UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/12**

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.

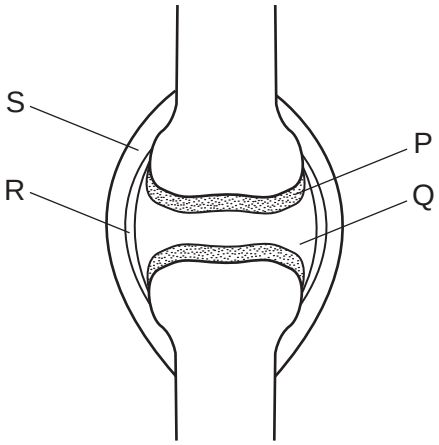
There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

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 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

2 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.

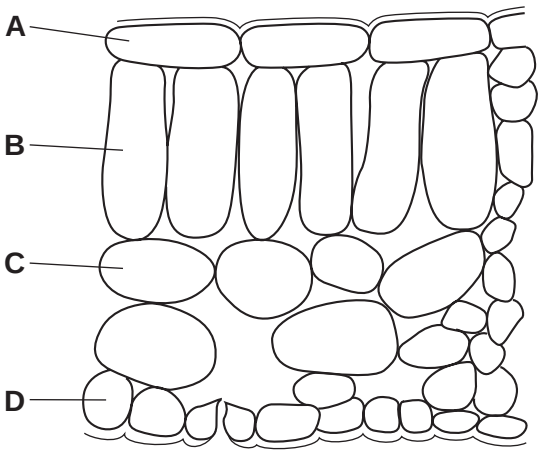
B are genetically identical.

C can interbreed.

D have many features in common.

3 The diagram shows a section through a leaf.

Which layer of cells produces most sugar?



4 A swollen abdomen caused by kwashiorkor is a symptom of a lack of which dietary constituent?

A carbohydrate

B fat

C fibre

D protein

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

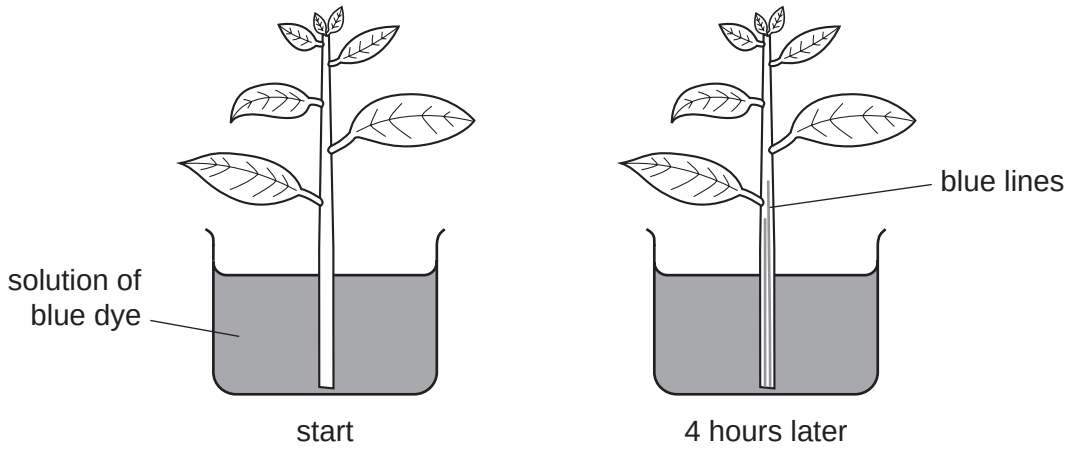
A to make its membranes permeable

B to make starch soluble

C to remove air from intercellular spaces

D to remove chlorophyll

6 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?

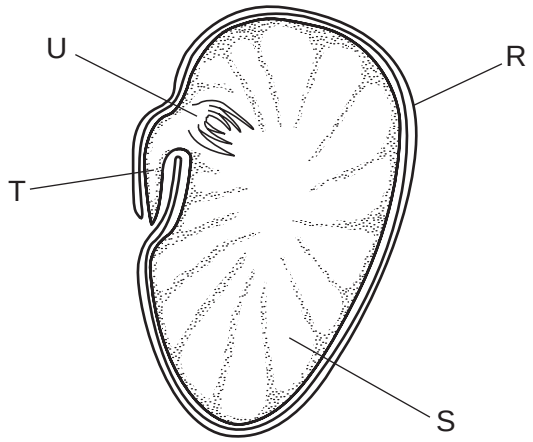
A The dye is drawn up the phloem in the stem.

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.

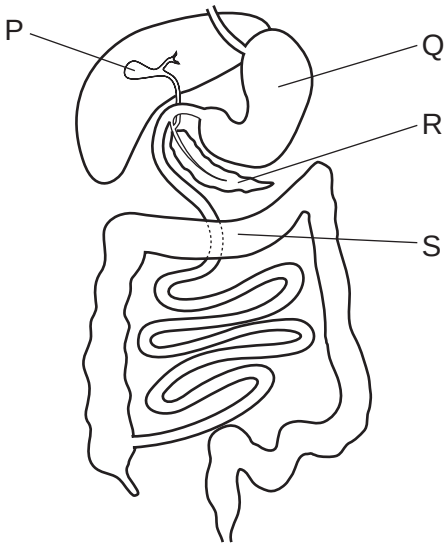
7 The diagram shows a section through a bean seed.



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

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



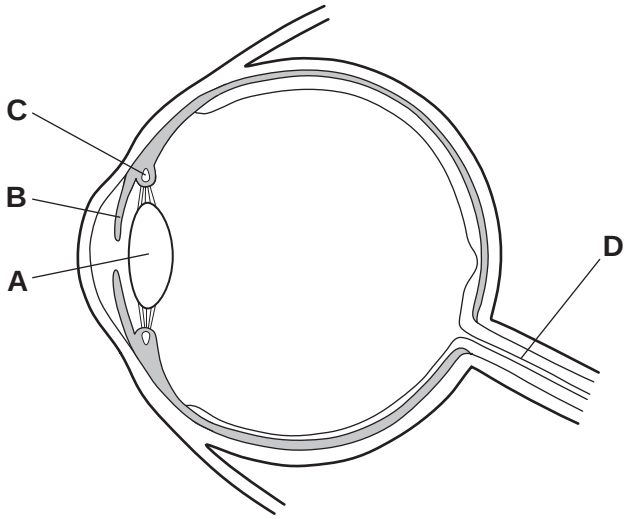
Which organs produce digestive enzymes?

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

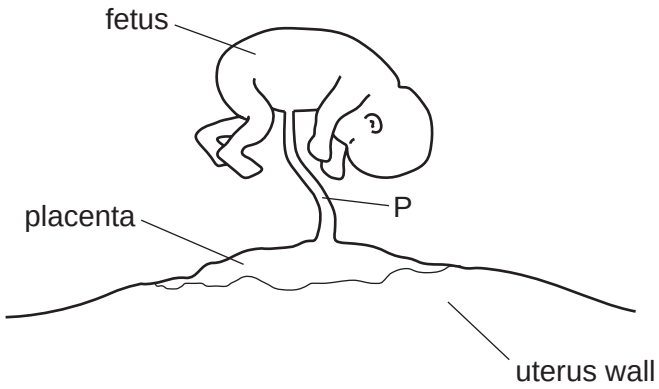
9 The diagram shows a section through the eye.

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

Where does the response to bright sunlight occur?



10 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	✓	✗	✓	✗
B	✓	✗	✗	✓
C	✗	✓	✓	✓
D	✗	✓	✗	✓

key

✓ = carried in P

✗ = not carried in P

11 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

12 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

13 Why is energy lost along a food chain?

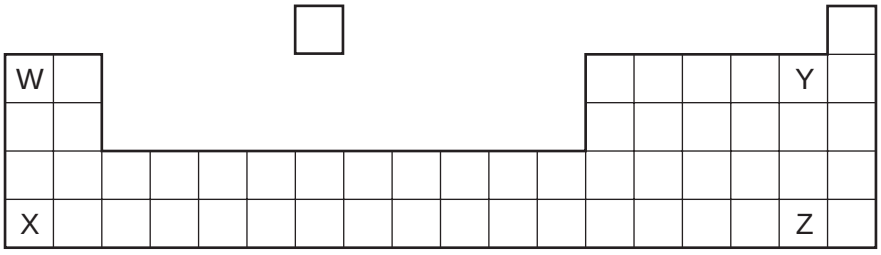
A All plants and animals respire.

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.

14 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

15 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

16 Processes used in the petrochemical industry include

1 cracking,

2 distillation.

For which of these processes is a catalyst used?

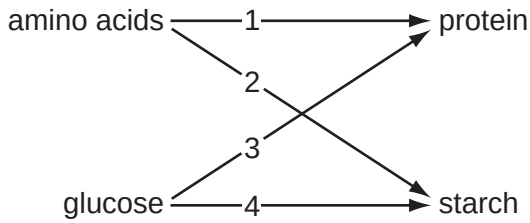
A both 1 and 2

B 1 only

C 2 only

D neither 1 nor 2

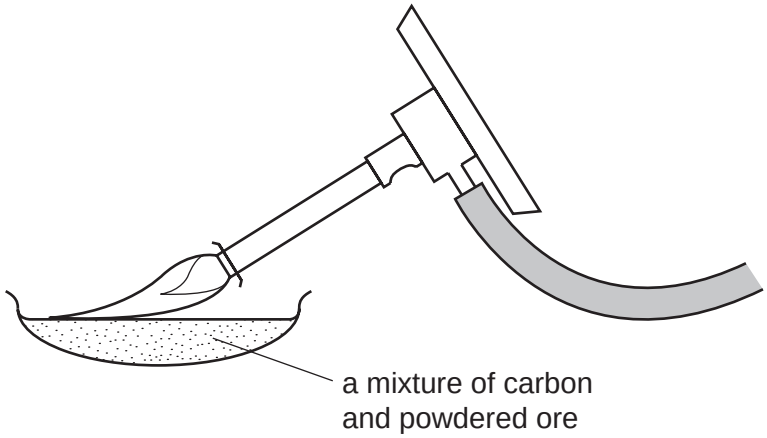
17 In the diagram below, the compounds on the left are monomers and those on the right are polymers.



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



What happens to the ore in this reaction?

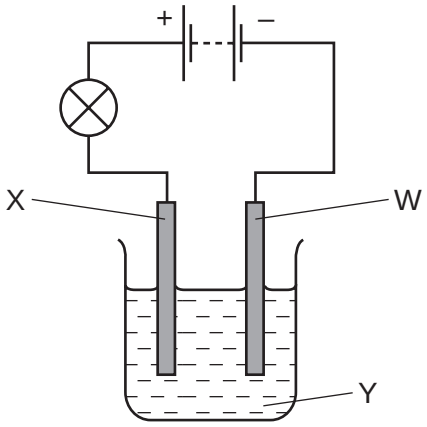
A It burns.

B It decomposes.

C It is oxidised.

D It is reduced.

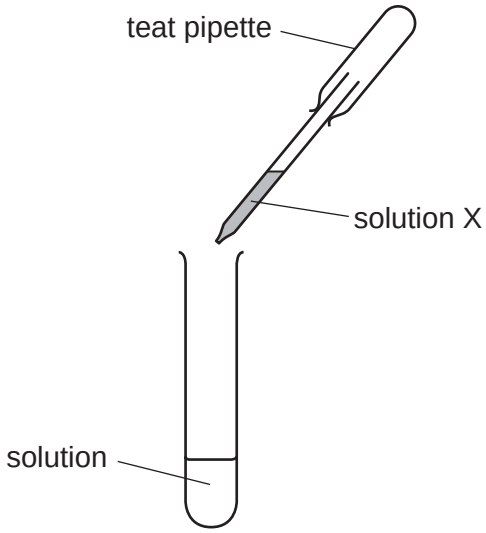
19 An experiment is set up to test the effect of electricity on solution Y.



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

20 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

21 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.

22 Why is an analgesic used in medicine?

A as a painkiller

B as a vitamin

C to kill bacteria

D to kill viruses

23 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.

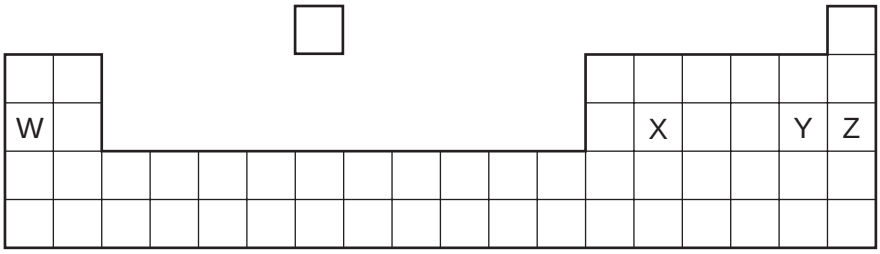
C Reduction takes place and the temperature falls.

D Reduction takes place and the temperature rises.

24 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

25 The positions of four elements are shown in part of the Periodic Table.



Which elements form a bond by sharing electrons?

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

26 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

27 Which is a solid fossil fuel?

A coal

B oil

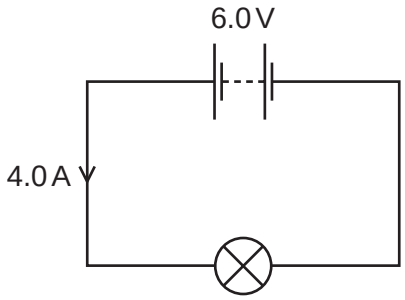
C sugar

D wood

28 Which of the following is a unit of density?

A cm^3/g **B** g/cm^2 **C** g/cm^3 **D** kg/m^2

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

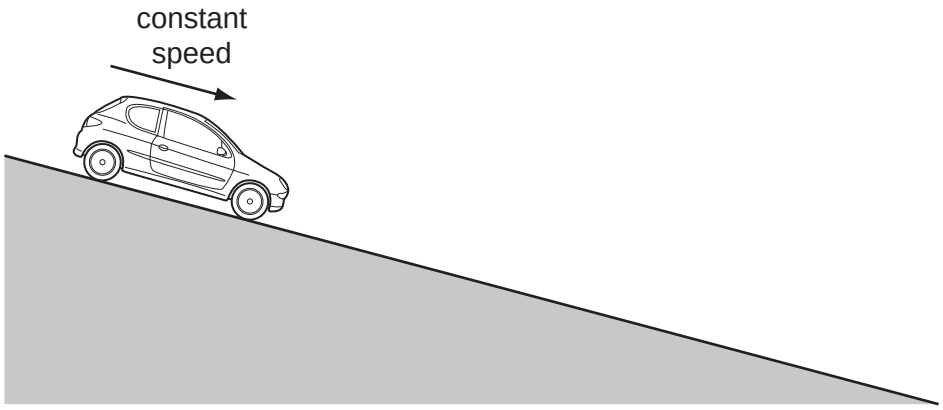


A current of 4.0 A flows in the circuit for 20 s.

How much charge flows through the lamp?

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

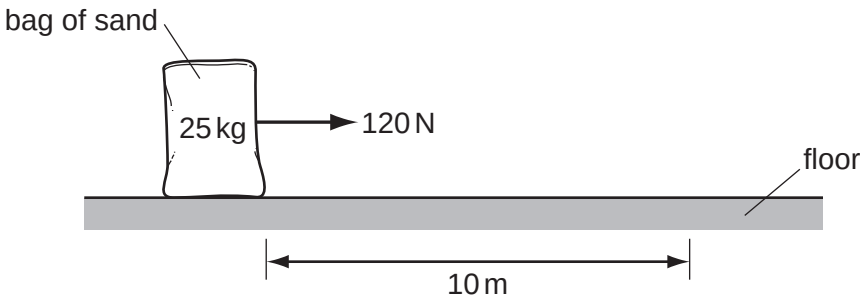
30 A car rolls down a hill at a constant speed.



Which row describes the friction force and the unbalanced force acting on the car?

	friction force	unbalanced force
A	acts downhill	acts downhill
B	acts uphill	acts downhill
C	acts uphill	is zero
D	is zero	is zero

31 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?

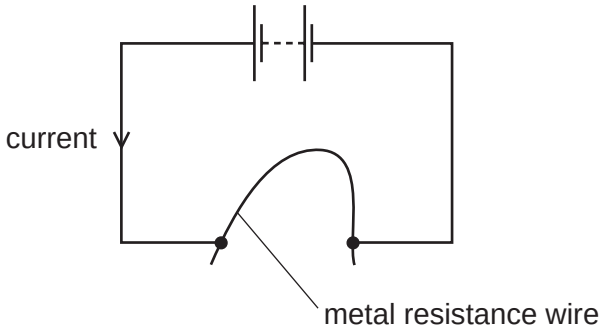
A 2.5 J **B** 12 J **C** 250 J **D** 1200 J

32 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

33 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.

34 Which type of electromagnetic waves are used for cooking?

A gamma rays

B infra-red waves

C ultraviolet waves

D X-rays

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?

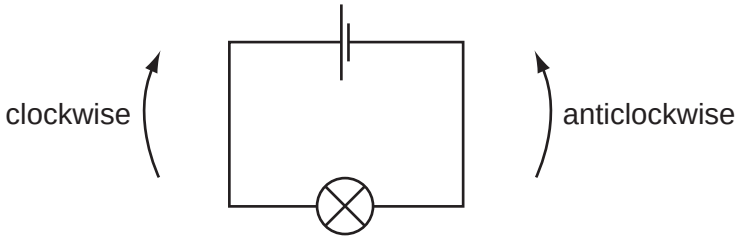
A alpha particles

B electrons

C neutrons

D protons

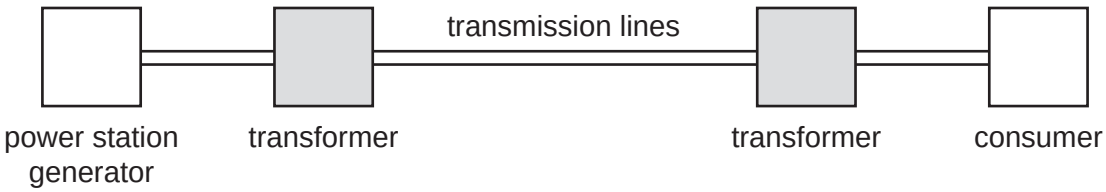
37 Charged particles flow in the circuit below.



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 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

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

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

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

40 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.

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											
	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	238 Pa Protactinium 91	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.).