



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

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CO-ORDINATED SCIENCES

0654/13

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.

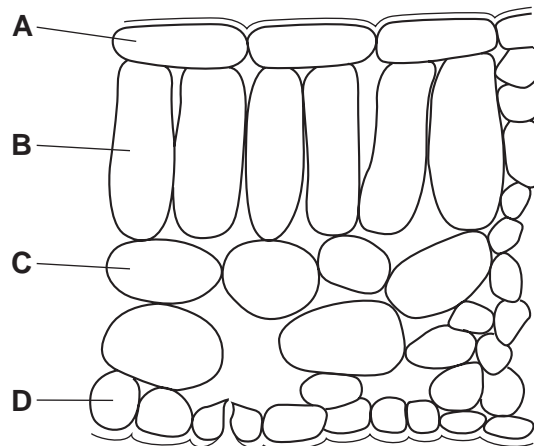
A copy of the Periodic Table is printed on page **16**.

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

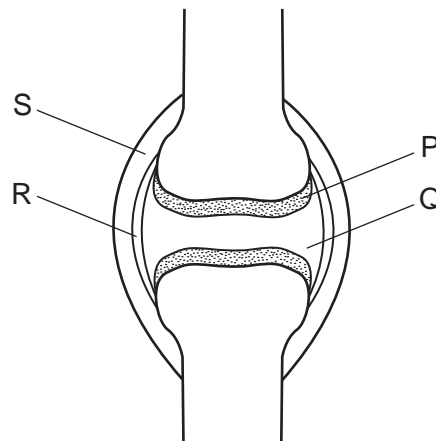


- 1 The diagram shows a section through a leaf.

Which layer of cells produces most sugar?



- 2 The diagram shows a synovial joint.



Which two parts prevent friction between the bones?

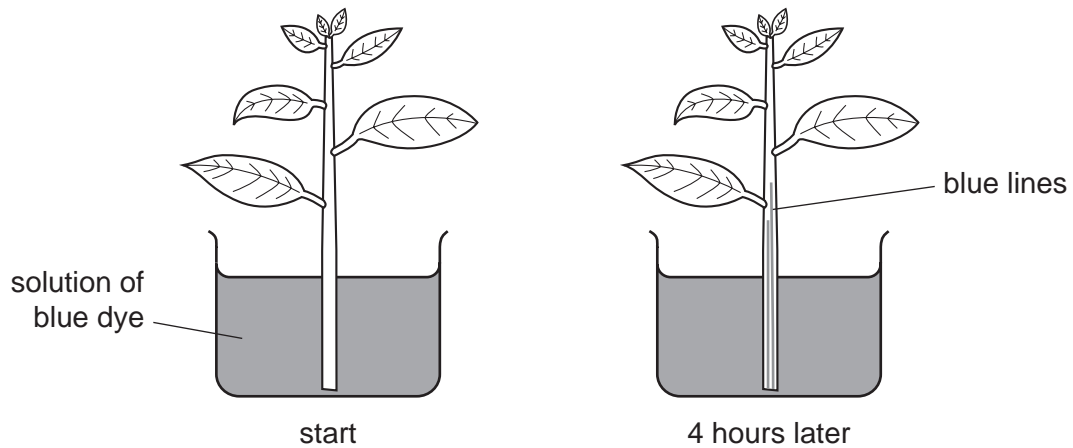
- A** P and Q **B** P and R **C** Q and R **D** Q and S
- 3 The binomial name for a tiger is *Panthera tigris* and for a lion, *Panthera leo*.

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.

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



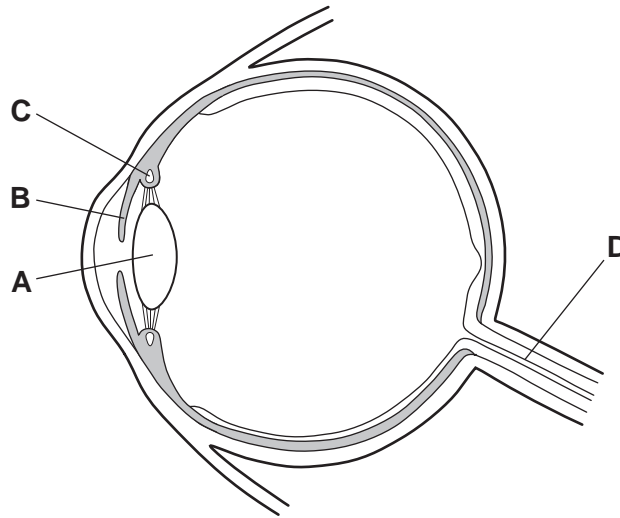
What do the blue lines in the stem show?

- 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.
- 5 A swollen abdomen caused by kwashiorkor is a symptom of a lack of which dietary constituent?
- A** carbohydrate
- B** fat
- C** fibre
- D** protein
- 6 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

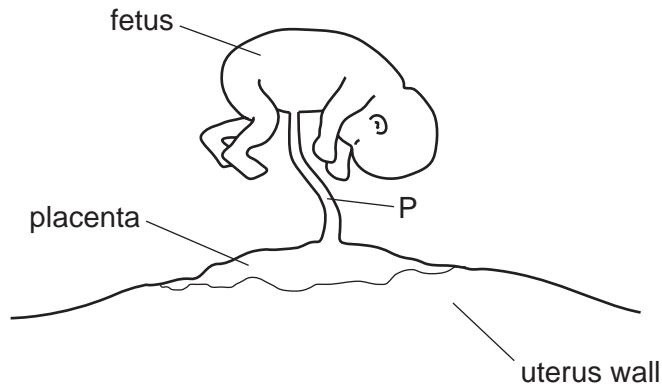
7 The diagram shows a section through the eye.

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

Where does the response to bright sunlight occur?



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

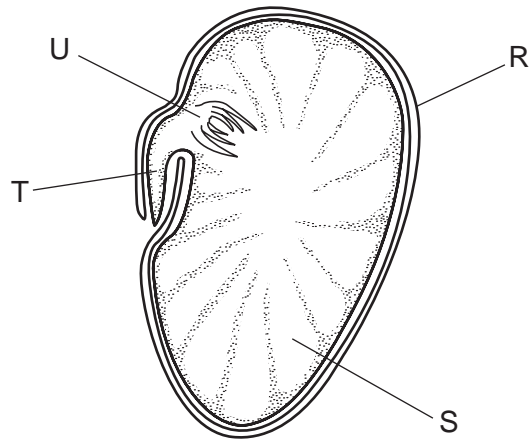


What is carried in structure P?

	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

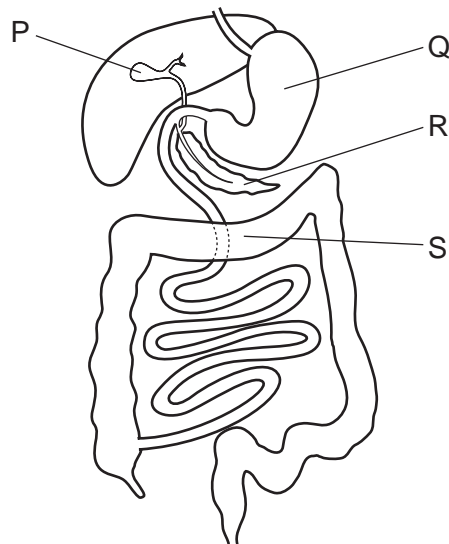
- 9 The diagram shows a section through a bean seed.



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

- 10 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

11 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.

12 The diagram shows a food chain.

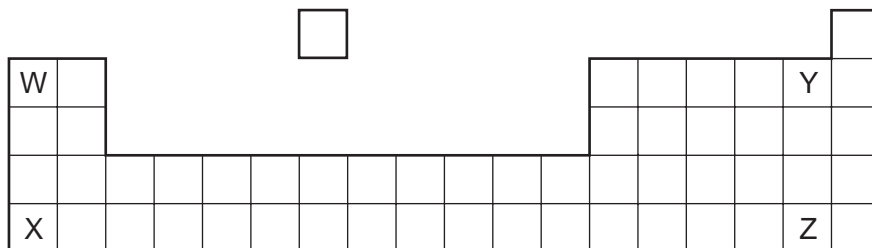
phytoplankton → small fish → large fish → killer whale

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
- 13 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
- 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

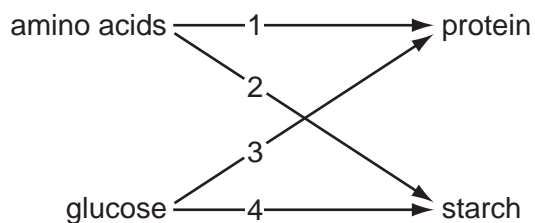
15 The diagram shows part of the Periodic Table.



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 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

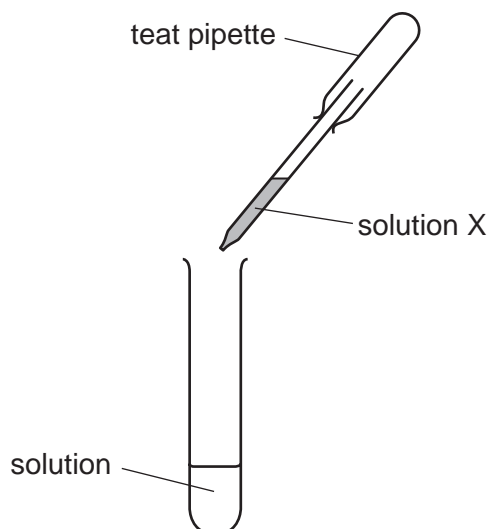
17 Processes used in the petrochemical industry include

- 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

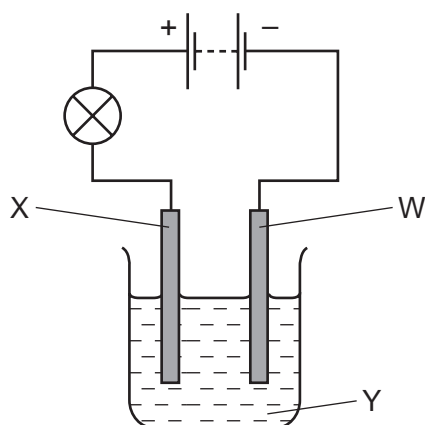
18 Using solution X, a student successfully tested for the presence of chloride ions.



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

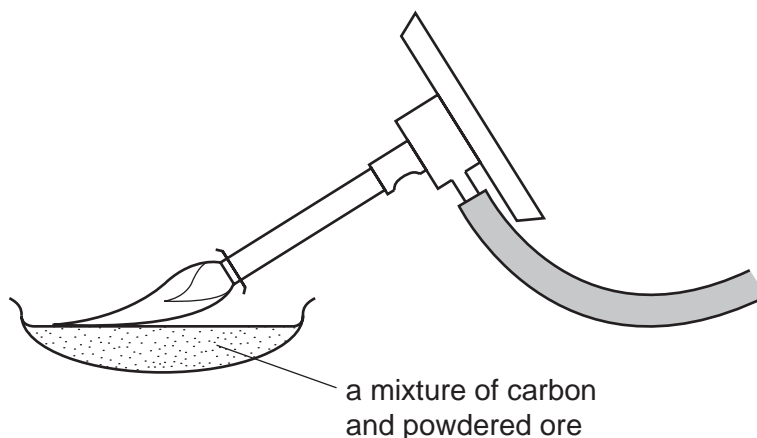
19 An experiment is set up to test the effect of electricity on solution Y.



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 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.

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 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

- 23 Why is an analgesic used in medicine?
- A as a painkiller
B as a vitamin
C to kill bacteria
D to kill viruses
- 24 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.

- 25 Which is a solid fossil fuel?
- A coal
B oil
C sugar
D wood

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

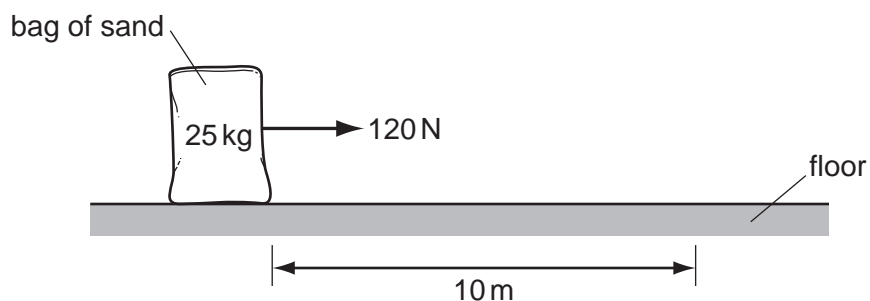
Which elements form a bond by sharing electrons?

- A W and X B W and Y C X and Y D Y and Z
- 27 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

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

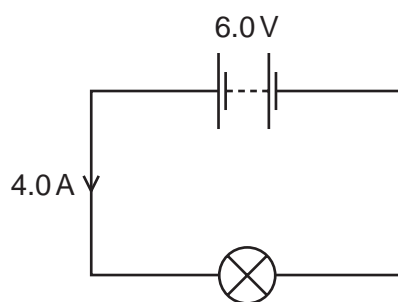
29 A horizontal force of 120 N is used to pull a 25 kg bag of sand 10 m along a floor.



How much work is done by the force?

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

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

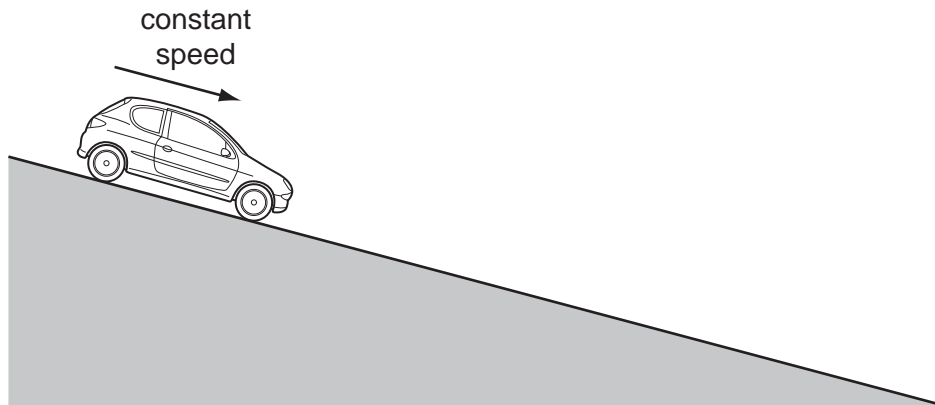


A current of 4.0 A flows in the circuit for 20 s.

How much charge flows through the lamp?

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

31 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

32 Which type of electromagnetic waves are used for cooking?

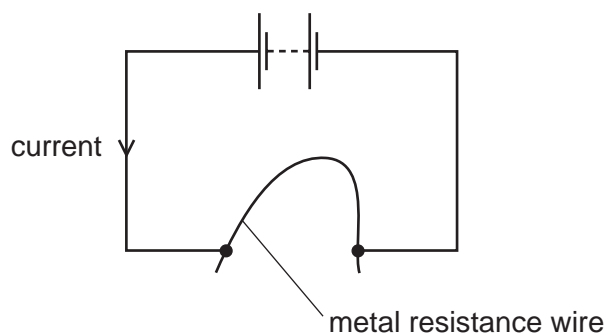
- A** gamma rays
- B** infra-red waves
- C** ultraviolet waves
- D** X-rays

33 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

34 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.

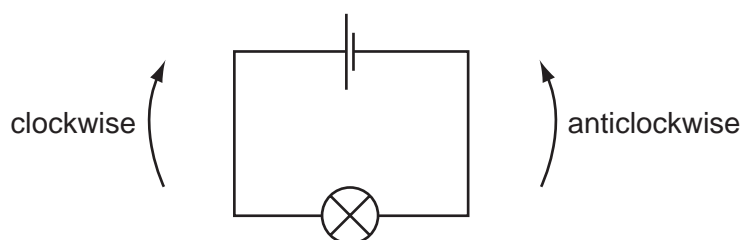
35 A sky-diver jumps from a helicopter which is very high and not moving.

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 Charged particles flow in the circuit below.



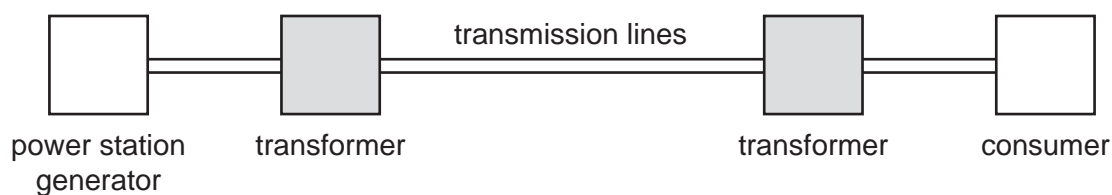
What are the particles and which way do they flow?

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

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

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

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 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.

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																			
		4 He Helium 2																			
7	9	3	4	5	6	7	8	9	10	11	12	13									
Li Lithium	Be Beryllium	B Boron	C Carbon	N Nitrogen	O Oxygen	F Fluorine	Ne Neon	Na Sodium	Mg Magnesium	Al Aluminium	Si Silicon	P Phosphorus	S Sulfur	Cl Chlorine	Ar Argon						
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36				
K Potassium	Ca Calcium	Sc Scandium	Ti Titanium	V Vanadium	Cr Chromium	Mn Manganese	Fe Iron	Co Cobalt	Ni Nickel	Cu Copper	Zn Zinc	Ga Gallium	Ge Germanium	As Arsenic	Se Selenium	Br Bromine	Kr Krypton				
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54				
Rb Rubidium	Sr Strontium	Y Yttrium	Zr Zirconium	Nb Niobium	Mo Molybdenum	Tc Technetium	Ru Ruthenium	Rh Rhodium	Pd Palladium	Ag Silver	Cd Cadmium	In Indium	Sn Tin	Sb Antimony	Te Tellurium	I Iodine	Xe Xenon				
55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86				
Cs Caesium	Ba Barium	La Lanthanum	Hf Hafnium	Ta Tantalum	W Tungsten	Re Rhenium	Os Osmium	Ir Iridium	Pt Platinum	Au Gold	Hg Mercury	Tl Thallium	Pb Lead	Bi Bismuth	Po Polonium	At Astatine	Rn Radon				
87	88	89	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†				
Fr Francium	Ra Radium	Ac Actinium											Lu Lutetium	Yb Ytterbium	Tm Thulium	Md Mendelevium	Lr Lawrencium				
87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105			
Ce Cerium	Pr Praseodymium	Nd Neodymium	Pm Promethium	Sm Samarium	Eu Europium	Gd Gadolinium	Tb Terbium	Dy Dysprosium	Ho Holmium	Er Erbium	Tm Thulium	Yb Ytterbium	Lu Lutetium	Fm Fermium	Md Mendelevium	No Nobelium	Lr Lawrencium	Cf Californium	Es Einsteinium		
58	59	60	61	62	63	64	65	66	67	68	69	70	71	100	101	102	103	104	105		
Ce Cerium	Pr Praseodymium	Nd Neodymium	Pm Promethium	Sm Samarium	Eu Europium	Gd Gadolinium	Tb Terbium	Dy Dysprosium	Ho Holmium	Er Erbium	Tm Thulium	Yb Ytterbium	Lu Lutetium	Fm Fermium	Md Mendelevium	No Nobelium	Lr Lawrencium	Cf Californium	Es Einsteinium	Bk Berkelium	
90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	
Th Thorium	Pa Protactinium	U Uranium	Np Neptunium	Pu Plutonium	Am Americium	Cm Curium	Bk Berkelium	Cf Californium	Es Einsteinium	Fm Fermium	Md Mendelevium	No Nobelium	Lr Lawrencium	Cf Californium	Es Einsteinium	Fm Fermium	Md Mendelevium	No Nobelium	Lr Lawrencium	Cf Californium	Es Einsteinium
90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
Th Thorium	Pa Protactinium	U Uranium	Np Neptunium	Pu Plutonium	Am Americium	Cm Curium	Bk Berkelium	Cf Californium	Es Einsteinium	Fm Fermium	Md Mendelevium	No Nobelium	Lr Lawrencium	Cf Californium	Es Einsteinium	Fm Fermium	Md Mendelevium	No Nobelium	Lr Lawrencium	Cf Californium	Es Einsteinium

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

Key

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

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

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