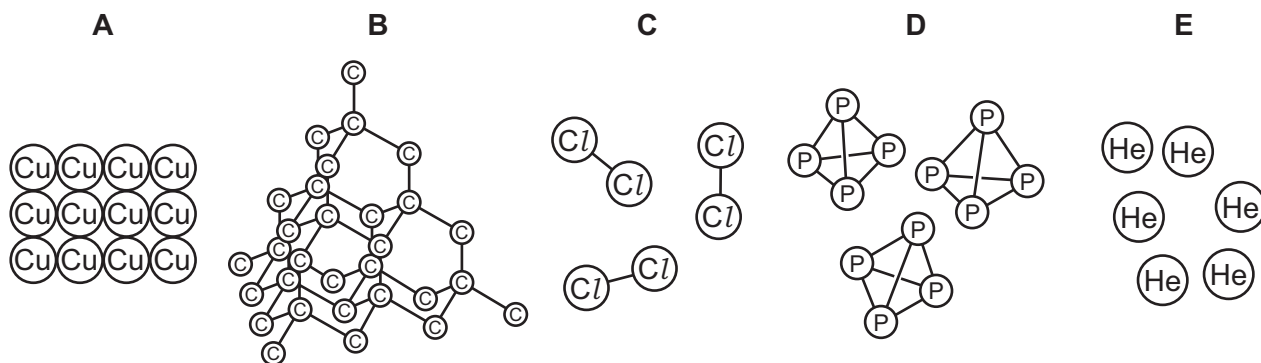
The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
1	
2	
3	
4	
5	
6	
7	
<b>Total</b>	

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



1 The diagram shows the structures of five elements, **A**, **B**, **C**, **D** and **E**.



(a) Answer these questions using the letters **A**, **B**, **C**, **D** or **E**.  
Each element can be used once, more than once or not at all.

Which one of these elements

- (i) is in Group V of the Periodic Table, ..... [1]
- (ii) is used to fill weather balloons, ..... [1]
- (iii) is a diatomic gas at room temperature, ..... [1]
- (iv) conducts electricity, ..... [1]
- (v) is a transition element? ..... [1]

(b) Which **two** of the elements **A**, **B**, **C**, **D** or **E** are simple molecules?

..... and ..... [2]

(c) Which **two** of the words or phrases in the list below describe the structure of element **B**?

covalent                      giant                      ionic  
metallic                      simple atomic                      simple molecular

..... and ..... [2]

(d) What do you understand by the term *element*?

..... [1]

[Total: 10]

2 Ammonia,  $\text{NH}_3$ , is an alkaline gas.

(a) Describe a test for ammonia.

test .....

result ..... [2]

(b) What is the pH of an aqueous solution of ammonia?  
Put a ring around the correct answer.

**pH 1**

**pH 3**

**pH 5**

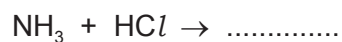
**pH 7**

**pH 9**

[1]

(c) Ammonia reacts with hydrochloric acid.

(i) Complete the symbol equation for this reaction.



[1]

(ii) Hydrochloric acid can be made by dissolving hydrogen chloride,  $\text{HCl}$ , in water.  
Draw a diagram to show the arrangement of electrons in hydrogen chloride.  
Show only the outer electrons.

Show a hydrogen electron as ●

Show a chlorine electron as x

[2]

(d) Aqueous ammonia reacts with sulfuric acid to form a solution of ammonium sulfate.



(i) Ammonium sulfate is a colourless salt. Describe how you could use a titration method to make a colourless solution of ammonium sulfate.

.....

.....

.....

.....

.....

..... [4]

(ii) How can crystals of ammonium sulfate be obtained from a solution of ammonium sulfate?

.....

..... [1]

[Total: 11]

- 3 The table below shows the properties of some halogens.

halogen	colour	state at room temperature	melting point /°C
fluorine	yellow		-220
chlorine	light green	gas	
bromine	brownish-red	liquid	-7
iodine	grey-black	solid	+114

- (a) (i) What is the trend in the colour of the halogens down the Group?

..... [1]

- (ii) Predict the state of fluorine at room temperature.

..... [1]

- (iii) Predict the melting point of chlorine.

..... [1]

- (b) The reactivity of three different halogens was compared by reacting them with solutions of sodium halides.

The results are shown in the table below.

reaction mixture	observations
astatine + sodium iodide	colour of reaction mixture remains unchanged
bromine + sodium iodide	mixture turns dark brown
chlorine + sodium bromide	mixture turns brownish-red

- (i) Use the results in the table to suggest the order of reactivity of astatine, bromine, chlorine and iodine.

most reactive  $\longrightarrow$  least reactive

--	--	--	--

[2]

- (ii) Predict whether bromine will react with sodium chloride solution.  
Explain your answer.

.....

..... [1]

- (c) Chlorine reacts with excess cold dilute sodium hydroxide. The products of the reaction are sodium chloride, sodium chlorate(I) and water.  
The formula of sodium chlorate(I) is  $\text{NaClO}$ .

Complete the equation for this reaction.

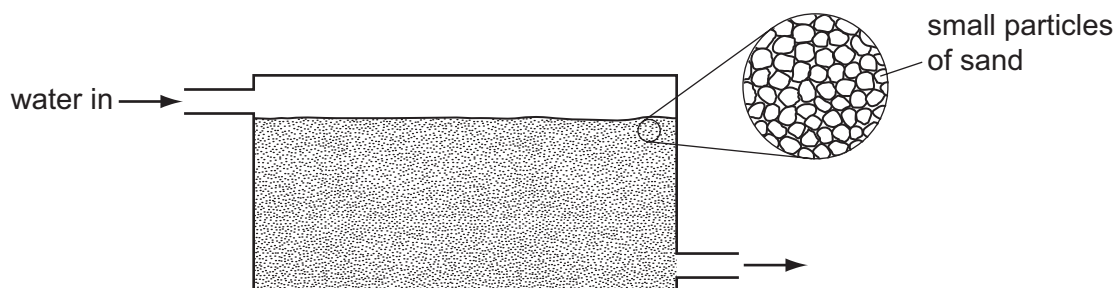


[2]

- (d) (i) Explain why chlorine is used in water purification.

..... [1]

- (ii) Impure water contains particles of minerals and remains of dead plants and animals. One stage in water purification is the removal of these particles by filtration. The diagram below shows a water filter.



Explain how this water filter works.

.....  
 .....  
 ..... [2]

[Total: 11]

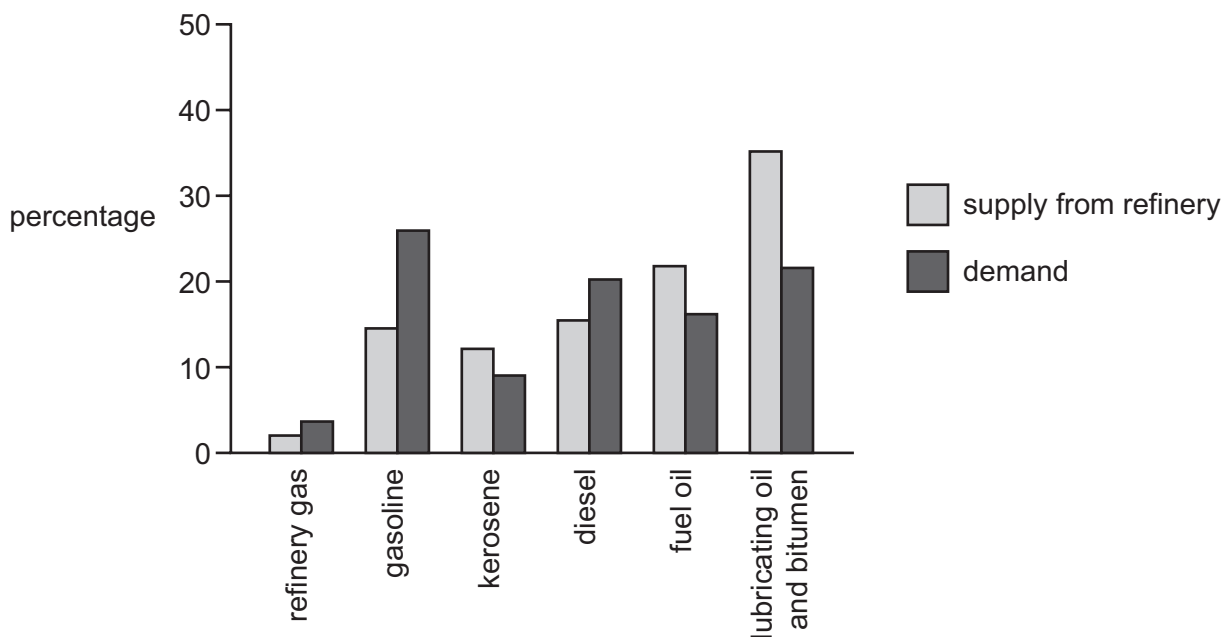
4 The process of distillation is used in an oil refinery to separate petroleum into different fractions.

(a) What do you understand by the term *petroleum fraction*?

.....  
 ..... [2]

(b) Some petroleum fractions are more useful than others. There is a greater demand for these fractions.

The diagram shows the demand from customers and the ability of an oil refinery to supply these fractions by fractional distillation alone.



(i) State the name of **two** fractions for which demand is greater than supply.

..... [2]

(ii) State **one** use for each of the following fractions.

refinery gas .....

bitumen ..... [2]

(c) More gasoline can be made by cracking long-chain hydrocarbons.

State the conditions needed for cracking.

.....  
 ..... [2]

(d) Dodecane,  $C_{12}H_{26}$ , can be cracked to form smaller hydrocarbons.

(i) What do you understand by the term *hydrocarbon*?

..... [1]

(ii) Complete the equation for the cracking of dodecane.



(e) Ethene,  $C_2H_4$ , can be formed by cracking.

(i) Draw the full structure of ethene showing all atoms and bonds.

[1]

(ii) Poly(ethene) can be made from ethene.  
Complete the following sentences using words from the list below.

**addition                  atoms                  condensation                  dimers**  
**monomers                  polymers                  subtraction**

The small ethene molecules which join together to form poly(ethene) are called ethene ..... . The process of joining the ethene molecules together is an example of an ..... reaction. The long-chain molecules which are formed are called ..... . [3]

[Total: 14]



5 Aluminium is in Group III of the Periodic Table. Iron is a transition element.

- (a) Both aluminium and iron have high melting points and boiling points.  
State **two** differences in the physical properties of aluminium and iron.

.....  
..... [2]

- (b) State **one** use of aluminium.

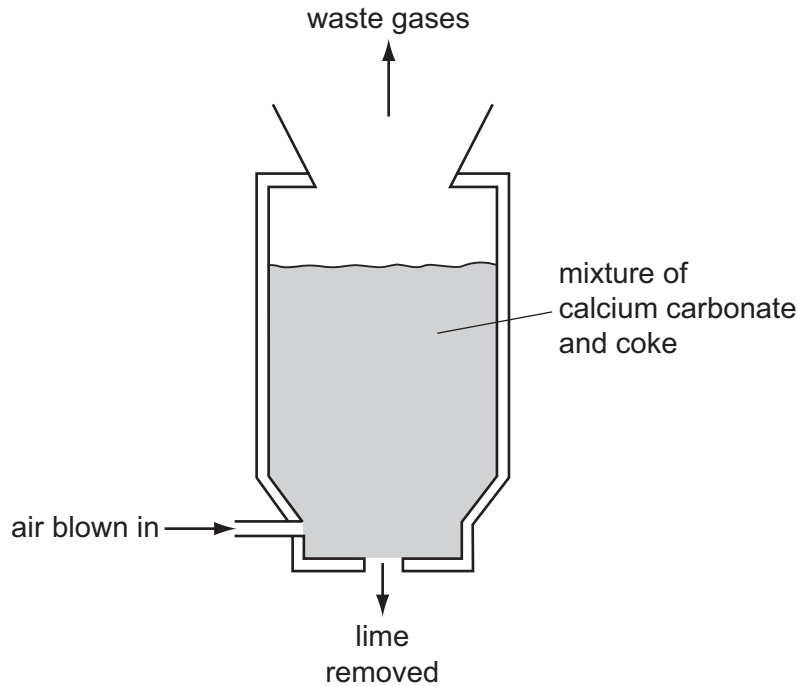
..... [1]

- (c) Sodium hydroxide is used to test for aluminium ions.  
Describe what happens when you add a solution of sodium hydroxide to a solution of aluminium ions until the sodium hydroxide is in excess.

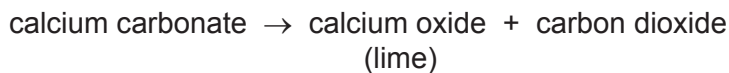
.....  
.....  
..... [3]

[Total: 6]

6 The diagram below shows a kiln used for manufacturing lime.



The reaction taking place in the kiln is



(a) (i) State the name of a rock which is largely calcium carbonate.

..... [1]

(ii) Explain why, at the end of the reaction, there is only lime left in the lime kiln.

..... [1]

(b) (i) Coke is mainly carbon.

Combustion of coke provides the heat for the reaction in the lime kiln.

Write a symbol equation for the complete combustion of carbon in oxygen.

..... [2]

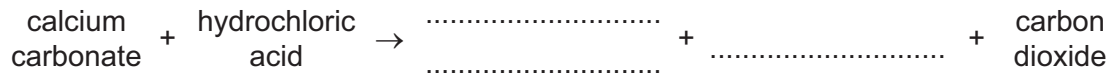
(ii) Complete these sentences using words from the list below.

- |                |                 |                  |                     |
|----------------|-----------------|------------------|---------------------|
| <b>air</b>     | <b>dioxide</b>  | <b>harmless</b>  | <b>hydrogenated</b> |
| <b>limited</b> | <b>monoxide</b> | <b>poisonous</b> | <b>water</b>        |

When carbon burns in a ..... supply of ....., carbon  
..... is formed. This is a colourless gas which has no smell and is  
.....

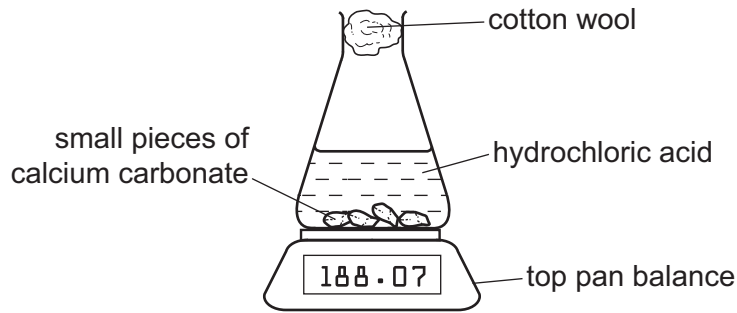
[4]

- (c) Calcium carbonate reacts with hydrochloric acid to form carbon dioxide.  
Complete the word equation for this reaction.



[2]

- (d) The speed of reaction of calcium carbonate with hydrochloric acid can be found using the apparatus shown below.



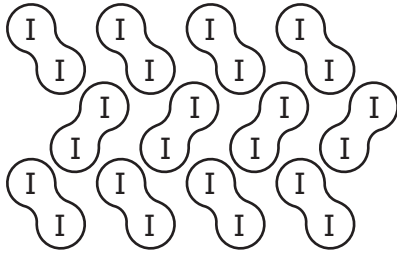
- (i) Suggest how this apparatus can be used to find the speed of this reaction.

.....  
 .....  
 ..... [2]

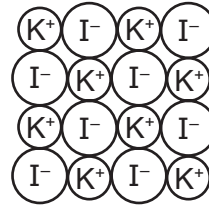
- (ii) State how the speed of this reaction changes when  
 the concentration of acid is increased, .....  
 larger pieces of calcium carbonate are used, .....  
 the temperature is increased. .... [3]

[Total: 15]

7 The structures of iodine and potassium iodide are shown below.



iodine



potassium iodide

(a) Iodine is a solid at room temperature. Its melting point is +114 °C.

(i) Describe what happens to the arrangement and movement of iodine molecules when iodine is gradually heated from 20 °C to 120 °C.

.....

.....

.....

.....

..... [4]

(ii) Calculate the relative molecular mass of iodine.

..... [1]

(b) (i) What type of bonding is present in potassium iodide?

..... [1]

(ii) Write the simplest formula for potassium iodide.

..... [1]

- (c) Complete the table below to show the solubility in water and electrical conductivity of solid iodine and solid potassium iodide.

substance	solubility in water	electrical conductivity of solid
iodine		
potassium iodide		

[4]

- (d) Predict the product formed at each electrode when molten potassium iodide is electrolysed.

at the positive electrode .....

at the negative electrode ..... [2]

[Total: 13]





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

		Group																																																																																																																																																																																																																																																																																																																																																																																									
I	II	III	IV	V	VI	VII	0																																																																																																																																																																																																																																																																																																																																																																																				
7 <b>Li</b> Lithium 3	9 <b>Be</b> Beryllium 4	1 <b>H</b> Hydrogen 1	11 <b>B</b> Boron 5	12 <b>C</b> Carbon 6	13 <b>Al</b> Aluminium 13	14 <b>N</b> Nitrogen 7	15 <b>O</b> Oxygen 8	16 <b>F</b> Fluorine 9	17 <b>Ne</b> Neon 10	18 <b>Ar</b> Argon 18	19 <b>K</b> Potassium 19	20 <b>Ca</b> Calcium 20	21 <b>Sc</b> Scandium 21	22 <b>Ti</b> Titanium 22	23 <b>V</b> Vanadium 23	24 <b>Cr</b> Chromium 24	25 <b>Mn</b> Manganese 25	26 <b>Fe</b> Iron 26	27 <b>Co</b> Cobalt 27	28 <b>Ni</b> Nickel 28	29 <b>Cu</b> Copper 29	30 <b>Zn</b> Zinc 30	31 <b>Ga</b> Gallium 31	32 <b>Ge</b> Germanium 32	33 <b>As</b> Arsenic 33	34 <b>Se</b> Selenium 34	35 <b>Br</b> Bromine 35	36 <b>Kr</b> Krypton 36	37 <b>Rb</b> Rubidium 37	38 <b>Sr</b> Strontium 38	39 <b>Y</b> Yttrium 39	40 <b>Zr</b> Zirconium 40	41 <b>Nb</b> Niobium 41	42 <b>Mo</b> Molybdenum 42	43 <b>Tc</b> Technetium 43	44 <b>Ru</b> Ruthenium 44	45 <b>Rh</b> Rhodium 45	46 <b>Pd</b> Palladium 46	47 <b>Ag</b> Silver 47	48 <b>Cd</b> Cadmium 48	49 <b>In</b> Indium 49	50 <b>Sn</b> Tin 50	51 <b>Sb</b> Antimony 51	52 <b>Te</b> Tellurium 52	53 <b>I</b> Iodine 53	54 <b>Xe</b> Xenon 54	55 <b>Cs</b> Caesium 55	56 <b>Ba</b> Barium 56	57 <b>La</b> Lanthanum 57	72 <b>Hf</b> Hafnium 72	73 <b>Ta</b> Tantalum 73	74 <b>W</b> Tungsten 74	75 <b>Re</b> Rhenium 75	76 <b>Os</b> Osmium 76	77 <b>Ir</b> Iridium 77	78 <b>Pt</b> Platinum 78	79 <b>Au</b> Gold 79	80 <b>Hg</b> Mercury 80	81 <b>Tl</b> Thallium 81	82 <b>Pb</b> Lead 82	83 <b>Bi</b> Bismuth 83	84 <b>Po</b> Polonium 84	85 <b>At</b> Astatine 85	86 <b>Rn</b> Radon 86	87 <b>Fr</b> Francium 87	88 <b>Ra</b> Radium 88	89 <b>Ac</b> Actinium 89	†	90 <b>Th</b> Thorium 90	91 <b>Pa</b> Protactinium 91	92 <b>U</b> Uranium 92	93 <b>Np</b> Neptunium 93	94 <b>Pu</b> Plutonium 94	95 <b>Am</b> Americium 95	96 <b>Cm</b> Curium 96	97 <b>Bk</b> Berkelium 97	98 <b>Cf</b> Californium 98	99 <b>Es</b> Einsteinium 99	100 <b>Fm</b> Fermium 100	101 <b>Md</b> Mendelevium 101	102 <b>No</b> Nobelium 102	103 <b>Lr</b> Lawrencium 103	104 <b>Rf</b> Rutherfordium 104	105 <b>Db</b> Dubnium 105	106 <b>Sg</b> Seaborgium 106	107 <b>Bh</b> Bohrium 107	108 <b>Hs</b> Hassium 108	109 <b>Mt</b> Meitnerium 109	110 <b>Ds</b> Darmstadtium 110	111 <b>Rg</b> Roentgenium 111	112 <b>Cn</b> Copernicium 112	113 <b>Nh</b> Nihonium 113	114 <b>Fl</b> Flerovium 114	115 <b>Lv</b> Livermorium 115	116 <b>Ts</b> Tennessine 116	117 <b>Og</b> Oganesson 117	118 <b>Uu</b> Ununseptium 118	119 <b>Uub</b> Ununseptium 119	120 <b>Uuq</b> Ununseptium 120	121 <b>Uub</b> Ununseptium 121	122 <b>Uuq</b> Ununseptium 122	123 <b>Uub</b> Ununseptium 123	124 <b>Uuq</b> Ununseptium 124	125 <b>Uub</b> Ununseptium 125	126 <b>Uuq</b> Ununseptium 126	127 <b>Uub</b> Ununseptium 127	128 <b>Uuq</b> Ununseptium 128	129 <b>Uub</b> Ununseptium 129	130 <b>Uuq</b> Ununseptium 130	131 <b>Uub</b> Ununseptium 131	132 <b>Uuq</b> Ununseptium 132	133 <b>Uub</b> Ununseptium 133	134 <b>Uuq</b> Ununseptium 134	135 <b>Uub</b> Ununseptium 135	136 <b>Uuq</b> Ununseptium 136	137 <b>Uub</b> Ununseptium 137	138 <b>Uuq</b> Ununseptium 138	139 <b>Uub</b> Ununseptium 139	140 <b>Uuq</b> Ununseptium 140	141 <b>Uub</b> Ununseptium 141	142 <b>Uuq</b> Ununseptium 142	143 <b>Uub</b> Ununseptium 143	144 <b>Uuq</b> Ununseptium 144	145 <b>Uub</b> Ununseptium 145	146 <b>Uuq</b> Ununseptium 146	147 <b>Uub</b> Ununseptium 147	148 <b>Uuq</b> Ununseptium 148	149 <b>Uub</b> Ununseptium 149	150 <b>Uuq</b> Ununseptium 150	151 <b>Uub</b> Ununseptium 151	152 <b>Uuq</b> Ununseptium 152	153 <b>Uub</b> Ununseptium 153	154 <b>Uuq</b> Ununseptium 154	155 <b>Uub</b> Ununseptium 155	156 <b>Uuq</b> Ununseptium 156	157 <b>Uub</b> Ununseptium 157	158 <b>Uuq</b> Ununseptium 158	159 <b>Uub</b> Ununseptium 159	160 <b>Uuq</b> Ununseptium 160	161 <b>Uub</b> Ununseptium 161	162 <b>Uuq</b> Ununseptium 162	163 <b>Uub</b> Ununseptium 163	164 <b>Uuq</b> Ununseptium 164	165 <b>Uub</b> Ununseptium 165	166 <b>Uuq</b> Ununseptium 166	167 <b>Uub</b> Ununseptium 167	168 <b>Uuq</b> Ununseptium 168	169 <b>Uub</b> Ununseptium 169	170 <b>Uuq</b> Ununseptium 170	171 <b>Uub</b> Ununseptium 171	172 <b>Uuq</b> Ununseptium 172	173 <b>Uub</b> Ununseptium 173	174 <b>Uuq</b> Ununseptium 174	175 <b>Uub</b> Ununseptium 175	176 <b>Uuq</b> Ununseptium 176	177 <b>Uub</b> Ununseptium 177	178 <b>Uuq</b> Ununseptium 178	179 <b>Uub</b> Ununseptium 179	180 <b>Uuq</b> Ununseptium 180	181 <b>Uub</b> Ununseptium 181	182 <b>Uuq</b> Ununseptium 182	183 <b>Uub</b> Ununseptium 183	184 <b>Uuq</b> Ununseptium 184	185 <b>Uub</b> Ununseptium 185	186 <b>Uuq</b> Ununseptium 186	187 <b>Uub</b> Ununseptium 187	188 <b>Uuq</b> Ununseptium 188	189 <b>Uub</b> Ununseptium 189	190 <b>Uuq</b> Ununseptium 190	191 <b>Uub</b> Ununseptium 191	192 <b>Uuq</b> Ununseptium 192	193 <b>Uub</b> Ununseptium 193	194 <b>Uuq</b> Ununseptium 194	195 <b>Uub</b> Ununseptium 195	196 <b>Uuq</b> Ununseptium 196	197 <b>Uub</b> Ununseptium 197	198 <b>Uuq</b> Ununseptium 198	199 <b>Uub</b> Ununseptium 199	200 <b>Uub</b> Ununseptium 200	201 <b>Uub</b> Ununseptium 201	202 <b>Uub</b> Ununseptium 202	203 <b>Uub</b> Ununseptium 203	204 <b>Uub</b> Ununseptium 204	205 <b>Uub</b> Ununseptium 205	206 <b>Uub</b> Ununseptium 206	207 <b>Uub</b> Ununseptium 207	208 <b>Uub</b> Ununseptium 208	209 <b>Uub</b> Ununseptium 209	210 <b>Uub</b> Ununseptium 210	211 <b>Uub</b> Ununseptium 211	212 <b>Uub</b> Ununseptium 212	213 <b>Uub</b> Ununseptium 213	214 <b>Uub</b> Ununseptium 214	215 <b>Uub</b> Ununseptium 215	216 <b>Uub</b> Ununseptium 216	217 <b>Uub</b> Ununseptium 217	218 <b>Uub</b> Ununseptium 218	219 <b>Uub</b> Ununseptium 219	220 <b>Uub</b> Ununseptium 220	221 <b>Uub</b> Ununseptium 221	222 <b>Uub</b> Ununseptium 222	223 <b>Uub</b> Ununseptium 223	224 <b>Uub</b> Ununseptium 224	225 <b>Uub</b> Ununseptium 225	226 <b>Uub</b> Ununseptium 226	227 <b>Uub</b> Ununseptium 227	228 <b>Uub</b> Ununseptium 228	229 <b>Uub</b> Ununseptium 229	230 <b>Uub</b> Ununseptium 230	231 <b>Uub</b> Ununseptium 231	232 <b>Uub</b> Ununseptium 232	233 <b>Uub</b> Ununseptium 233	234 <b>Uub</b> Ununseptium 234	235 <b>Uub</b> Ununseptium 235	236 <b>Uub</b> Ununseptium 236	237 <b>Uub</b> Ununseptium 237	238 <b>Uub</b> Ununseptium 238	239 <b>Uub</b> Ununseptium 239	240 <b>Uub</b> Ununseptium 240	241 <b>Uub</b> Ununseptium 241	242 <b>Uub</b> Ununseptium 242	243 <b>Uub</b> Ununseptium 243	244 <b>Uub</b> Ununseptium 244	245 <b>Uub</b> Ununseptium 245	246 <b>Uub</b> Ununseptium 246	247 <b>Uub</b> Ununseptium 247	248 <b>Uub</b> Ununseptium 248	249 <b>Uub</b> Ununseptium 249	250 <b>Uub</b> Ununseptium 250	251 <b>Uub</b> Ununseptium 251	252 <b>Uub</b> Ununseptium 252	253 <b>Uub</b> Ununseptium 253	254 <b>Uub</b> Ununseptium 254	255 <b>Uub</b> Ununseptium 255	256 <b>Uub</b> Ununseptium 256	257 <b>Uub</b> Ununseptium 257	258 <b>Uub</b> Ununseptium 258	259 <b>Uub</b> Ununseptium 259	260 <b>Uub</b> Ununseptium 260	261 <b>Uub</b> Ununseptium 261	262 <b>Uub</b> Ununseptium 262	263 <b>Uub</b> Ununseptium 263	264 <b>Uub</b> Ununseptium 264	265 <b>Uub</b> Ununseptium 265	266 <b>Uub</b> Ununseptium 266	267 <b>Uub</b> Ununseptium 267	268 <b>Uub</b> Ununseptium 268	269 <b>Uub</b> Ununseptium 269	270 <b>Uub</b> Ununseptium 270	271 <b>Uub</b> Ununseptium 271	272 <b>Uub</b> Ununseptium 272	273 <b>Uub</b> Ununseptium 273	274 <b>Uub</b> Ununseptium 274	275 <b>Uub</b> Ununseptium 275	276 <b>Uub</b> Ununseptium 276	277 <b>Uub</b> Ununseptium 277	278 <b>Uub</b> Ununseptium 278	279 <b>Uub</b> Ununseptium 279	280 <b>Uub</b> Ununseptium 280	281 <b>Uub</b> Ununseptium 281	282 <b>Uub</b> Ununseptium 282	283 <b>Uub</b> Ununseptium 283	284 <b>Uub</b> Ununseptium 284	285 <b>Uub</b> Ununseptium 285	286 <b>Uub</b> Ununseptium 286	287 <b>Uub</b> Ununseptium 287	288 <b>Uub</b> Ununseptium 288	289 <b>Uub</b> Ununseptium 289	290 <b>Uub</b> Ununseptium 290	291 <b>Uub</b> Ununseptium 291	292 <b>Uub</b> Ununseptium 292	293 <b>Uub</b> Ununseptium 293	294 <b>Uub</b> Ununseptium 294	295 <b>Uub</b> Ununseptium 295	296 <b>Uub</b> Ununseptium 296	297 <b>Uub</b> Ununseptium 297	298 <b>Uub</b> Ununseptium 298	299 <b>Uub</b> Ununseptium 299	300 <b>Uub</b> Ununseptium 300	301 <b>Uub</b> Ununseptium 301	302 <b>Uub</b> Ununseptium 302	303 <b>Uub</b> Ununseptium 303	304 <b>Uub</b> Ununseptium 304	305 <b>Uub</b> Ununseptium 305	306 <b>Uub</b> Ununseptium 306	307 <b>Uub</b> Ununseptium 307	308 <b>Uub</b> Ununseptium 308	309 <b>Uub</b> Ununseptium 309	310 <b>Uub</b> Ununseptium 310	311 <b>Uub</b> Ununseptium 311	312 <b>Uub</b> Ununseptium 312	313 <b>Uub</b> Ununseptium 313	314 <b>Uub</b> Ununseptium 314	315 <b>Uub</b> Ununseptium 315	316 <b>Uub</b> Ununseptium 316	317 <b>Uub</b> Ununseptium 317	318 <b>Uub</b> Ununseptium 318	319 <b>Uub</b> Ununseptium 319	320 <b>Uub</b> Ununseptium 320	321 <b>Uub</b> Ununseptium 321	322 <b>Uub</b> Ununseptium 322	323 <b>Uub</b> Ununseptium 323	324 <b>Uub</b> Ununseptium 324	325 <b>Uub</b> Ununseptium 325	326 <b>Uub</b> Ununseptium 326	327 <b>Uub</b> Ununseptium 327	328 <b>Uub</b> Ununseptium 328	329 <b>Uub</b> 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Ununseptium 361	362 <b>Uub</b> Ununseptium 362	363 <b>Uub</b> Ununseptium 363	364 <b>Uub</b> Ununseptium 364	365 <b>Uub</b> Ununseptium 365	366 <b>Uub</b> Ununseptium 366	367 <b>Uub</b> Ununseptium 367	368 <b>Uub</b> Ununseptium 368	369 <b>Uub</b> Ununseptium 369	370 <b>Uub</b> Ununseptium 370	371 <b>Uub</b> Ununseptium 371	372 <b>Uub</b> Ununseptium 372	373 <b>Uub</b> Ununseptium 373	374 <b>Uub</b> Ununseptium 374	375 <b>Uub</b> Ununseptium 375	376 <b>Uub</b> Ununseptium 376	377 <b>Uub</b> Ununseptium 377	378 <b>Uub</b> Ununseptium 378	379 <b>Uub</b> Ununseptium 379	380 <b>Uub</b> Ununseptium 380	381 <b>Uub</b> Ununseptium 381	382 <b>Uub</b> Ununseptium 382	383 <b>Uub</b> Ununseptium 383	384 <b>Uub</b> Ununseptium 384	385 <b>Uub</b> Ununseptium 385	386 <b>Uub</b> Ununseptium 386	387 <b>Uub</b> Ununseptium 387	388 <b>Uub</b> Ununseptium 388	389 <b>Uub</b> Ununseptium 389	390 <b>Uub</b> Ununseptium 390	391 <b>Uub</b> Ununseptium 391	392 <b>Uub</b> Ununseptium 392	393 <b>Uub</b> Ununseptium 393	394 <b>Uub</b> Ununseptium 394	395 <b>Uub</b> Ununseptium 395	396 <b>Uub</b> Ununseptium 396	397 <b>Uub</b> Ununseptium 397	398 <b>Uub</b> Ununseptium 398	399 <b>Uub</b> Ununseptium 399	400 <b>Uub</b> Ununseptium 400

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

**a** = relative atomic mass  
**x** = atomic symbol  
**b** = proton (atomic) number

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

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