Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

CHEMISTRY **5070/12**

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

1 hour

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB recommended)

9697448638

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.

This document consists of **13** printed pages and **3** blank pages.

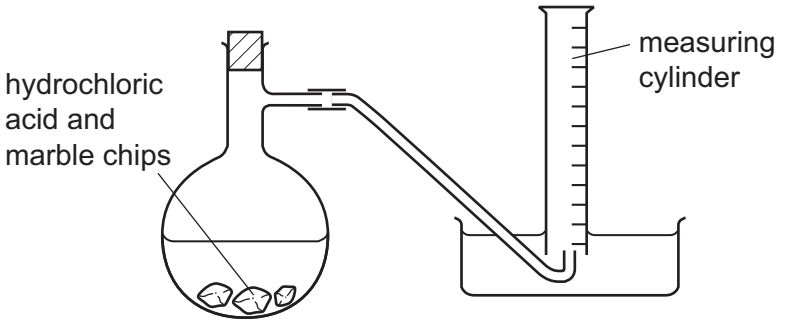
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1 A student wants to carry out an experiment to follow the rate of the reaction between hydrochloric acid and marble chips.

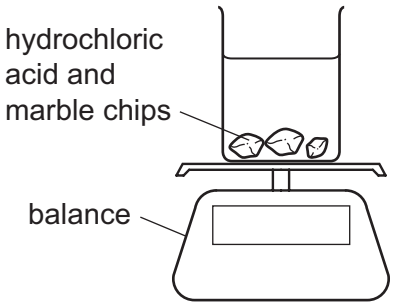
$$CaCO_3 + 2HCl \rightarrow CaCl_2 + CO_2 + H_2O$$

Which diagrams show apparatus that is suitable for this experiment?

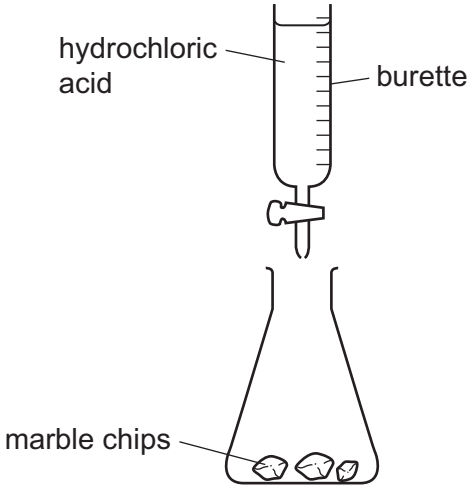
1



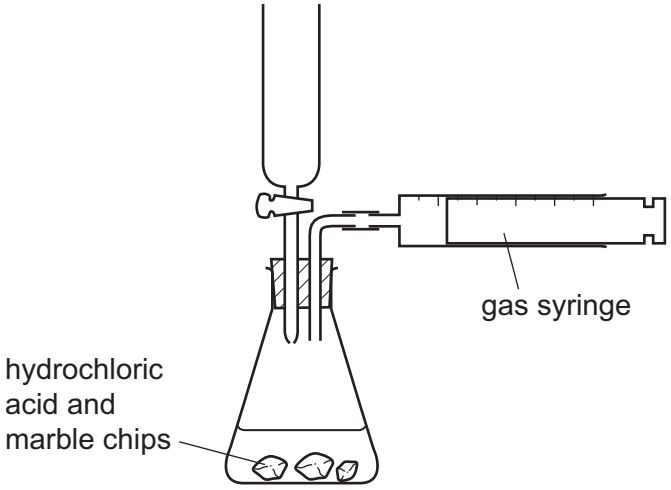
2



3



4



A 1 and 2 only **B** 1 and 3 only **C** 1 and 4 only **D** 1, 2 and 4

2 Solutions of lead(II) nitrate and potassium iodide are mixed together in the preparation of lead(II) iodide.

Which method can be used to separate the lead(II) iodide from the mixture?

A crystallisation

B distillation

C evaporation

D filtration

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3 A small amount of aqueous copper(II) sulfate is put into a test-tube. A few drops of aqueous ammonia are added to the test-tube. Then an excess of aqueous ammonia is added to the same test-tube.

What are the two observations?

	few drops of aqueous ammonia	excess aqueous ammonia
A	light blue precipitate	dark blue solution
B	light blue precipitate	light blue precipitate
C	dark blue solution	dark blue solution
D	dark blue solution	light blue precipitate

4 An atom of element *Z* has 14 neutrons and 13 protons.

It forms a positive ion.

How many electrons does the ion of *Z* have?

A 10 **B** 13 **C** 14 **D** 27

5 Which gas is **neither** an element **nor** a compound?

A ammonia

B chlorine

C air

D carbon monoxide

6 Why does ammonia gas diffuse faster than hydrogen chloride gas?

A Ammonia has a higher boiling point than hydrogen chloride.

B Ammonia is a base, hydrogen chloride is an acid.

C The ammonia molecule contains more atoms than a hydrogen chloride molecule.

D The relative molecular mass of ammonia is smaller than that of hydrogen chloride.

7 The compound formed between elements *X* and *Y* is ionic.

Which statement about elements *X* and *Y* is correct?

A *X* and *Y* are both at the left-hand side of the Periodic Table.

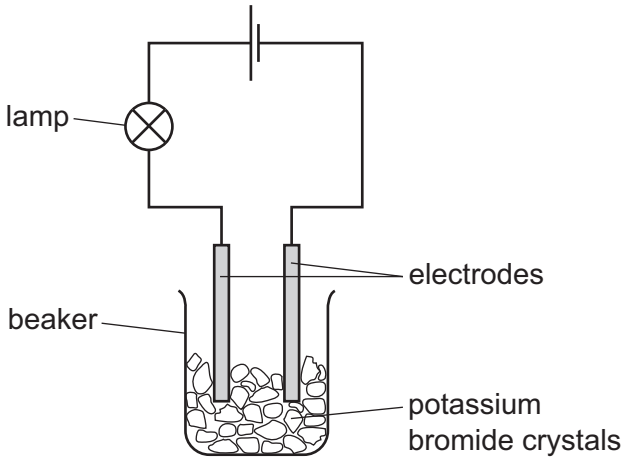
B *X* and *Y* are both at the right-hand side of the Periodic Table.

C *X* and *Y* are both transition elements.

D *X* is at the opposite side of the Periodic Table from element *Y*.

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8 The experiment shown is used to test potassium bromide crystals.



The lamp does not light.

Distilled water is then added to the beaker and the lamp lights.

Which statement explains these results?

A Electrons are free to move in the solution when potassium bromide dissolves.

B Metal ions are free to move when potassium bromide melts.

C Metal ions are free to move when potassium reacts with water.

D Oppositely charged ions are free to move in the solution when potassium bromide dissolves.

9 How many electrons are used in covalent bonding in the N_2 molecule?

A 2 **B** 4 **C** 6 **D** 10

10 Propene, $CH_3CH=CH_2$, has a very low boiling point because of the weakness of the

A C–C bond.

B C=C bond.

C C–H bond.

D intermolecular forces.

11 What is the empirical formula of a compound containing 12 g of carbon, 2 g of hydrogen and 16 g of oxygen only?

A CHO **B** CHO_2 **C** CH_2O **D** C_2HO

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12 What is the correct equation for the reaction taking place at the negative electrode when molten magnesium chloride is electrolysed using inert electrodes?

A $Cl^- \rightarrow Cl + e^-$

B $2Cl^- \rightarrow Cl_2 + 2e^-$

C $Mg^+ + e^- \rightarrow Mg$

D $Mg^{2+} + 2e^- \rightarrow Mg$

13 Which fertiliser contains the greatest percentage by mass of nitrogen?

A $(NH_4)_2HPO_4$ $M_r = 132$

B $(NH_4)_2SO_4$ $M_r = 132$

C NH_4NO_3 $M_r = 80$

D $CO(NH_2)_2$ $M_r = 60$

14 A volume of ethane, C_2H_6, at r.t.p. has a mass of 20 g.

What is the mass of an equal volume of propene, C_3H_6, at r.t.p.?

A 20 g **B** 21 g **C** 28 g **D** 42 g

15 Which of these processes are both endothermic?

A combustion, cracking

B combustion, fermentation

C cracking, photosynthesis

D fermentation, photosynthesis

16 Ethanol is produced by the fermentation of glucose from sugar cane. In some countries ethanol is used as a fuel.

Which statements are correct?

1 Sugar cane is a non-renewable (finite) resource.

2 When sugar cane is growing it removes carbon dioxide from the atmosphere.

A 1 only

B 2 only

C both 1 and 2

D neither 1 nor 2

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17 Which row correctly classifies the oxides in the table?

	carbon dioxide	copper(II) oxide	zinc oxide
A	acidic	amphoteric	basic
B	acidic	basic	amphoteric
C	acidic	neutral	amphoteric
D	basic	neutral	neutral

18 Sulfur is burnt in air.

Which statement about this reaction is correct?

A The gas formed turns aqueous potassium dichromate(VI) from green to orange.

B The product is used as a food preservative.

C The reaction is endothermic.

D The reaction is reversible.

19 Which method is used to obtain chlorine from aqueous sodium chloride?

A crystallisation

B distillation

C electrolysis

D filtration

20 The equation shows the reaction for the formation of sulfur trioxide using a catalyst.

$$2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g) \qquad \Delta H = -197\,kJ/mol$$

Which change in reaction conditions would produce more sulfur trioxide?

A adding more catalyst

B decreasing the pressure

C increasing the temperature

D removing some sulfur trioxide

21 How many of these salts are soluble in water?

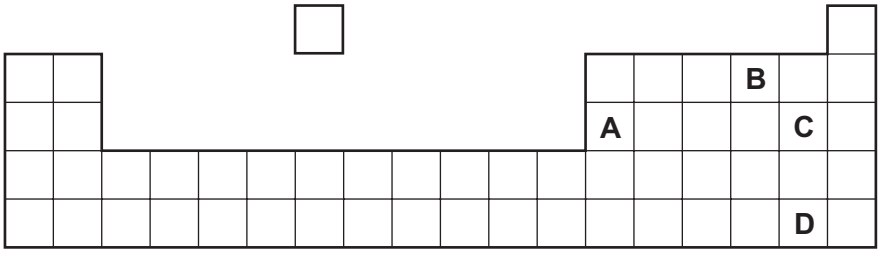
$AgCl$ $Ca(NO_3)_2$ $(NH_4)_2SO_4$ $PbCO_3$

A 1 **B** 2 **C** 3 **D** 4

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22 The positions of four elements are shown on the outline of part of the Periodic Table.

Which element is a solid non-metal at r.t.p.?



23 Which statements about fertilisers containing nitrates are correct?

1 They increase plant growth.

2 Nitrates dissolve in water.

3 Eutrophication is caused by nitrates from farmland entering rivers.

4 If nitrates are applied to alkaline soils they produce ammonia gas.

A 1 and 3 only **B** 1, 2 and 3 **C** 1, 2 and 4 **D** 2 and 3 only

24 Which is a property of the element molybdenum, $^{96}_{42}Mo$?

A low density

B low melting point

C forms white or colourless compounds

D has more than one oxidation state

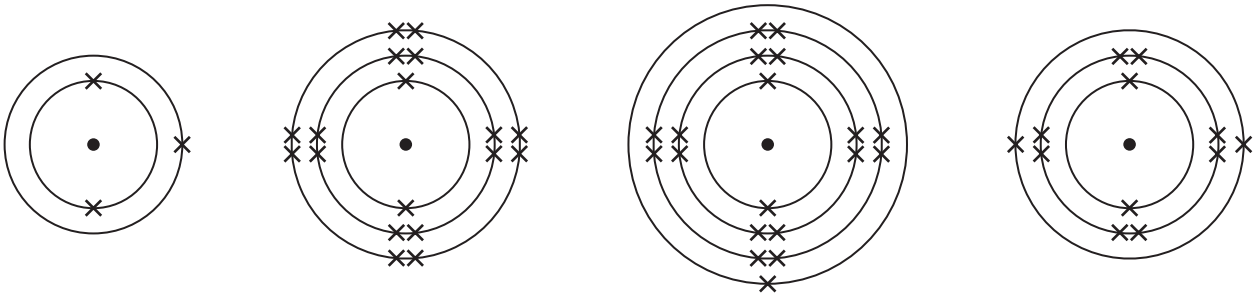
25 In the Periodic Table, how many periods are needed to accommodate the elements of atomic numbers 1-18?

A 2 **B** 3 **C** 4 **D** 8

26 The diagram shows the arrangement of electrons in the atoms of four different elements.

Which is the **least** reactive of the four elements?

A **B** **C** **D**



27 A gas **G**

1 has no smell,

2 is not poisonous,

3 reacts with hydrogen at high temperature and pressure.

What is gas **G**?

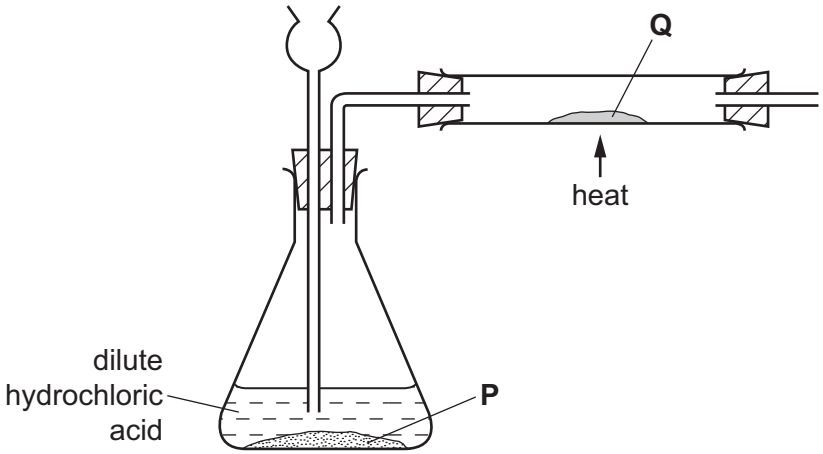
A carbon monoxide

B helium

C nitrogen

D chlorine

28 Substance **P** reacts with dilute hydrochloric acid to produce a gas.
This gas reduces substance **Q**.



What are substances **P** and **Q**?

	P	Q
A	copper	copper(II) oxide
B	lead	lead(II) oxide
C	magnesium	zinc oxide
D	zinc	copper(II) oxide

29 Iron rusts when exposed to oxygen in the presence of water.

Which method will **not** slow down the rate of rusting of an iron roof?

A attaching strips of copper to it

B coating it with plastic

C galvanising it with zinc

D painting it

30 The solid carbonates of three metals, *W*, *X* and *Y*, are heated.

	result
carbonate of *W*	carbon dioxide given off solid changes colour from green to black
carbonate of *X*	carbon dioxide given off solid does not change colour
carbonate of *Y*	carbon dioxide not given off solid does not change colour

Which statements are correct?

1 Metal *Y* is more reactive than metal *X*.

2 Metal *W* is a transition metal.

3 If dilute nitric acid is added to all three carbonates, carbon dioxide is given off from the carbonates of *W* and *X* but not from the carbonate of *Y*.

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

31 Bond breaking is an endothermic process and bond making is an exothermic process.

For which change is it **not** possible, from the equation, to deduce whether the reaction is endothermic or exothermic?

A $Cl_2(g) \rightarrow 2Cl(g)$

B $H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$

C $H_2O(g) \rightarrow 2H(g) + O(g)$

D $H(g) + Cl(g) \rightarrow HCl(g)$

32 Which row is correct for the reaction of the alkene with steam and a catalyst?

	alkene	product
A	$CH_3CH=CH_2$	$CH_3CH(OH)CH_3$ only
B	$CH_3CH_2CH=CH_2$	$CH_3CH_2CH_2CH_2OH$ only
C	$CH_3CH=CHCH_3$	$CH_3CH(OH)CH_2CH_3$ only
D	$(CH_3)_2C=CH_2$	$(CH_3)_2CHCH_2OH$ only

33 Why is carbon used in water purification?

A It acts as a filter to remove insoluble solids.

B It desalinates the water.

C It disinfects the water.

D It removes tastes and odours.

34 Which of the statements about the preparation and properties of ammonia is correct?

A Ammonia is formed when ammonium chloride is heated with an acid.

B Ammonia reacts with sodium hydroxide solution to form a salt and water.

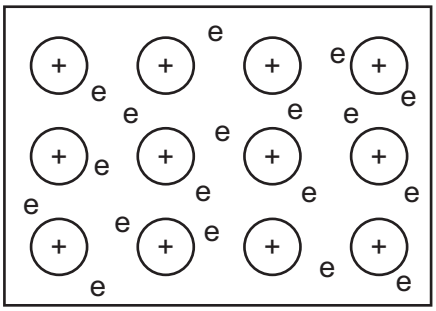
C Ammonia reacts with water to form hydrogen ions.

D A solution of ammonia in water has a pH greater than 7.

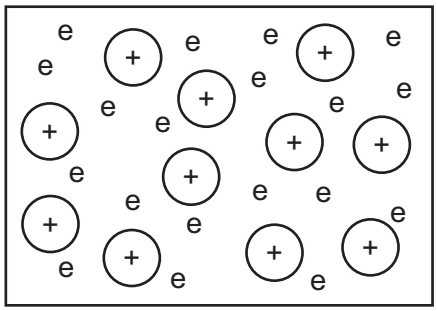
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35 Which structure represents that of an alloy?

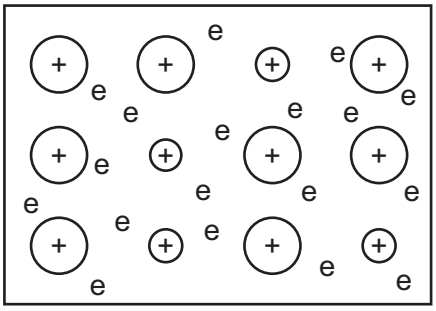
A



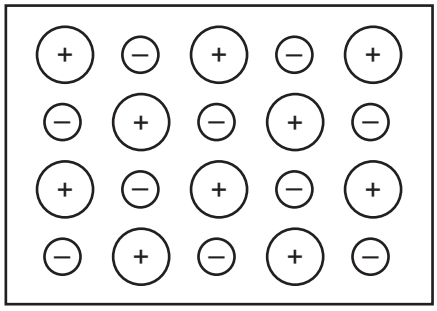
B

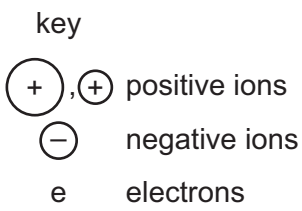


C



D





36 Which statement is **not** correct?

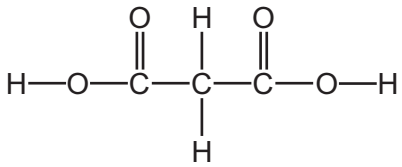
A Carbohydrates, proteins and fats are all natural macromolecules.

B *Terylene* contains the same linkages as a protein.

C When a carbohydrate is hydrolysed, sugars are formed.

D When a protein is hydrolysed, amino acids are formed.

37 Which statements would be true of the compound which has the formula shown?



1 It would react with excess aqueous sodium hydroxide in a 1 : 1 molar ratio.

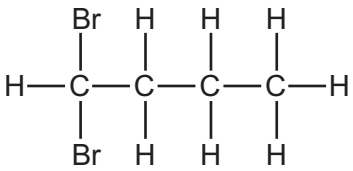
2 In aqueous solution, it would have a pH of 9.5.

3 It would react with an alcohol to form an ester.

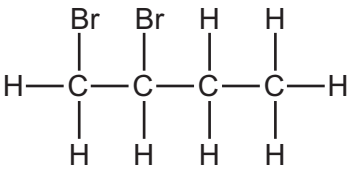
A 1 only **B** 1 and 2 **C** 2 and 3 **D** 3 only

38 When butene reacts with bromine, which compound could be made?

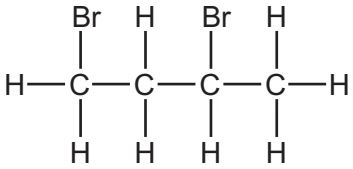
A



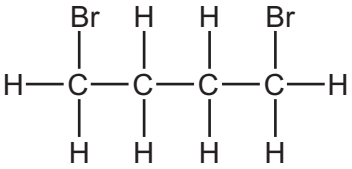
B



C



D



39 Methane is the first member of the alkane series of hydrocarbons. The second member is ethane.

Which statements about ethane are correct?

1 Ethane has the formula C_2H_4.

2 Ethane has a higher boiling point than that of methane.

3 Ethane has the same molecular formula as methane.

4 Ethane has chemical properties very similar to those of methane.

A 1, 2 and 3 **B** 1 and 4 **C** 2 and 4 **D** 3 only

40 When ethanol reacts with ethanoic acid, the ester ethyl ethanoate is formed.

$$C_2H_5OH + CH_3CO_2H \rightarrow CH_3CO_2C_2H_5 + H_2O$$

What is the formula of the ester formed when methanol reacts with butanoic acid, $C_3H_7CO_2H$?

A $C_2H_5CO_2C_2H_5$

B $C_3H_7CO_2C_2H_5$

C $CH_3CO_2C_3H_7$

D $C_3H_7CO_2CH_3$

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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												
										11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10		
7 Li Lithium 3	9 Be Beryllium 4									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		
23 Na Sodium 11	24 Mg Magnesium 12									70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36		
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	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
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.).

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