EXAMINATIONS COUNCIL OF LESOTHO
Lesotho General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | | CANDIDATE NUMBER | | | | | | | | | |

PHYSICAL SCIENCE

Paper 1

0181/01

October/November 2018

45 minutes

Marks: 40

Candidates answer all questions on the Question Paper.

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

708

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.

A017

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

1 A student buys his father a can of Sesotho beer.

Which of these instruments would be suitable to determine the volume of alcohol in the beer?

A beaker

B conical flask

C measuring cylinder

D pipette

2 A girl walked 15 m in 10 seconds to a nearby shop. She spent 5 seconds in a shop, and walked home in 15 seconds.

Which of the graphs best describes her journey to and from the shop?

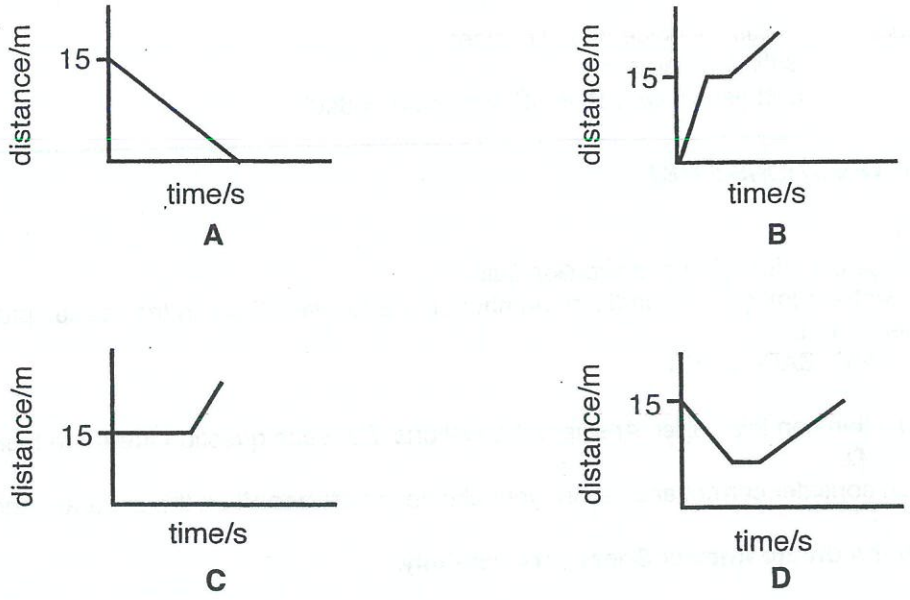

Fig. 2.1

3 A boy roasts some maize on a metal pan as shown in Fig. 3.1.

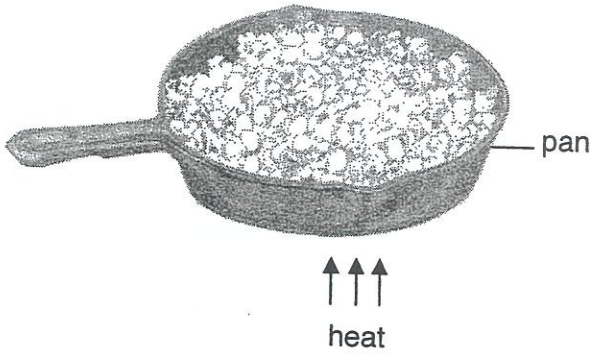

Fig. 3.1

How is thermal energy (heat) from the flame transferred to the maize?

A conduction

B convection

C expansion

D radiation

4 Which of the following appliances, main transfer is electrical energy to kinetic energy?

A kettle

B iron

C television

D washing machine

5 A wave hits a barrier in a ripple tank. Four wavefronts hit the barrier every second. The wavelength of the wave is 0.03 m.

What is the speed of the wave?

A 0.008 m/s

B 0.03 m/s

C 0.12 m/s

D 4 m/s

6 Fig. 1 shows a solar panel connected to water tanks to warm water. The inside of surface **X** is covered with aluminium foil.

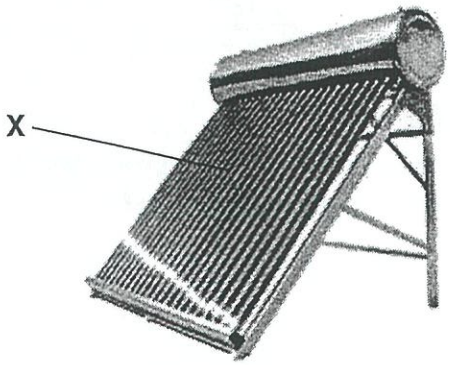

Fig. 6.1

What is the purpose of using aluminium foil on surface **X**?

A to absorb solar radiation

B to emit solar radiation

C to radiate solar radiation

D to reflect solar radiation

7 The frequency of a musical note is 64 Hz. The frequency of the note is then doubled.

Which statement is correct?

A the amplitude of the sound decreases

B the pitch of the note increases

C the velocity of the sound in the air decreases

D the wavelength of the sound wave increases

8 A loudspeaker produces a sound that is transmitted by air. Fig. 8.1 represents successive compressions and rarefactions produced.

Which labelled distance is the wavelength?

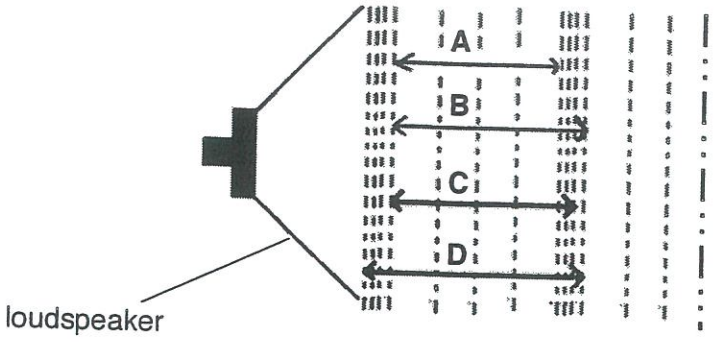

Fig. 8.1

9 Fig. 9.1 shows an object O placed in front of a thin converging lens of focal point F.

At what point will the position of image of P be located?

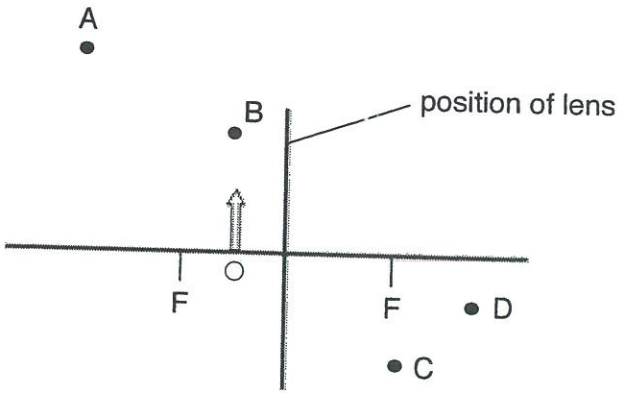

Fig. 9.1

10 Which of these hazards is present when handling electrical equipment that has damaged insulation?

A electric shock

B explosion

C short circuit

D overheating

11 A and B are identical lamps operated by switches **X** and **Y** as shown in the circuit.

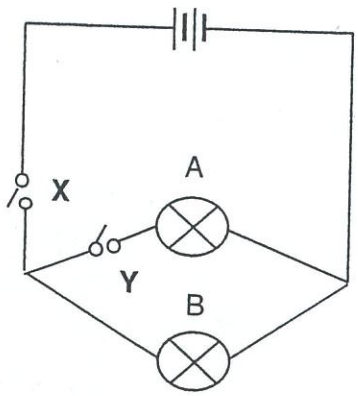

Fig. 11.1

What happens to the lamps if only switch **X** is closed?

A lamp A lights up

B lamp B lights up

C lamps A and B will both be off

D lamps A and B light up

12 Fig. 12.1 shows four different circuits. The cells and lamps in each circuitare identical.

Which circuit diagram produces the brightest light?

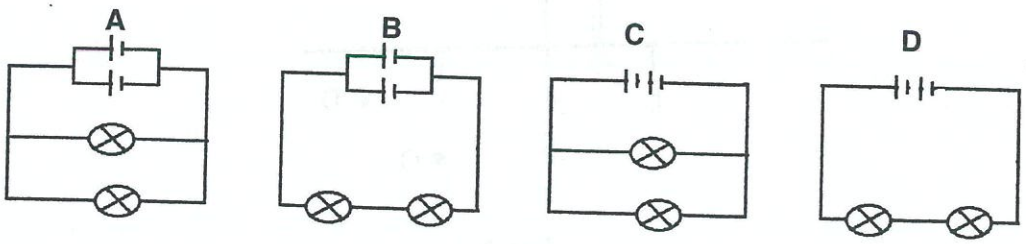

Fig. 12.1

13 A student wants to design a d.c. motor for a science project.

Which of these will **not** make the motor turn faster?

A increased the voltage to the motor

B use more turns of wire in the coil

C use less turns of wire in the coil

D use stronger magnet in the motor

14 Fig. 14.1 shows a magnet inserted into a coil to generate electricity.

Which diagram shows the correct flow of current?

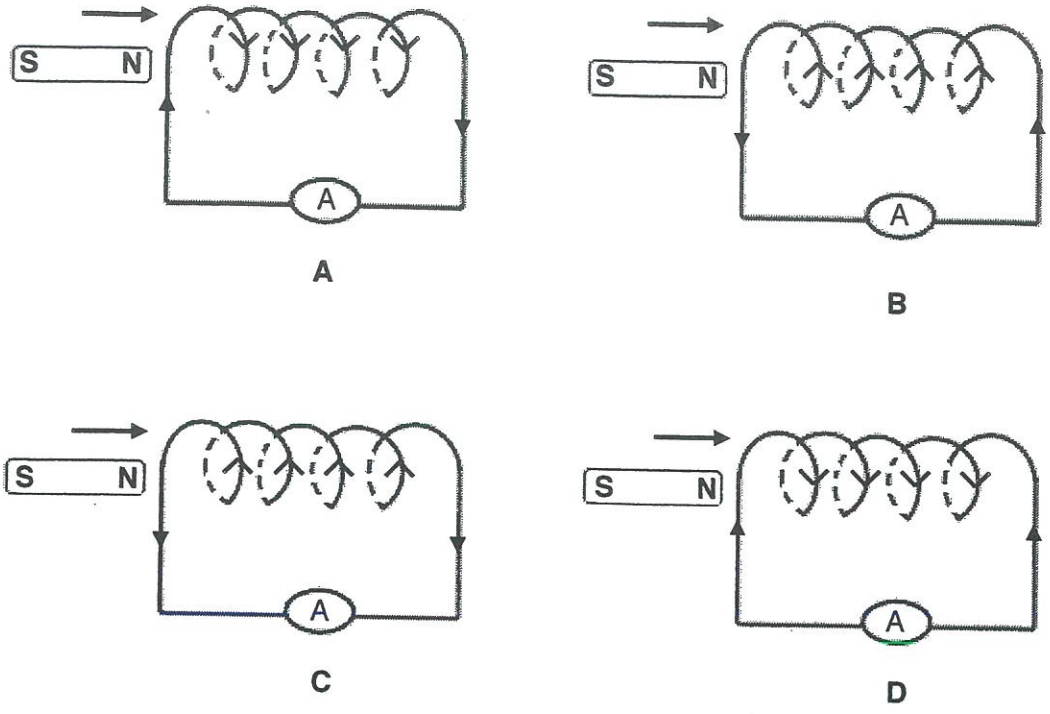

Fig. 14.1

15 Fig. 15.1 shows a lamp connected into a circuit. The ammeter reads 2A and a voltmeter reads 12V.

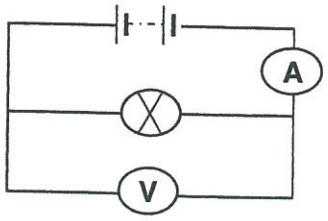

Fig. 15.1

What is the power of the lamp?

A 6W

B 10W

C 14W

D 24W

16 What is the main source of background radiation?

A cosmic rays

B nuclear power stations

C the sun

D uranium mines

17 Which statement about an alpha particle is **not** correct?

A It is a helium nucleus.

B It is more penetrating than beta-particles.

C It is positively charged.

D It can ionize atoms in the air.

18 A radioactive isotope has a half-life of 1 minute. What fraction of the isotope remains after 4 minutes?

A $\frac{1}{16}$

B $\frac{1}{4}$

C $\frac{3}{4}$

D $\frac{15}{16}$

19 A radioactive source is brought near to a negatively charged gold leaf electroscope.
The gold leaf gradually falls.

Which statement best explains the result?

A Electrons are added to the gold leaf.

B The air surrounding the gold leaf is ionised.

C A magnet field is created around the gold leaf.

D The radiation from the source penetrates the gold leaf.

20 Fig. 20.1 shows a decay curve for radioactive radon-222.

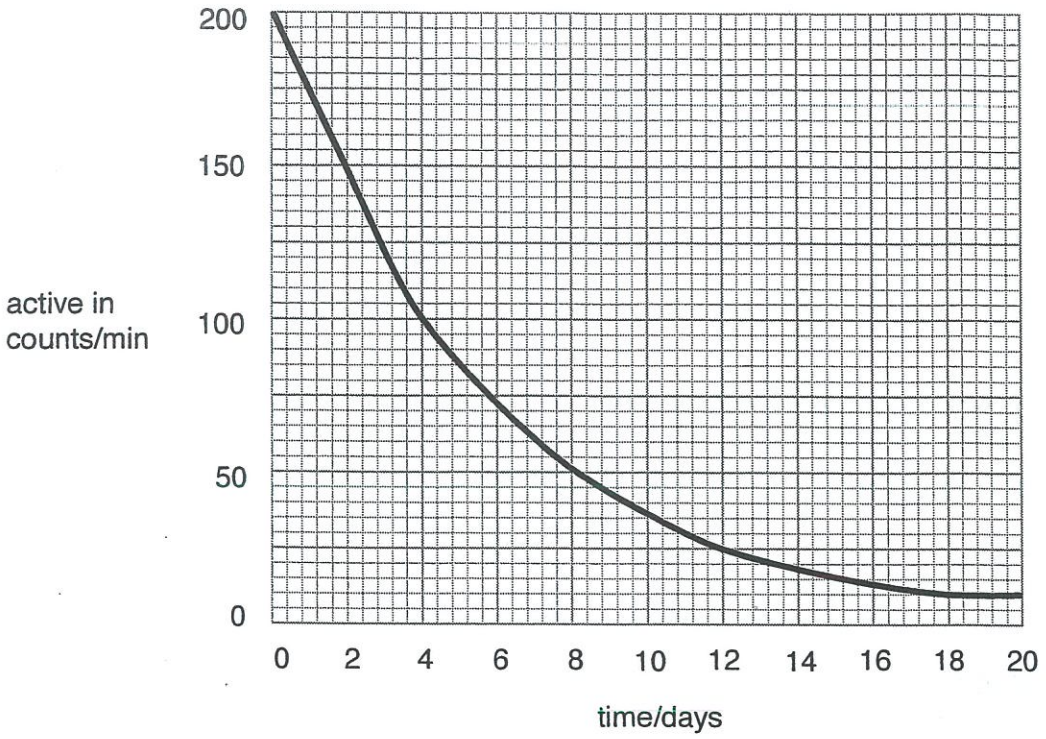

Fig. 20.1

What is the half-life of radon-222?

A 4 days

B 20 days

C 50 days

D 100 days

21 Which one of the following pairs represents two atoms with the same number of neutrons?

A $^{12}_{6}C$ and $^{14}_{6}C$

B $^{12}_{6}C$ and $^{24}_{12}Mg$

C $^{19}_{9}F$ and $^{20}_{10}Ne$

D $^{59}_{27}Co$ and $^{59}_{28}Ni$

22 Bromine melts at −2 °C and boils at 59 °C.

At which temperature is bromine a liquid?

A −25 °C

B 25 °C

C 75 °C

D 125 °C

23 Element X has a proton number of 19.

What will be the electronic structure of the ion of X?

A 2, 8, 7

B 2, 8, 8

C 2, 8, 8,1

D 2, 8, 8, 8

24 Using the trend down group VII, which statement most likely describes astatine at room temperature and pressure?

A colourless liquid

B colourless solid

C dark liquid

D dark solid

25 The reaction between Methane and steam is shown. The reaction is not balanced.
CH_4 (g) + H_2O (g) → CO (g) + H_2 (g)

Which number should be used to balance the equation?

A 2

B 3

C 4

D 6

26 The total volume of hydrogen collected at regular intervals during the reaction between magnesium and dilute hydrochloric acid is shown in Table 26.1.

Table 26.1

time/s	0	10	20	30	40	50
Volume of hydrogen/cm^3	0	6	8	9	9	9

During which time interval was the highest volume of gas produced?

A 0 to 10 s

B 10 to 20 s

C 20 to 30 s

D 30 to 40 s

27 Table 27.1 shows an acid level in the burette at the start and end of a neutralization reaction.

Table 27.1

Volume of acid in burette at start/cm^3	**Volume of acid in burette after neutralization/cm^3**
0.75	27.4

What volume of acid was added from the burette?

A 26.6 cm^3

B 27.3 cm^3

C 27.4 cm^3

D 28.7 cm^3

28 A ceramic material has a giant covalent structure.

Which of the following properties is not likely to be a property of the ceramic material?

A very high melting point

B poor thermal conductivity

C good electrical conductivity

D very hard

[Turn over

29 Copper and copper (II) chloride solution both conduct electricity.

Which particles are responsible for conduction of electricity for each of these substances?

	copper	copper (II) chloride solution
A	electrons	electrons
B	electrons	positive and negative ions
C	positive ions	electrons
D	positive ions	positive and negative ions

30 Which set of gases contribute to acidic rain?

A CFCs and ozone

B carbon dioxide and methane

C sulphur dioxide and oxides of nitrogen

D methane and sulphur dioxide

31 Solution Y is a solution of a copper salt. It reacts with acidified barium nitrate and a white precipitate forms from the reaction.

Which of these salts is contained in solution Y?

A copper (II) carbonate

B copper (II) chloride

C copper (II) nitrate

D copper (II) sulphate

32 Fig. 32.1 show structures of organic substances.

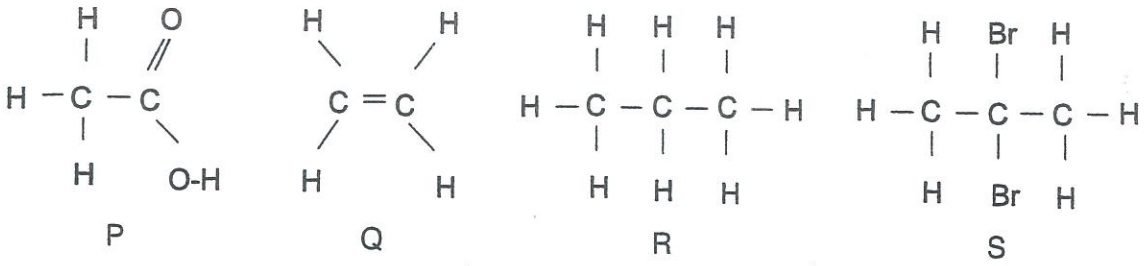

Fig. 32.1

Which pair of substances contains a saturated hydrocarbon and an unsaturated hydrocarbon?

	saturated	**unsaturated**
A	P	Q
B	P	S
C	R	Q
D	S	R

33 Which of these fuels, when burned, have the least impact on the environment?

A hydrogen

B petrol

C propane

D uranium

34 What is the colour change of anhydrous cobalt chloride when moistened?

A blue to white

B blue to pink

C pink to blue

D white to blue

35 Which set of substances is involved in the Haber process?

	reactants		product
A	ammonia	hydrogen	nitrogen
B	carbon dioxide	limestone	lime
C	hydrogen	nitrogen	ammonia
D	lime	carbon dioxide	limestone

36 Which element burns in air to form an oxide that will produce a solution with pH greater than seven when shaken with water?

A carbon

B calcium

C hydrogen

D sulphur

37 An element W has the following properties

- forms an acidic oxide
- good conductor of electricity

Which element is likely to be W?

A carbon

B fluorine

C magnesium

D silver

38 Which of the following is a compound?

A bronze

B clean air

C lime

D sea water

39 Which of the substances is correctly matched with its involvement in an industrial process?

	substance	industrial process
A	carbon monoxide	extraction of aluminium
B	magnesium	galvanizing
C	glucose	brewing
D	ethane	polymerization

40 Fig. 40 1 shows four different metals reacting with the same dilute acid.

Which is the most reactive metal?

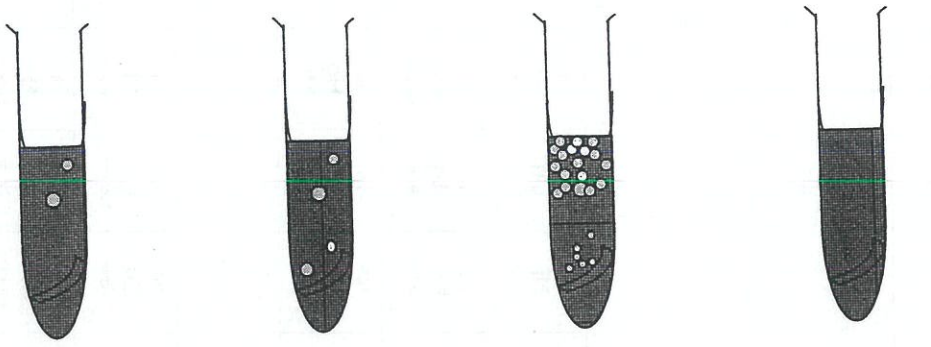

Fig. 40 1

DATA SHEET
The Periodic Table of the Elements

Group I	Group II											Group III	Group IV	Group V	Group VI	Group VII	Group 0
							1 H Hydrogen 1										4 He Helium 2
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	209 Po Polonium 84	210 At Astatine 85	222 Rn Radon 86
223 Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 †															

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	147 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	231 Pa Protactinium 91	238 U Uranium 92	237 Np Neptunium 93	244 Pu Plutonium 94	243 Am Americium 95	247 Cm Curium 96	247 Bk Berkelium 97	251 Cf Californium 98	252 Es Einsteinium 99	257 Fm Fermium 100	258 Md Mendelevium 101	259 No Nobelium 102	260 Lr Lawrencium 103

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

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

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).