



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CO-ORDINATED SCIENCES

0654/11

Paper 1 Multiple Choice

October/November 2011

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**.

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



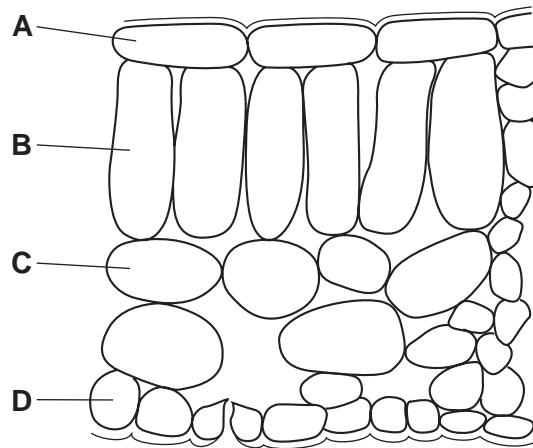
- 1 The binomial name for a tiger is *Panthera tigris* and for a lion, *Panthera leo*.

What do the scientific names show?

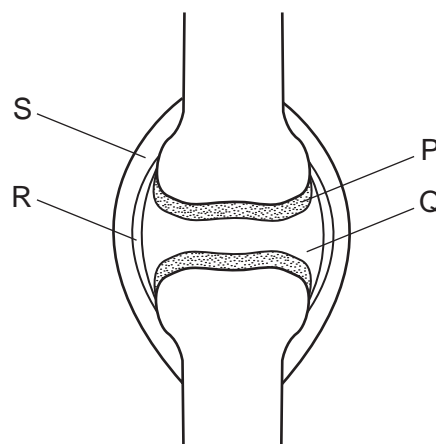
Lions and tigers

- A** are both in the same species.
B are genetically identical.
C can interbreed.
D have many features in common.
- 2 The diagram shows a section through a leaf.

Which layer of cells produces most sugar?



- 3 The diagram shows a synovial joint.



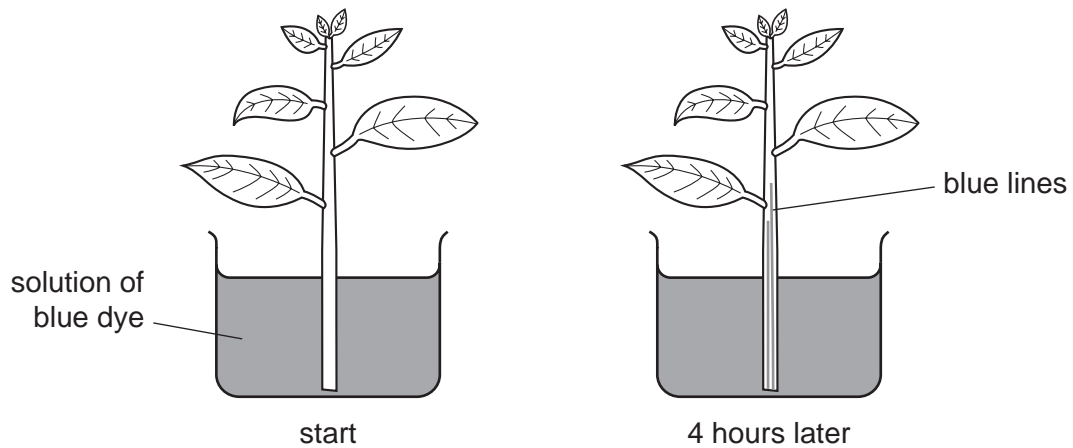
Which two parts prevent friction between the bones?

- A** P and Q **B** P and R **C** Q and R **D** Q and S

4 Why is a leaf first dipped into hot water when performing the starch test?

- A to make its membranes permeable
- B to make starch soluble
- C to remove air from intercellular spaces
- D to remove chlorophyll

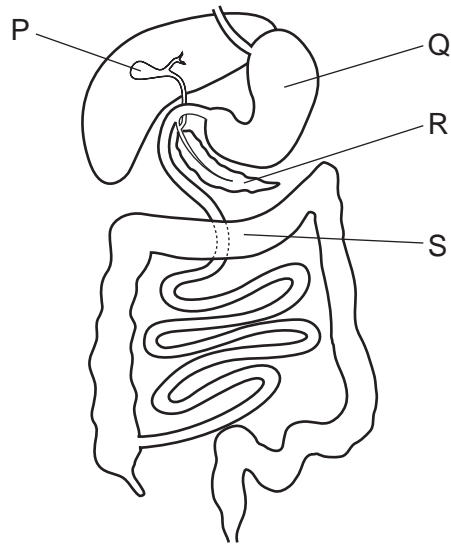
5 The diagram shows a shoot of a plant with a transparent stem in a solution of blue dye.



What do the blue lines in the stem show?

- A The dye is drawn up the phloem in the stem.
 - B The dye moves up the stem by diffusion.
 - C The dye shows liquid can circulate in the stem.
 - D The dye travels through tubes in the stem.
- 6 A swollen abdomen caused by kwashiorkor is a symptom of a lack of which dietary constituent?
- A carbohydrate
 - B fat
 - C fibre
 - D protein

7 The diagram shows some parts of the alimentary canal and its associated organs.



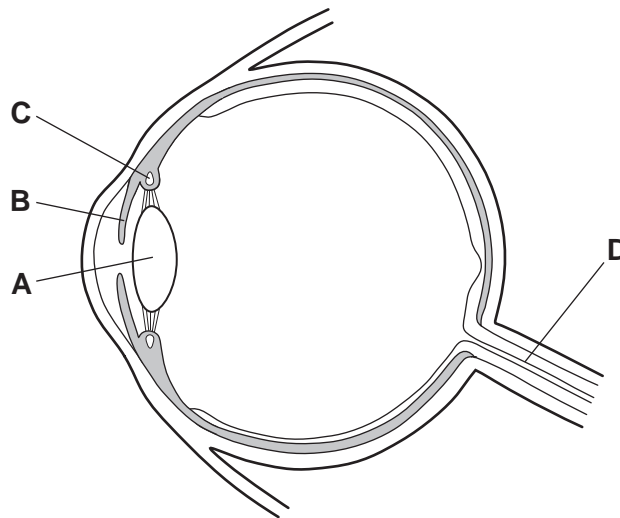
Which organs produce digestive enzymes?

- A** P and Q **B** Q and R **C** R and S **D** S and P

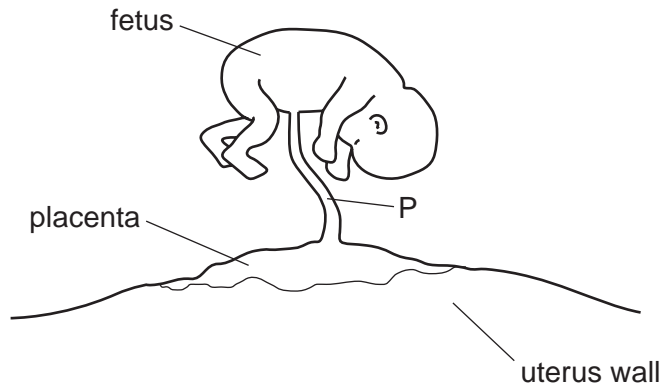
8 The diagram shows a section through the eye.

When a person moves from shade into bright sunlight, a reflex action takes place.

Where does the response to bright sunlight occur?



9 The diagram shows a fetus attached to its mother's uterus via the placenta.

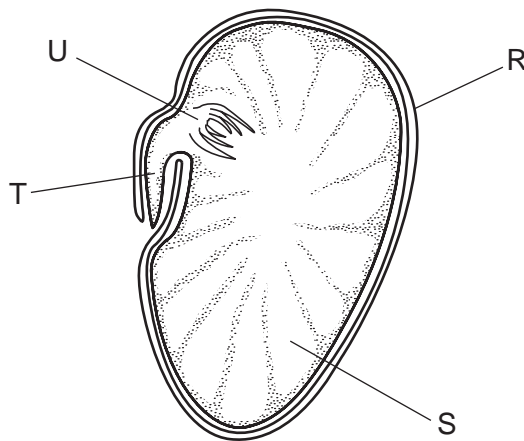


What is carried in structure P?

	mother's blood	fetus's blood	oxygenated blood	deoxygenated blood
A	✓	x	✓	x
B	✓	x	x	✓
C	x	✓	✓	✓
D	x	✓	x	✓

key
 ✓ = carried in P
 x = not carried in P

10 The diagram shows a section through a bean seed.



What are the labelled parts?

	cotyledon	plumule	radicle	testa
A	R	T	U	S
B	R	U	T	S
C	S	T	U	R
D	S	U	T	R

11 What is an allele?

- A a pair of identical genes
- B one of the forms of a gene
- C the genetic make-up of a nucleus
- D the result of two gametes fusing

12 Why is energy lost along a food chain?

- A All plants and animals respire.
- B Decomposers are at one end of a food chain.
- C Energy enters a food chain only through plants.
- D Not all animals feed on plants.

13 The diagram shows a food chain.

phytoplankton → small fish → large fish → killer whale

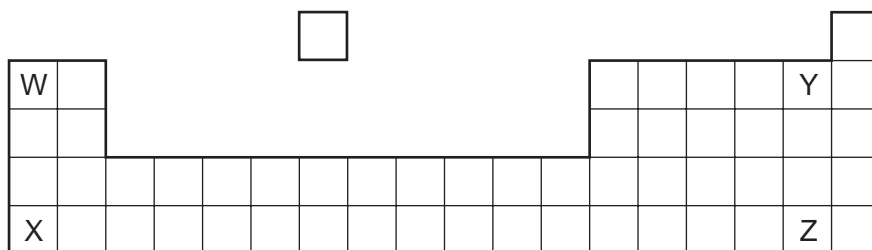
Which are consumers?

- A killer whales only
- B killer whales and large fish only
- C killer whales, large fish and small fish only
- D phytoplankton only

14 Which would be a liquid at 50 °C?

	melting point °C	boiling point °C
A	-100	80
B	-73	-10
C	-60	40
D	95	280

15 The diagram shows part of the Periodic Table.



Which two elements would be the most reactive in their group?

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

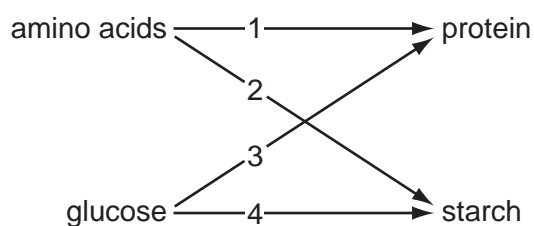
16 Processes used in the petrochemical industry include

- 1 cracking,
- 2 distillation.

For which of these processes is a catalyst used?

- A** both 1 and 2
B 1 only
C 2 only
D neither 1 nor 2

17 In the diagram below, the compounds on the left are monomers and those on the right are polymers.



Which two arrows link the monomer to the correct polymer?

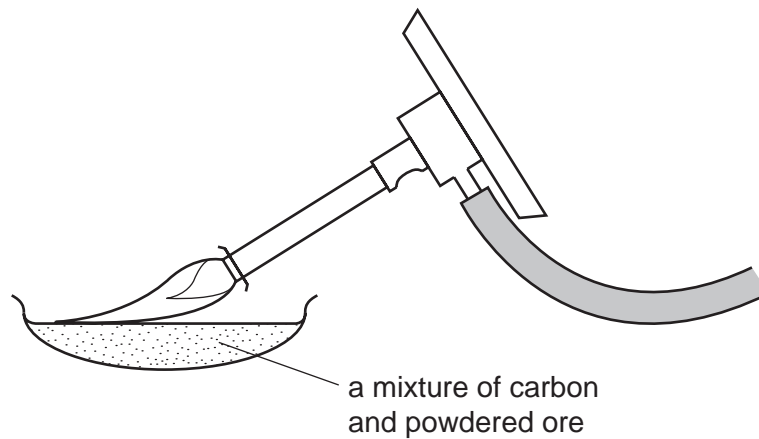
- A** 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

18 Diamond and silicon(IV) oxide are hard materials.

What could be the reason for this?

- A They are compounds of non-metallic elements.
- B They are naturally occurring materials.
- C They have giant structures with covalent bonding.
- D They have very high melting points.

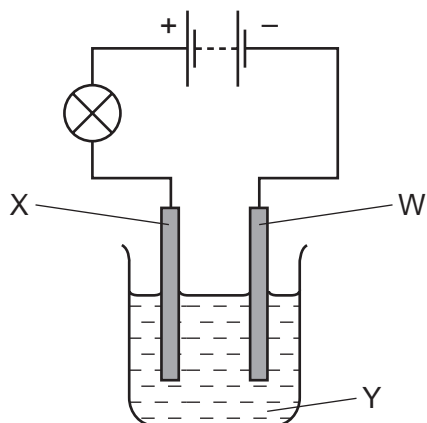
19 The diagram shows a metal being extracted from its powdered ore using carbon.



What happens to the ore in this reaction?

- A It burns.
- B It decomposes.
- C It is oxidised.
- D It is reduced.

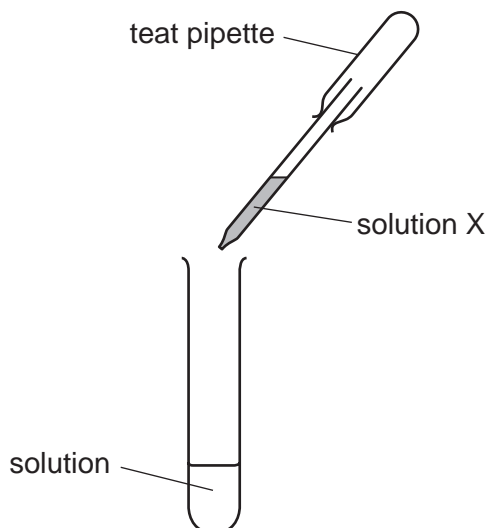
20 An experiment is set up to test the effect of electricity on solution Y.



What are the names of W, X and Y?

	W	X	Y
A	anode	cathode	electrode
B	anode	cathode	electrolyte
C	cathode	anode	electrode
D	cathode	anode	electrolyte

21 Using solution X, a student successfully tested for the presence of chloride ions.



What is solution X and the result of the test?

	solution X	result
A	dilute sulfuric acid	yellow precipitate
B	dilute sulfuric acid	white precipitate
C	silver nitrate solution	yellow precipitate
D	silver nitrate solution	white precipitate

22 What happens when an acid reacts with an alkali?

- A Neutralisation takes place and the temperature falls.
- B Neutralisation takes place and the temperature rises.
- C Reduction takes place and the temperature falls.
- D Reduction takes place and the temperature rises.

23 Which test and result show that a fertiliser contains nitrate ions?

	test	result
A	warm with aqueous sodium hydroxide	gas turns litmus blue
B	warm with aqueous sodium hydroxide	gas turns litmus red
C	warm with aqueous sodium hydroxide, then add aluminium metal	gas turns litmus blue
D	warm with aqueous sodium hydroxide, then add aluminium metal	gas turns litmus red

24 Why is an analgesic used in medicine?

- A as a painkiller
- B as a vitamin
- C to kill bacteria
- D to kill viruses

25 Salad dressing contains oil dispersed in water.

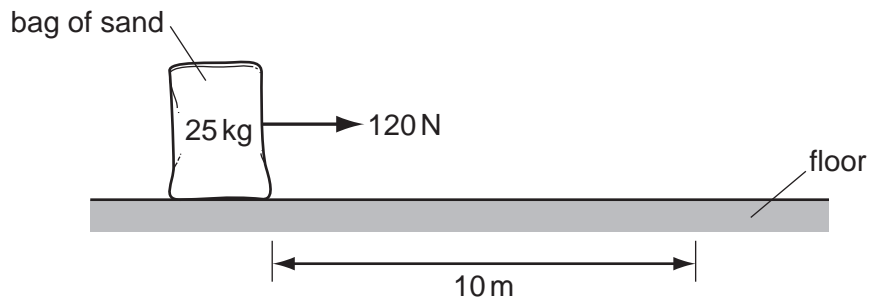
What is the name of this type of colloidal system?

- A emulsion
- B gel
- C sol
- D solution

26 Which is a solid fossil fuel?

- A coal
- B oil
- C sugar
- D wood

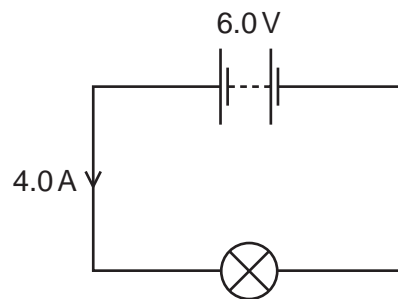
30 A horizontal force of 120 N is used to pull a 25 kg bag of sand 10 m along a floor.



How much work is done by the force?

- A 2.5 J B 12 J C 250 J D 1200 J

31 The circuit shows a lamp connected to a 6.0 V battery.

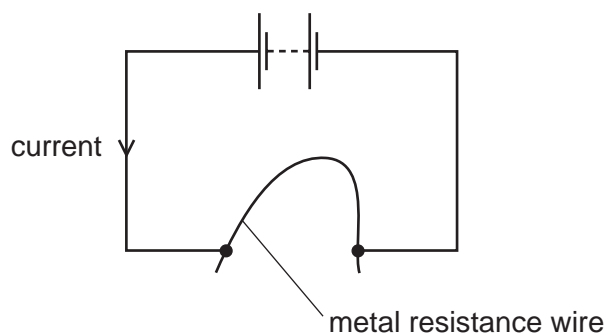


A current of 4.0 A flows in the circuit for 20 s.

How much charge flows through the lamp?

- A 120 C B 80 C C 24 C D 0.20 C

32 A student connects a length of metal resistance wire to a battery.



The student wishes to increase the current in the resistance wire.

Which change would do this?

- A Connect a second wire in series with the first wire.
 - B Heat the wire.
 - C Shorten the wire.
 - D Use a thinner wire.
- 33 Which type of electromagnetic waves are used for cooking?
- A gamma rays
 - B infra-red waves
 - C ultraviolet waves
 - D X-rays
- 34 A girl of mass 50 kg is running at 6.0 m/s.

What is her momentum?

- A 300 J B 300 kg m/s C 900 J D 900 kg m/s

35 A sky-diver jumps from a helicopter which is very high and not moving.

She does not open her parachute when she first jumps.

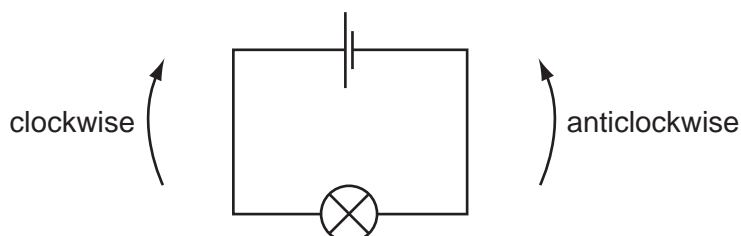
Which row describes her acceleration and the air resistance acting on her in the first few seconds as she falls?

	acceleration	air resistance
A	constant	constant
B	constant	increasing
C	decreasing	constant
D	decreasing	increasing

36 What are the particles given off by the heated tungsten filament in a thermionic diode?

- A** alpha particles
- B** electrons
- C** neutrons
- D** protons

37 Charged particles flow in the circuit below.



What are the particles and which way do they flow?

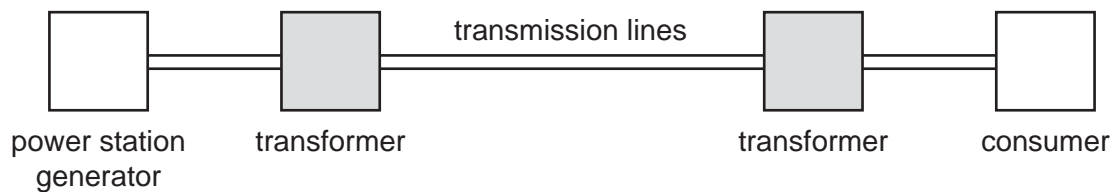
	particles	direction
A	electrons	clockwise
B	electrons	anticlockwise
C	protons	clockwise
D	protons	anticlockwise

38 A machine is claimed to be 100% efficient.

For this to be true, which statement must be correct?

- A All the energy put into it is changed into useful energy.
- B It is very easy to use.
- C It produces more energy than is put into it.
- D It wastes a small amount of energy.

39 The diagram represents an electrical energy transmission system.



Why are the transformers used?

- A to decrease the energy loss from the transmission lines
- B to make the transmission lines safer
- C to supply the consumer with energy at very high voltage
- D to transmit the energy from the power station at low voltage

40 A light bulb is marked '3.0V, 6.0W'.

How much current flows in the bulb when it operates at normal brightness?

- A 0.50A
- B 2.0A
- C 6.0A
- D 18A

DATA SHEET
The Periodic Table of the Elements

		Group										
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI
		1 H Hydrogen 1										
		9 Be Beryllium 4										
		23 Na Sodium 11										
		40 Ca Calcium 20										
		88 Sr Strontium 38										
		137 Ba Barium 56										
		226 Ra Radium 88										
		227 Ac Actinium 89										
		7 Li Lithium 3										
		24 Mg Magnesium 12										
		39 K Potassium 19										
		85 Rb Rubidium 37										
		133 Cs Caesium 55										
		226 Fr Francium 87										
		51 V Vanadium 23										
		48 Ti Titanium 22										
		91 Zr Zirconium 40										
		137 Hf Hafnium 72										
		45 Sc Scandium 21										
		89 Y Yttrium 39										
		139 La Lanthanum 57										
		227 Ac Actinium 89										
		52 Cr Chromium 24										
		55 Mn Manganese 25										
		96 Mo Molybdenum 42										
		186 Re Rhenium 75										
		56 Fe Iron 26										
		101 Ru Ruthenium 44										
		186 Os Osmium 76										
		59 Co Cobalt 27										
		103 Rh Rhodium 45										
		190 Ir Iridium 77										
		59 Ni Nickel 28										
		106 Pd Palladium 46										
		195 Pt Platinum 78										
		64 Cu Copper 29										
		108 Ag Silver 47										
		197 Au Gold 79										
		65 Zn Zinc 30										
		112 Cd Cadmium 48										
		201 Hg Mercury 80										
		70 Ga Gallium 31										
		120 In Indium 49										
		204 Tl Thallium 81										
		73 Ge Germanium 32										
		122 Sn Tin 50										
		207 Pb Lead 82										
		75 As Arsenic 33										
		127 Sb Antimony 51										
		209 Bi Bismuth 83										
		79 Se Selenium 34										
		128 Te Tellurium 52										
		209 Po Polonium 84										
		80 Br Bromine 35										
		127 I Iodine 53										
		209 At Astatine 85										
		84 Kr Krypton 36										
		131 Xe Xenon 54										
		210 Rn Radon 86										
		16 O Oxygen 8										
		32 S Sulfur 16										
		79 Po Polonium 84										
		16 O Oxygen 8										
		32 S Sulfur 16										
		79 Se Selenium 34										
		128 Te Tellurium 52										
		209 Po Polonium 84										
		19 F Fluorine 9										
		35.5 Cl Chlorine 17										
		85 At Astatine 85										
		20 Ne Neon 10										
		40 Ar Argon 18										
		86 Rn Radon 86										
		4 He Helium 2										
		175 Lu Lutetium 71										
		173 Yb Ytterbium 70										
		169 Tm Thulium 69										
		167 Er Erbium 68										
		165 Ho Holmium 67										
		162 Dy Dysprosium 66										
		159 Tb Terbium 65										
		157 Gd Gadolinium 64										
		152 Eu Europium 63										
		150 Sm Samarium 62										
		144 Nd Neodymium 60										
		141 Pr Praseodymium 59										
		140 Ce Cerium 58										
		238 U Uranium 92										
		232 Th Thorium 90										
		94 Pu Plutonium 94										
		93 Np Neptunium 93										
		91 Pa Protactinium 91										
		96 Cm Curium 96										
		95 Am Americium 95										
		97 Bk Berkelium 97										
		98 Cf Californium 98										
		99 Es Einsteinium 99										
		100 Fm Fermium 100										
		101 Md Mendelevium 101										
		102 No Nobelium 102										
		103 Lr Lawrencium 103										

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

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

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

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