



CO-ORDINATED SCIENCES

0654/13

Paper 1 Multiple Choice

May/June 2016

45 minutes

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

* 5 9 8 2 0 3 0 8 5 2 *

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.

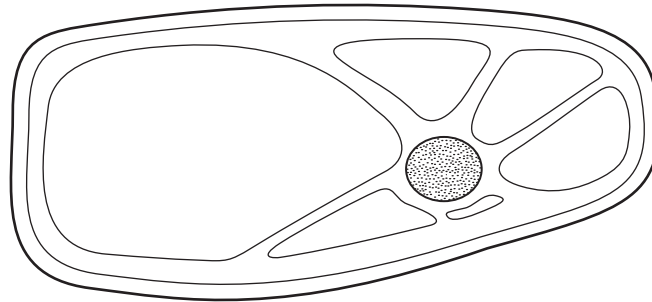
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
A copy of the Periodic Table is printed on page 20.
Electronic calculators may be used.

This document consists of **17** printed pages and **3** blank pages.

1 What is **not** a characteristic of all living organisms?

- A breathing
- B excretion
- C movement
- D reproduction

2 The diagram shows a section through a cell from a leaf, magnified $\times 4000$. The diameter of the nucleus in the diagram is 10 mm.



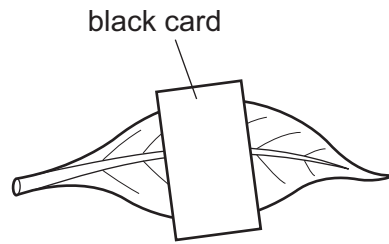
What is the true diameter of the nucleus?

- A 0.0025 mm B 0.0050 mm C 0.0100 mm D 0.0250 mm

3 Which statement about all enzymes is correct?

- A They are used up in the reaction they catalyse.
- B They speed up reactions.
- C They work best above 40°C .
- D They work best at a pH of 7.0.

- 4 A plant is destarched and then one of its leaves is partly covered with black card as shown.



The plant is then put in the light for six hours.

The card is removed and the leaf is tested for starch using iodine solution.

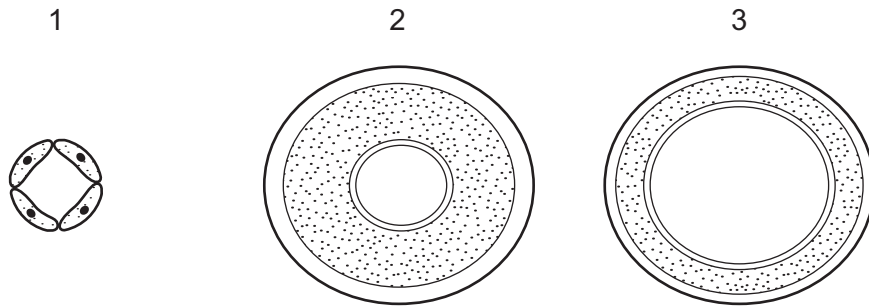
Which colours are seen five minutes after iodine solution is added?

	area of leaf	
	not covered by card	covered by card
A	blue / black	blue / black
B	blue / black	yellow
C	yellow	blue / black
D	yellow	yellow

- 5 Where is the gall bladder situated?

- A** in the pancreas
- B** near the entrance to the urethra
- C** near the kidneys
- D** near the liver

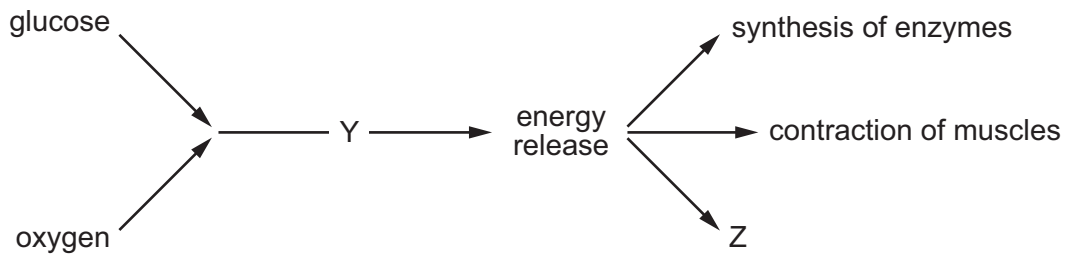
6 The diagrams show the cross-section of three blood vessels, not drawn to the same scale.



What are these vessels?

	1	2	3
A	artery	capillary	vein
B	artery	vein	capillary
C	capillary	artery	vein
D	capillary	vein	artery

7 The diagram shows what happens to glucose in the body.



What are processes Y and Z?

	Y	Z
A	photosynthesis	growth
B	photosynthesis	respiration
C	respiration	growth
D	respiration	photosynthesis

8 What does **not** use energy released by cells?

- A cell division
- B diffusion
- C passage of nerve impulses
- D protein synthesis

9 What is an example of homeostasis?

- A adding acid to food in the stomach
- B breathing out water vapour from the lungs
- C keeping the body temperature constant
- D producing adrenaline in the adrenal glands

10 In a reflex arc, which structure carries nerve impulses towards the central nervous system?

- A effector
- B motor neurone
- C sensory neurone
- D spinal cord

11 A student placed four sets of seeds in different conditions.

Which set of conditions must be kept constant to show the effect of temperature on germination?

- A temperature and water only
- B temperature only
- C temperature, water and oxygen
- D water and oxygen only

12 Which row describes asexual reproduction?

	only one parent	fusion of nuclei	genetically identical offspring	
A	✓	✓	✓	key ✓ = yes x = no
B	✓	✓	x	
C	✓	x	✓	
D	x	✓	x	

13 When raw sewage is discharged into a river, there is

- A a decrease in oxygen concentration caused by a decrease in bacterial activity.
- B a decrease in oxygen concentration caused by an increase in bacterial activity.
- C an increase in oxygen concentration caused by a decrease in bacterial activity.
- D an increase in oxygen concentration caused by an increase in bacterial activity.

14 A student adds excess copper oxide powder to warm dilute sulfuric acid.

Copper sulfate solution is formed.

Which method is used to remove the unreacted copper oxide?

- A chromatography
- B crystallisation
- C distillation
- D filtration

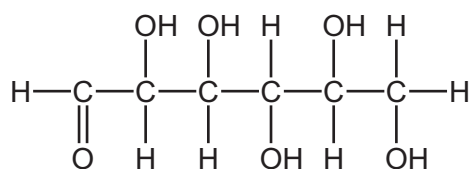
15 Hexane is a covalent compound.

Sodium phosphate is an ionic compound.

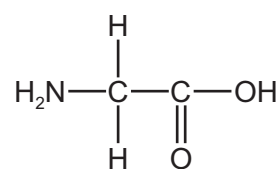
Which row describes the properties of hexane and sodium phosphate?

	hexane	sodium phosphate
A	high electrical conductivity	volatile
B	insoluble in water	non-volatile
C	non-volatile	soluble in water
D	volatile	low electrical conductivity in aqueous solution

16 The structures of a carbohydrate and an amino acid are shown.



carbohydrate

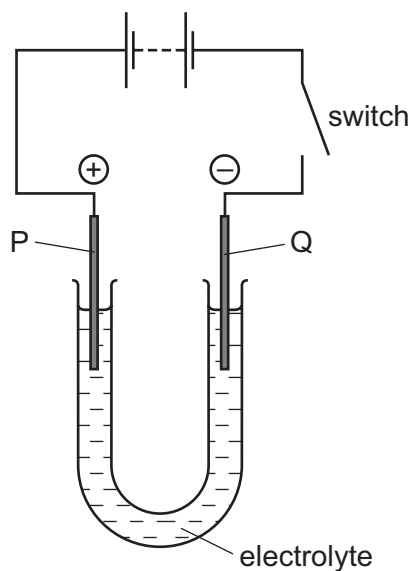


amino acid

Which elements are present in both structures?

- A carbon, hydrogen and nitrogen only
- B carbon, hydrogen and oxygen only
- C carbon, nitrogen and oxygen only
- D carbon, hydrogen, nitrogen and oxygen

17 The diagram shows the electrolysis of a compound.



When the switch is closed, the solution around electrode P turns orange because a halogen is formed.

The positive electrode P is called the1....., and the halogen is2..... .

Which words complete gaps 1 and 2?

	1	2
A	anode	bromine
B	anode	chlorine
C	cathode	bromine
D	cathode	chlorine

18 A metal ore dissolves in hydrochloric acid.

Under which conditions does the ore dissolve most quickly?

	form of ore	concentration of hydrochloric acid	temperature of hydrochloric acid
A	lumps	high	low
B	lumps	low	high
C	powder	high	high
D	powder	low	low

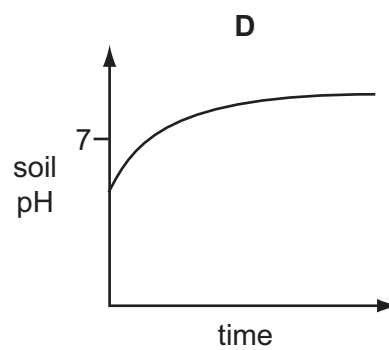
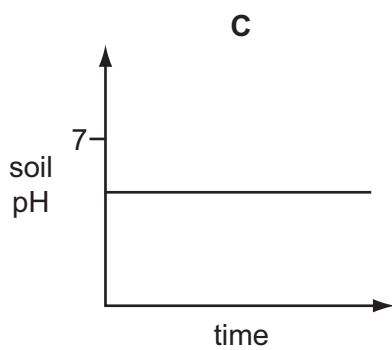
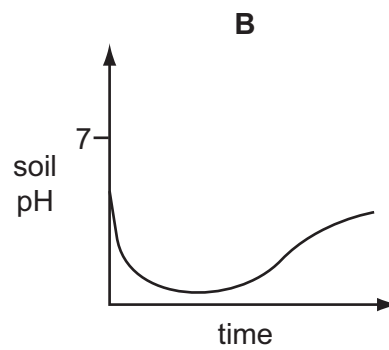
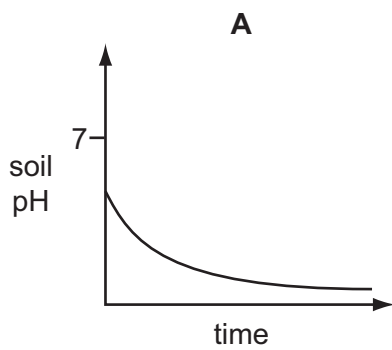
23 Which statement is **not** a reason why aluminium is used in aircraft manufacture?

- A It forms low density alloys.
- B It is malleable.
- C It is more reactive than iron.
- D It is resistant to corrosion.

24 Which gas emitted from a car exhaust contributes to acid rain?

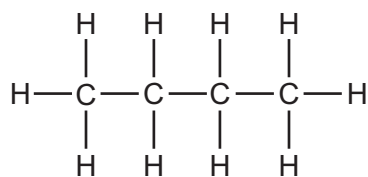
- A carbon monoxide, CO
- B nitrogen, N₂
- C nitrogen monoxide, NO
- D water vapour, H₂O

25 Which graph shows how the pH of soil changes when lime is added?

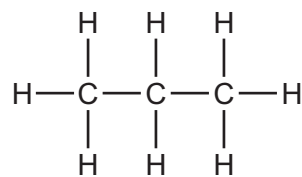


26 Which compound is the main constituent of natural gas?

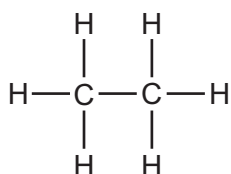
A



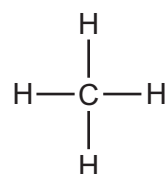
B



C



D

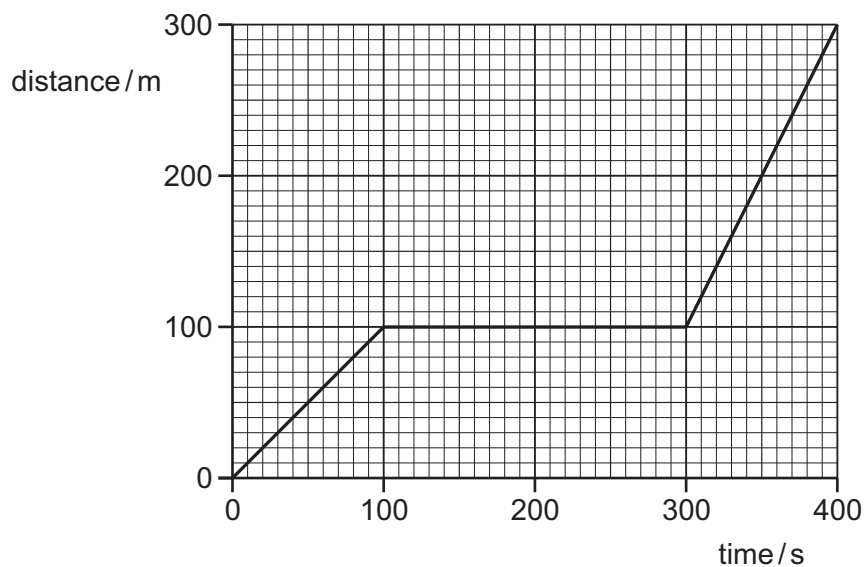


27 Which row describes the industrial manufacture and a use of ethanol?

	manufacture	use
A	cracking large hydrocarbon molecules	food colouring
B	cracking large hydrocarbon molecules	solvent
C	reaction between ethene and steam	food colouring
D	reaction between ethene and steam	solvent

28 A girl rides her bicycle from home to her friend's home.

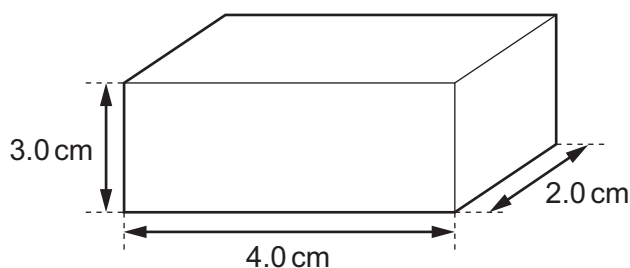
The distance/time graph for the whole journey is shown.



What is the average speed of the girl for the whole journey?

- A** 0.75 m/s **B** 1.00 m/s **C** 1.33 m/s **D** 1.50 m/s

29 The diagram shows a block of metal of mass 72 g.



What is the density of the metal?

- A** 3.0 g/cm³ **B** 6.0 g/cm³ **C** 9.0 g/cm³ **D** 12 g/cm³

30 Which source of energy is non-renewable?

- A** hydroelectric
B nuclear
C tides
D waves

31 A gas is trapped in a metal cylinder of constant volume. The gas is heated.

Which row describes the changes produced?

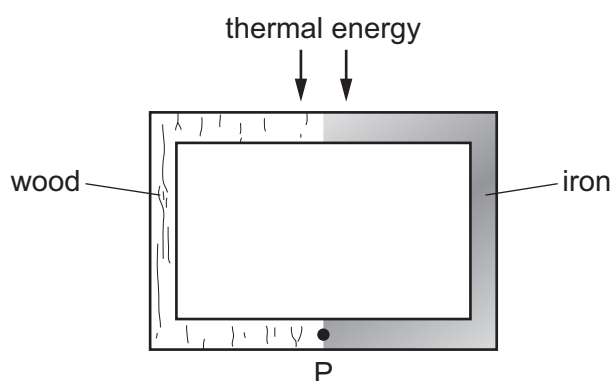
	average speed of gas molecules	pressure of gas
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

32 A substance is a gas when its temperature is 65°C .

How do the boiling point and the melting point of this substance compare with 65°C ?

	boiling point	melting point
A	above 65°C	above 65°C
B	above 65°C	below 65°C
C	below 65°C	above 65°C
D	below 65°C	below 65°C

33 The diagram shows an object made of wood and of iron. Thermal energy is supplied in the position shown. Point P is marked at the bottom of the object.



How does most thermal energy reach point P?

- A** by conduction through the iron
- B** by conduction through the wood
- C** by convection through the iron
- D** by convection through the wood

34 Diagram 1 represents a wave.

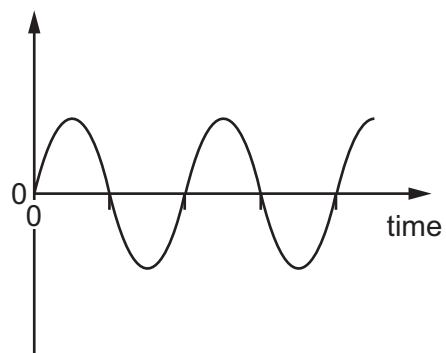
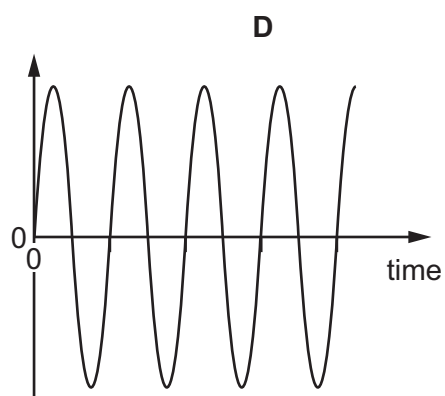
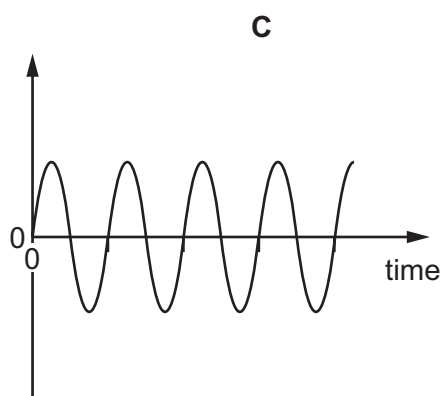
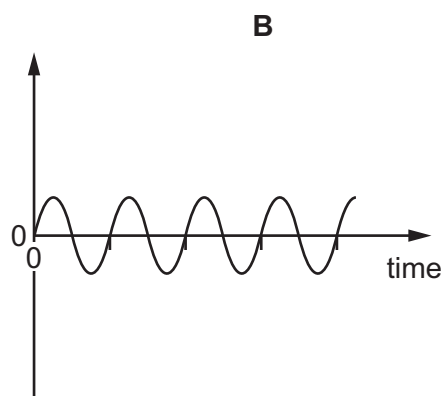
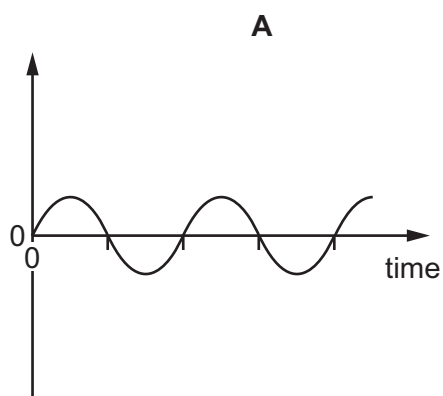


diagram 1

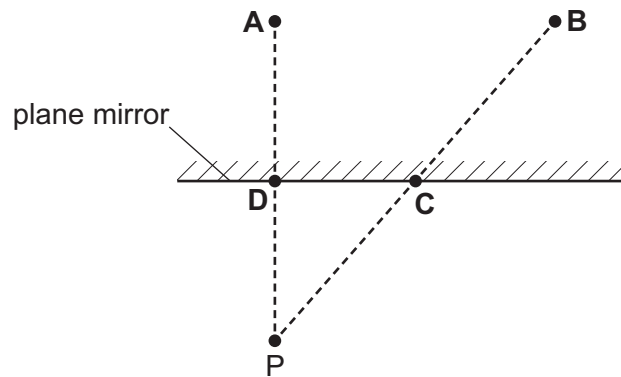
Which diagram below represents a wave with double the frequency and half the amplitude of the wave in diagram 1?

The scales are the same in all the diagrams.



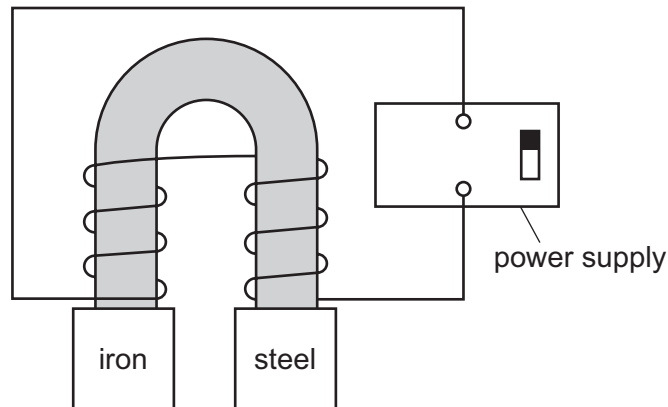
35 A boy stands at point P in front of a plane mirror.

At which labelled point is the boy's image formed?



36 The diagram shows an electromagnet attracting an iron bar and a steel bar.

The iron and the steel have become magnetised by the electromagnet.

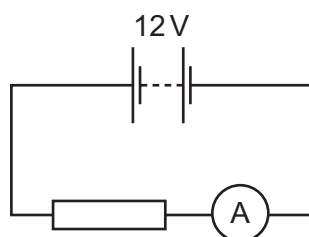


What happens to the iron bar and to the steel bar when the power supply is switched off?

	iron bar	steel bar
A	not magnetised	not magnetised
B	not magnetised	remains magnetised
C	remains magnetised	not magnetised
D	remains magnetised	remains magnetised

37 The diagram shows a 12V battery connected to a resistor and an ammeter.

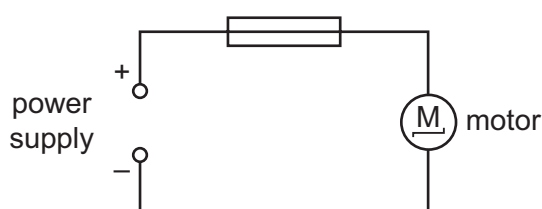
The reading on the ammeter is 3.0A.



What is the resistance of the resistor?

- A** 0.25Ω **B** 4.0Ω **C** 15Ω **D** 36Ω

38 An electric motor is connected to a power supply by insulated wires. The circuit is protected by a fuse, but the wires become hot.



How could the wires be prevented from becoming so hot?

- A** Connect a second identical fuse in the circuit.
B Use a fuse with a higher current rating.
C Use thicker connecting wires.
D Use thicker insulation on the connecting wires.

39 Which row shows how lamps are connected in a lighting circuit and gives an advantage of connecting them in this way?

	how lamps are connected	advantage of connecting them in this way
A	in parallel	they can be switched separately
B	in parallel	they share the voltage
C	in series	they can be switched separately
D	in series	they share the voltage

40 Which row describes the properties of β -particles (beta-particles)?

	they are electromagnetic waves	they are ionising	
A	✓	✓	key
B	✓	x	✓ = yes
C	x	✓	x = no
D	x	x	

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The Periodic Table of Elements

Group																																					
I	II	Key										III	IV	V	VI	VII	VIII																				
3	4	atomic number atomic symbol name relative atomic mass																2																			
Li lithium 7	Be beryllium 9	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																		
11	12	H hydrogen 1	He helium 4	Ne neon 20	Ar argon 40	K potassium 39	Ca calcium 40	Sc scandium 45	Ti titanium 48	V vanadium 51	Cr chromium 52	Mn manganese 55	Fe iron 56	Co cobalt 59	Ni nickel 59	Cu copper 64	Zn zinc 65	Ga gallium 70	Ge germanium 73	As arsenic 75	Se selenium 79	Br bromine 80	Kr krypton 84														
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54		
Na sodium 23	Mg magnesium 24	Y yttrium 89	Zr zirconium 91	Nb niobium 93	Mo molybdenum 96	Tc technetium —	Ru ruthenium 101	Rh rhodium 103	Pd palladium 106	Ag silver 108	Cd cadmium 112	In indium 115	Sn tin 119	Sb antimony 122	Te tellurium 128	I iodine 127	Xe xenon 131	Rb rubidium 85	Sr strontium 88	Y yttrium 89	Zr zirconium 91	Nb niobium 93	Mo molybdenum 96	Tc technetium —	Ru ruthenium 101	Rh rhodium 103	Pd palladium 106	Ag silver 108	Cd cadmium 112	In indium 115	Sn tin 119	Sb antimony 122	Te tellurium 128	I iodine 127	Xe xenon 131		
55	56	57–71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89–103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Cs caesium 133	Ba barium 137	lanthanoids	Hf hafnium 178	Ta tantalum 181	W tungsten 184	Re rhenium 186	Os osmium 190	Ir iridium 192	Pt platinum 195	Au gold 197	Hg mercury 201	Tl thallium 204	Pb lead 207	Bi bismuth 209	Po polonium —	At astatine —	Rn radon —	Fr francium —	Ra radium —	actinoids	Rf rutherfordium —	Db dubnium —	Sg seaborgium —	Bh bohrium —	Hs hassium —	Rg roentgenium —	Cn copernicium —	Nh nihonium —	Fl flerovium —	Lv livermorium —	Ts tennessine —	Og oganesson —	Uu unbinilium —	Uub unbibium —	Uut untrium —	Uuq unquadium —	Uuq unquadium —

lanthanoids	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
	La lanthanum 139	Ce cerium 140	Pr praseodymium 141	Nd neodymium 144	Pm promethium —	Sm samarium 150	Eu europium 152	Gd gadolinium 157	Tb terbium 159	Dy dysprosium 163	Ho holmium 165	Er erbium 167	Tm thulium 169	Yb ytterbium 173	Lu lutetium 175
actinoids	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103
	Ac actinium	Th thorium 232	Pa protactinium 231	U uranium 238	Np neptunium —	Pu plutonium —	Am americium —	Cm curium —	Bk berkelium —	Cf californium —	Es einsteinium —	Fm fermium —	Md mendelevium —	No nobelium —	Lr lawrencium —

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