Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/11**

Paper 1 Multiple Choice **May/June 2015**

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 20.
Electronic calculators may be used.

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1 Which is a characteristic of all living things?

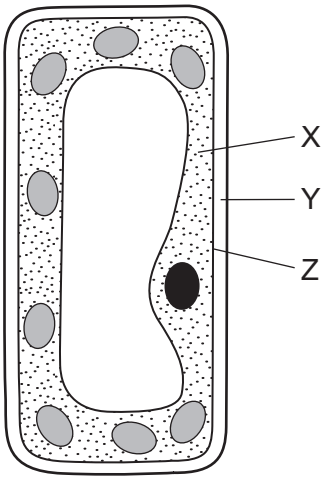
A a heart

B breathing

C excretion

D sexual reproduction

2 The diagram shows a typical plant cell.



Which row is correct?

	cell membrane	cell wall	cytoplasm
A	X	Y	Z
B	X	Z	Y
C	Z	X	Y
D	Z	Y	X

3 What is diffusion?

A the net movement of molecules from a region of their higher concentration to a region of their lower concentration down a concentration gradient

B the net movement of molecules from a region of their higher concentration to a region of their lower concentration up a concentration gradient

C the net movement of molecules from a region of their lower concentration to a region of their higher concentration down a concentration gradient

D the net movement of molecules from a region of their lower concentration to a region of their higher concentration up a concentration gradient

4 What is an enzyme?

A a carbohydrate that assists in the digestion of the contents of the stomach

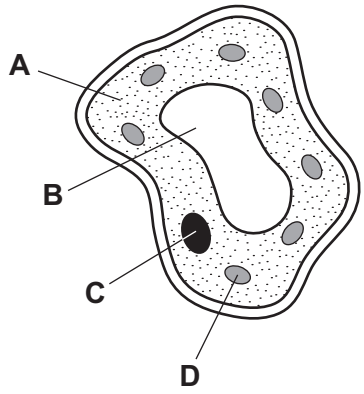
B a chemical that absorbs light for photosynthesis

C a chemical that alters the activity of a target organ

D a protein that alters the rate of a chemical reaction

5 The diagram shows a section through a cell from a leaf.

Which part makes simple sugars using light?



6 In a balanced diet, which constituents provide most energy?

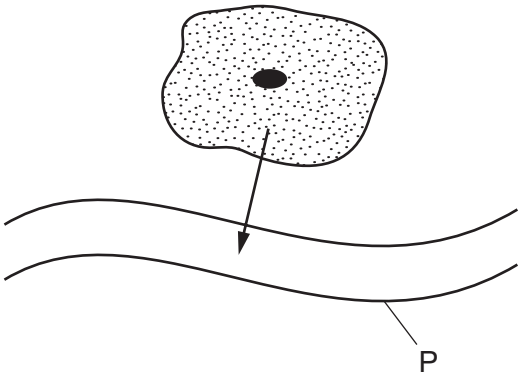
A carbohydrate and protein

B fat and carbohydrate

C fat and fibre

D vitamins and protein

7 The arrow shows urea leaving a cell and passing into structure P.



What is P?

A a capillary

B an artery

C a vein

D the small intestine

8 A person touches a hot object which triggers a reflex action.

In which order does the signal travel in the reflex arc?

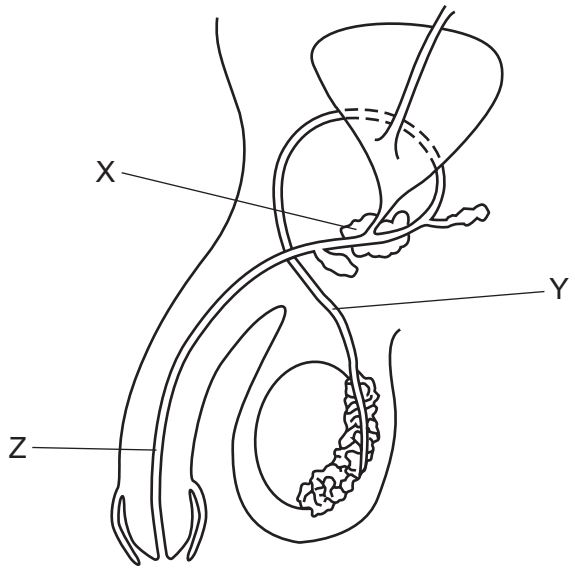
A relay neurone → spinal cord → sensory neurone

B sensory neurone → spinal cord → motor neurone

C spinal cord → sensory neurone → stimulus

D stimulus → motor neurone → spinal cord

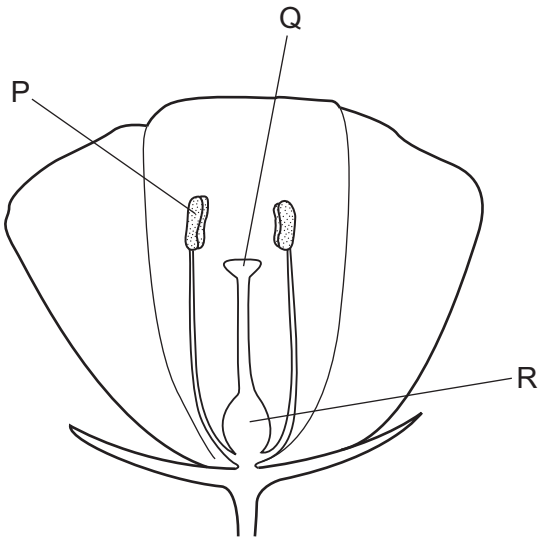
9 The diagram shows the male reproductive system.



Which row identifies structures X, Y and Z?

	urethra	sperm duct	prostate gland
A	X	Y	Z
B	X	Z	Y
C	Z	X	Y
D	Z	Y	X

10 The diagram shows a section through an insect-pollinated flower.



What are the functions of P, Q and R?

	P	Q	R
A	to produce ovules	to produce pollen	to receive pollen
B	to produce pollen	to produce ovules	to receive pollen
C	to produce pollen	to receive pollen	to produce ovules
D	to receive pollen	to produce pollen	to produce ovules

11 Which process is responsible for the flow of energy along a food chain?

A excretion

B feeding

C respiration

D seed dispersal

12 Which gas has the biggest greenhouse effect?

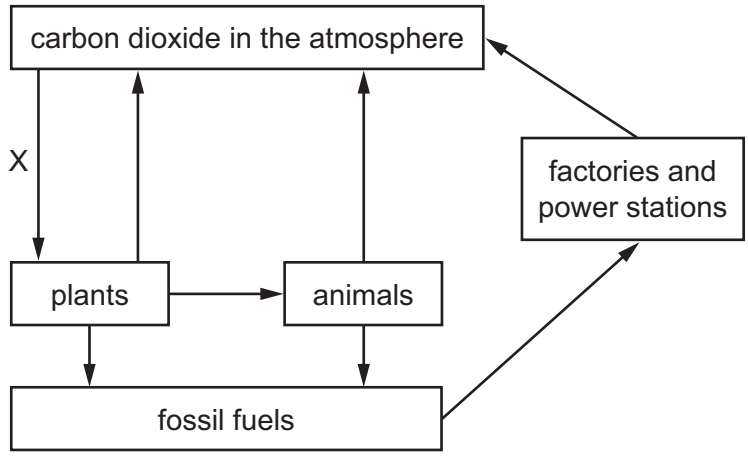
A carbon monoxide

B methane

C nitrogen

D oxygen

13 The diagram shows part of the carbon cycle.



What process does X represent?

A combustion

B decay

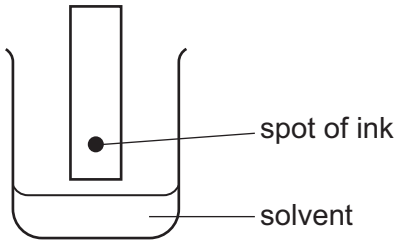
C photosynthesis

D respiration

14 The colours in an ink can be separated by chromatography.

Which diagram shows the correct way to set up the apparatus?

A



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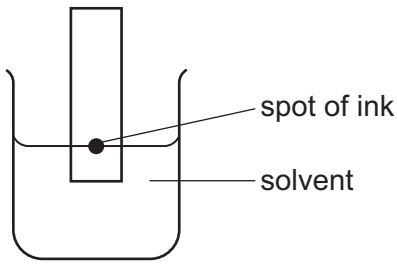
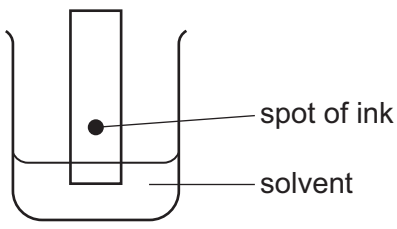
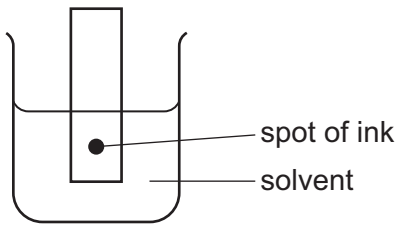


C

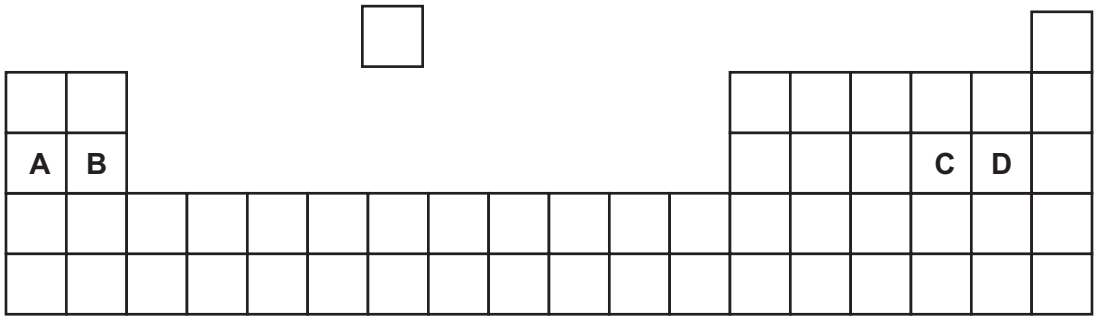


D



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

Which element forms an ion with a charge of 2+?



16 What are the products of the electrolysis of dilute sulfuric acid using inert electrodes?

A hydrogen and oxygen

B hydrogen and sulfur dioxide

C oxygen and sulfur

D oxygen and sulfur dioxide

17 Which change occurs in all exothermic reactions?

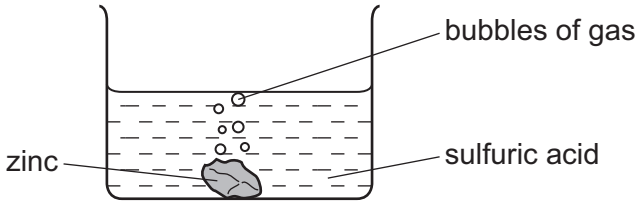
A Bubbles of gas are released from the mixture.

B Light energy is produced.

C The temperature of the mixture decreases.

D The temperature of the mixture increases.

18 The diagram shows zinc reacting with sulfuric acid.



Which change does **not** increase the speed of the reaction?

A adding a catalyst

B increasing the concentration of sulfuric acid

C increasing the temperature of sulfuric acid

D reducing the surface area of zinc

19 Hydrogen and oxygen react explosively to form water.

Which words describe this reaction?

	combustion	oxidation
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key
✓ = yes
✗ = no

20 Four substances are added to an acid.

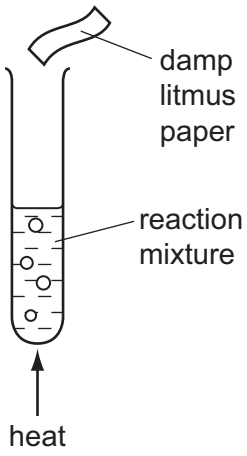
The substances are

1 calcium oxide
2 magnesium carbonate
3 sodium chloride
4 sodium hydroxide

Which substances neutralise the acid?

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

21 The diagram shows a chemical reaction that produces a gas.



The gas bleaches damp litmus paper.

What is the gas?

A ammonia

B chlorine

C hydrogen

D oxygen

22 Which statement about the elements in Group VII of the Periodic Table is correct?

A Chlorine displaces bromine from potassium bromide.

B The colour of the elements becomes darker up the group.

C The melting point of the elements decreases down the group.

D The reactivity of the elements increases down the group.

23 The table shows information about some minerals.

mineral	chemical formula
bauxite	Al_2O_3
galena	PbS
hematite	Fe_2O_3
rutile	TiO_2

Which minerals contain a transition element?

A bauxite and galena

B bauxite and hematite

C galena and rutile

D hematite and rutile

24 Two tests are done on material Y.

The tests show that Y conducts electricity and is soft.

What is Y?

A copper

B lithium

C sodium chloride

D sulfur

25 Which process does **not** produce carbon dioxide?

A complete combustion of fossil fuels

B reaction of an acid with a carbonate

C respiration in plants

D rusting iron

[Turn over

26 Lime is manufactured from limestone and is used for treating industrial waste.

Which row describes the type of reaction involved in the manufacture of lime and in the treatment of industrial waste?

	manufacture	waste treatment
A	reduction	neutralisation
B	reduction	oxidation
C	thermal decomposition	neutralisation
D	thermal decomposition	oxidation

27 A fuel used for cooking food is the hydrocarbon …1… that burns in an …2… reaction.

Which words correctly complete gaps 1 and 2?

	1	2
A	coke	endothermic
B	coke	exothermic
C	methane	endothermic
D	methane	exothermic

28 The circuit of a motor racing track is 3.0 km in length. In a race, a car goes 25 times round the circuit in 30 minutes.

What is the average speed of the car?

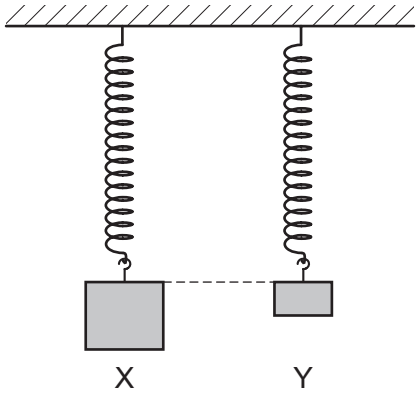
A 75 km / hour

B 90 km / hour

C 150 km / hour

D 750 km / hour

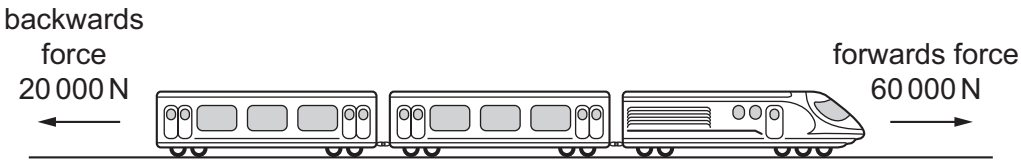
29 Two objects X and Y are suspended from identical springs. Both springs extend by the same amount.



What does this show about the masses and about the weights of objects X and Y?

	masses	weights
A	mass X is greater than mass Y	weight X is greater than weight Y
B	mass X is greater than mass Y	weight X is equal to weight Y
C	mass X is equal to mass Y	weight X is equal to weight Y
D	mass X is equal to mass Y	weight X is less than weight Y

30 A train travels along a horizontal track at constant speed. Two of the forces acting on the train are shown in the diagram.



A force of air resistance is also acting on the train to give it a resultant force of zero.

What is this air resistance force?

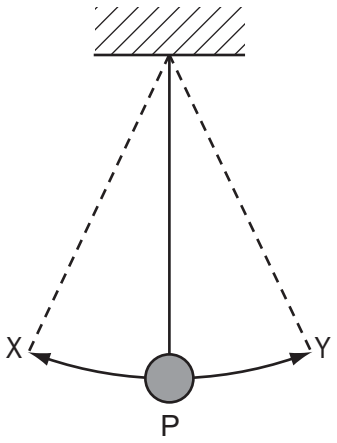
A 40 000 N backwards

B 80 000 N backwards

C 40 000 N forwards

D 80 000 N forwards

31 The diagram shows an object attached to a thread, swinging between point X and point Y, passing through point P.



Which row best describes the kinetic energy and the gravitational energy of the object when it is passing through point P?

	kinetic energy	gravitational energy
A	maximum	maximum
B	maximum	minimum
C	minimum	maximum
D	minimum	minimum

32 To keep a bottle of fruit juice cool on a hot day, it is wrapped in a cloth soaked in water.

Why is this method successful?

A Water has a high boiling point.

B Water has a low melting point.

C Water is a poor conductor of heat.

D Water produces a cooling effect as it evaporates.

33 There is a vacuum between the double walls of a vacuum flask.

Which types of heat transfer are reduced by the vacuum?

A conduction, convection and radiation

B conduction and convection only

C conduction and radiation only

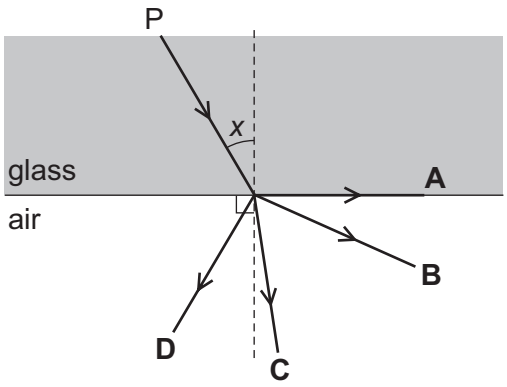
D convection and radiation only

34 Which row gives an example of a longitudinal wave and describes the direction of the vibrations?

	example of a longitudinal wave	vibrations
A	light wave	at right angles to the direction the wave travels
B	light wave	in the same direction as the wave travels
C	sound wave	at right angles to the direction the wave travels
D	sound wave	in the same direction as the wave travels

35 The diagram shows a ray of light travelling from P. Angle *x* is less than the critical angle.

In which labelled direction does the ray continue?



36 Which type of wave **cannot** travel through a vacuum?

A infra-red radiation

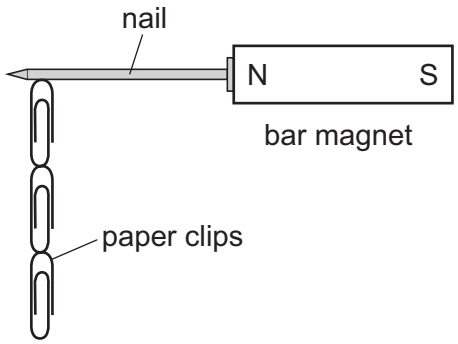
B microwaves

C sound waves

D X-rays

37 Four nails **A**, **B**, **C** and **D** are tested to find which makes the strongest permanent magnet.

One of the nails is placed against a bar magnet and the number of paper clips which the nail can support is recorded.

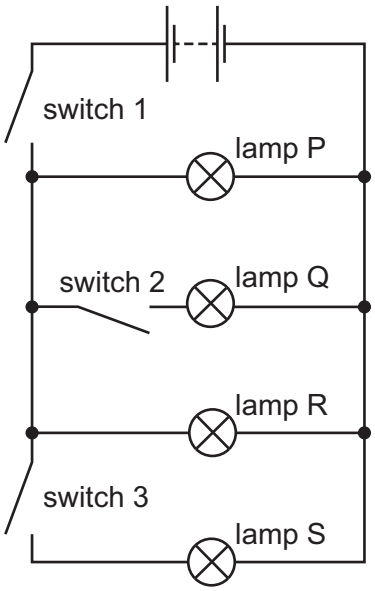


The bar magnet is then removed and the number of paper clips remaining attached to the nail is recorded. Each nail is tested in turn.

Which nail becomes the strongest permanent magnet?

nail	number of paper clips attached to the nail	
	bar magnet present	bar magnet removed
A	2	0
B	2	1
C	4	3
D	5	2

38 The circuit shown contains three switches and four lamps P, Q, R and S.



Which switches must be closed to light only lamps P and R?

A switch 1 only

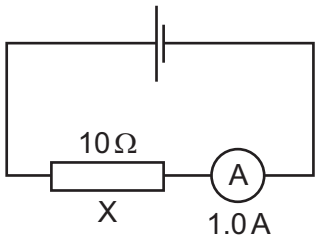
B switch 1 and switch 2 only

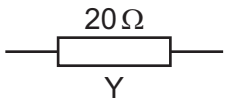
C switch 1 and switch 3 only

D switch 2 and switch 3 only

39 The diagram shows a circuit containing a 10 Ω resistor X and an ammeter. The ammeter reading is 1.0 A.

A 20 Ω resistor Y is also available.





Which change to the circuit produces a reading on the ammeter that is greater than 1.0 A?

A connecting Y in parallel with X

B placing X on the other side of the ammeter

C replacing X with Y

D reversing the connections to X

40 Which type of radiation has the greatest ionising effect?

A infra-red rays

B α–particles

C β–particles

D γ–rays

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DATA SHEET
The Periodic Table of the Elements

Group																	
I	II										III	IV	V	VI	VII	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	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.).