

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMBINED SCIENCE

0653/01

Paper 1 Multiple Choice

October/November 2004

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.

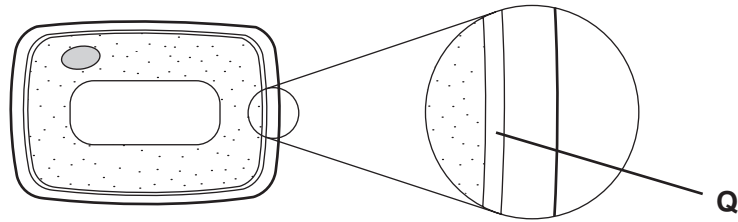
Any rough working should be done in this booklet.

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

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



- 1 The diagram shows a plant cell and part of that cell in higher magnification.



What does structure **Q** do during the uptake of water and mineral ions from the soil?

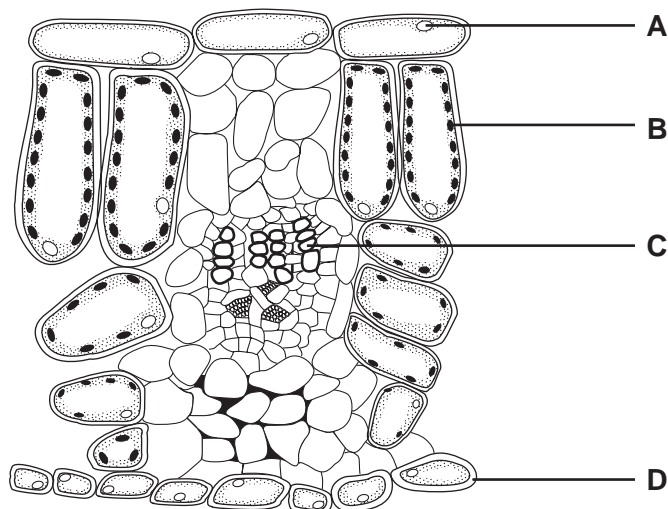
	allows water to pass freely	allows mineral ions to pass freely
A	✓	✓
B	✓	x
C	x	✓
D	x	x

- 2 Which gas is given off when the enzyme catalase is added to a solution of hydrogen peroxide?

- A** carbon dioxide
- B** carbon monoxide
- C** hydrogen
- D** oxygen

- 3 The diagram shows a section through a leaf.

Where will starch be found?



4 The table shows diets of four different people.

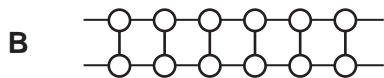
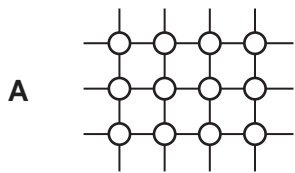
Which diet would cause a person to suffer from scurvy (including bleeding gums) and anaemia (lack of haemoglobin)?

	carbohydrates	vitamin C	proteins	iron
A	x	✓	✓	x
B	✓	x	✓	x
C	✓	✓	x	✓
D	✓	x	x	✓

5 The diagram shows part of a starch molecule.



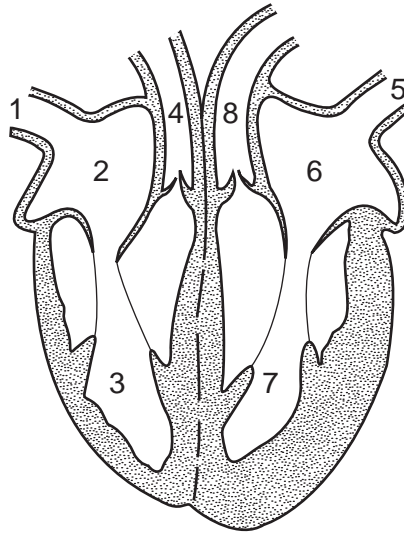
Which diagram shows this molecule after it has been **completely** digested?



6 What is the correct word equation for respiration?

- A** glucose → oxygen + water + carbon dioxide
- B** glucose + carbon dioxide → oxygen + water
- C** glucose + oxygen → water + carbon dioxide
- D** glucose + water → oxygen + carbon dioxide

7 The diagram shows a section through the human heart.

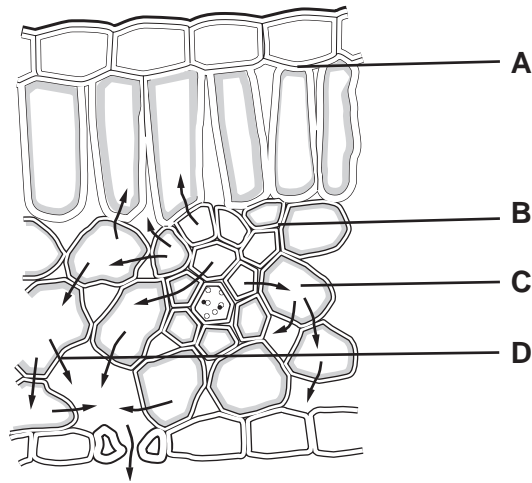


Which sequence shows the flow of **deoxygenated** blood through the heart?

- A 1 → 2 → 3 → 4
 - B 4 → 3 → 2 → 1
 - C 5 → 6 → 7 → 8
 - D 8 → 7 → 6 → 5
- 8 Which part of the blood may be described as 'small colourless fragments of cytoplasm without a nucleus and containing granules'?
- A plasma
 - B platelets
 - C red blood cells
 - D white blood cells

9 The diagram shows a section through a leaf. The arrows show water movement.

Where does the water evaporate?



10 In experiments on transpiration, both the cutting of a leafy shoot and the assembly of the apparatus must be done under water.

What is the reason for this?

- A to ensure a clean cut
- B to ensure air-tight seals
- C to prevent air entering the xylem
- D to prevent water leaving the shoot

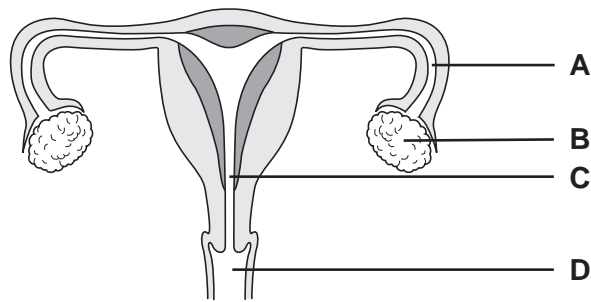
11 Four drivers have their reaction times measured.

Which driver is the most likely to have been drinking alcohol?

driver	reaction time /s
A	3
B	4
C	8
D	2

12 The diagram shows the human female reproductive system.

Where is the egg fertilised?



13 The table shows the conditions in which four samples of seeds were kept.

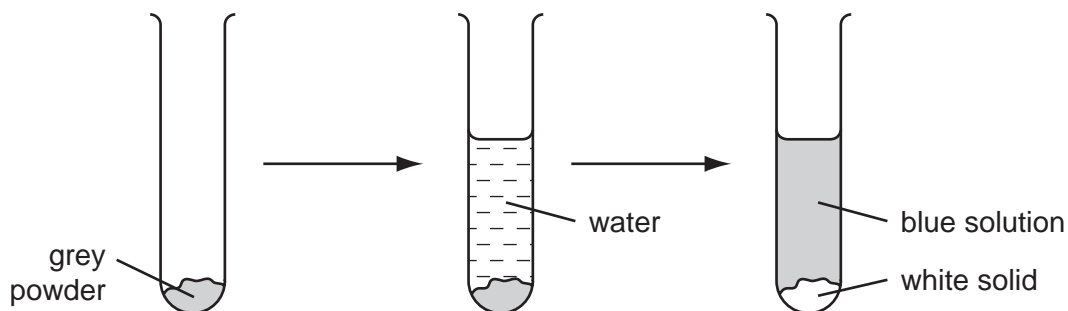
Which sample germinated?

sample	temperature / °C	water	oxygen
A	0	present	absent
B	10	absent	absent
C	20	present	present
D	40	absent	present

14 Which displayed formulae correctly represent a molecule of carbon dioxide and of nitrogen?

	carbon dioxide, CO ₂	nitrogen, N ₂
A	C=O=O	N=N
B	C=O=O	N≡N
C	O=C=O	N=N
D	O=C=O	N≡N

- 15 Some water is added to a grey powder. After shaking, a blue solution and a white solid are seen.



What does the grey powder contain?

- A one element
 - B one compound
 - C a mixture of elements
 - D a mixture of compounds
- 16 Solid mixtures are made from four salts, as shown.

mixture X	mixture Y
barium sulphate: white, insoluble	potassium chromate(VI): yellow, soluble
iron(III) sulphate: brown, soluble	potassium manganate(VII): purple, soluble

Each mixture is shaken with water.

How can the mixtures be separated?

	mixture X	mixture Y
A	chromatography	chromatography
B	chromatography	filtration
C	filtration	chromatography
D	filtration	filtration

- 17 Which formula contains the most elements?

- A HClO
- B PbO_2
- C Rb_2S
- D SiCl_4

18 The table below gives information on the properties of four gases.

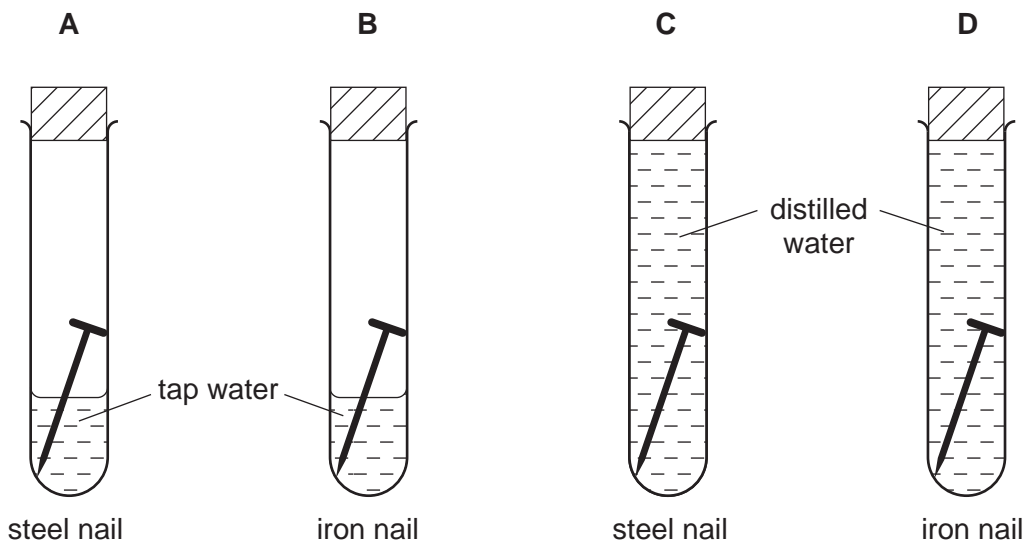
Which gas is the most suitable for filling an airship?

	flammability	density
A	high	high
B	high	low
C	low	high
D	low	low

19 Which substances explode when mixed together at room temperature?

- A** hydrogen and air
- B** magnesium and acid
- C** methane and air
- D** sodium and acid

20 In which test-tube does rusting occur most quickly?



21 The results of flame tests on four ores are shown.

ore	flame colour
P	brick red
Q	green
R	lilac
S	yellow

Which ores contain a metal from Group I?

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

22 In which reaction is carbon dioxide **not** formed?

- A adding hydrochloric acid to calcium
- B adding hydrochloric acid to calcium carbonate
- C burning coke in air
- D burning methane in air

23 What are the correct numbers of atoms in one molecule of nitric acid?

	hydrogen	nitrogen	oxygen
A	1	1	3
B	1	3	1
C	2	1	3
D	2	3	1

24 Are aluminium, iron and sodium hydroxide obtained by electrolysis?

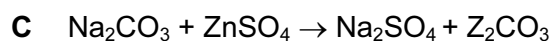
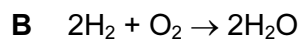
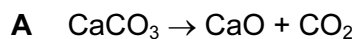
	aluminium	iron	sodium hydroxide
A	✓	✓	✓
B	✓	✓	x
C	x	✓	✓
D	✓	x	✓

25 Octane may undergo, under suitable conditions, either thermal decomposition or combustion.

Which information is correct for these two processes?

	thermal decomposition		combustion	
	oxygen needed	products	oxygen needed	products
A	yes	simpler	no	simpler
B	yes	more complex	no	more complex
C	no	simpler	yes	simpler
D	no	more complex	yes	more complex

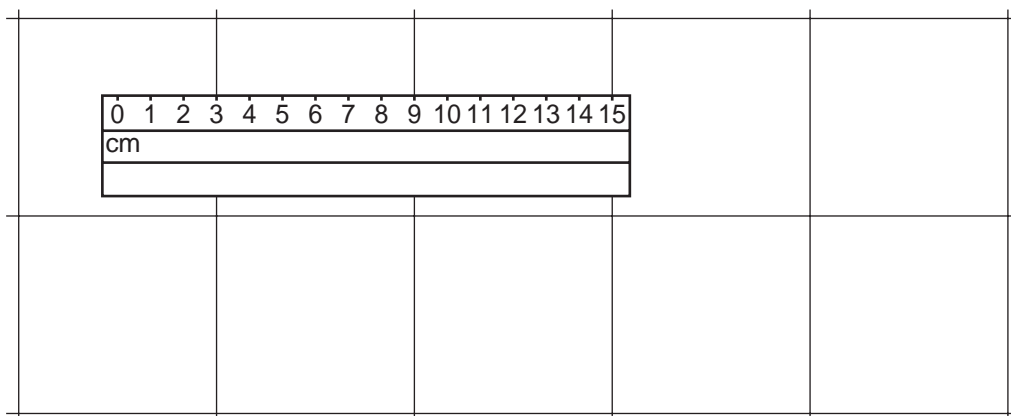
26 Which equation represents a redox reaction?



27 Which of hydrogen, petroleum and wood are fossil fuels?

	hydrogen	petroleum	wood
A	✓	✓	✓
B	✓	x	x
C	x	✓	x
D	x	x	✓

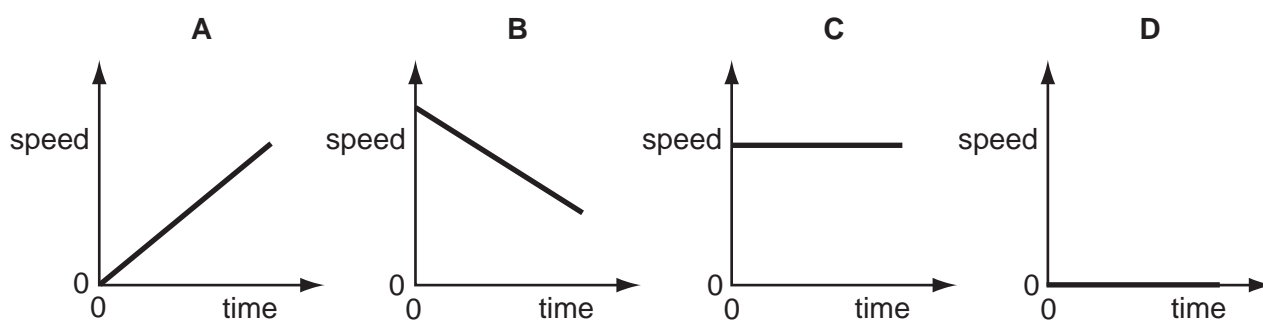
28 A floor is covered with square tiles. The diagram shows a ruler on the tiles.



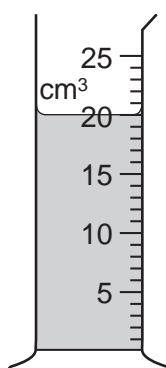
How long is one tile?

- A 3 cm B 6 cm C 9 cm D 12 cm

29 Which speed/time graph applies to an object at rest?



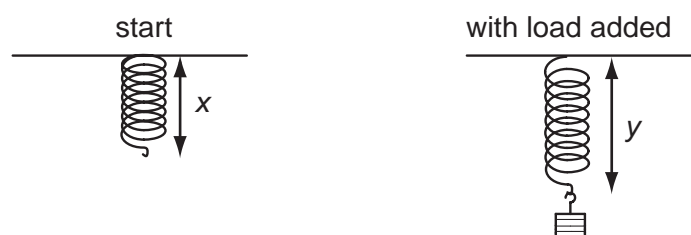
30 The diagram shows some liquid in a measuring cylinder. The mass of the liquid is 16g.



What is the density of the liquid?

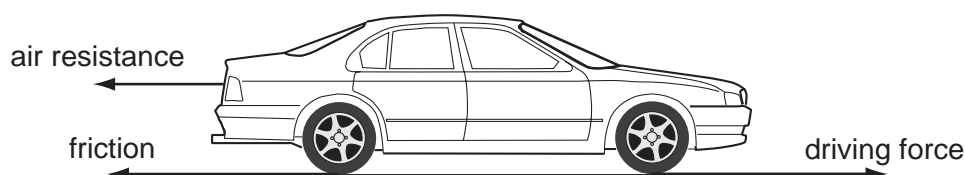
- A 320 g/cm^3 B 36 g/cm^3 C 1.25 g/cm^3 D 0.8 g/cm^3

- 31 A student carries out an experiment to plot an extension / load graph for a spring. The diagrams show the apparatus at the start of the experiment and with a load added.



What is the extension caused by the load?

- A** x **B** y **C** $y + x$ **D** $y - x$
- 32 Three horizontal forces act on a car that is moving along a straight, level road.



Which combination of forces would result in the car moving at constant speed?

	air resistance	friction	driving force
A	200 N	1000 N	800 N
B	800 N	1000 N	200 N
C	800 N	200 N	1000 N
D	1000 N	200 N	800 N

- 33 A child pushes a toy car along a level floor and then lets it go.

As the car slows down, what is the main energy change?

- A** from chemical to heat
B from chemical to kinetic
C from kinetic to gravitational (potential)
D from kinetic to heat

34 A beaker of water is heated at its base.

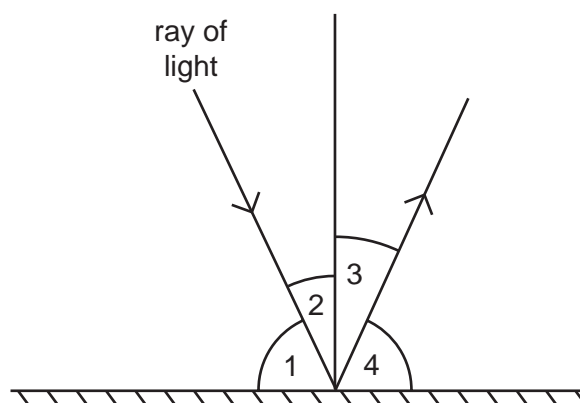
Why does the water at the base rise?

- A It contracts and becomes less dense.
- B It contracts and becomes more dense.
- C It expands and becomes less dense.
- D It expands and becomes more dense.

35 Which type of radiation lies between visible light and microwaves in the electromagnetic spectrum?

- A infra-red
- B radio waves
- C ultra-violet
- D X-rays

36 The diagram shows the path of a ray of light which has been reflected from a smooth surface.

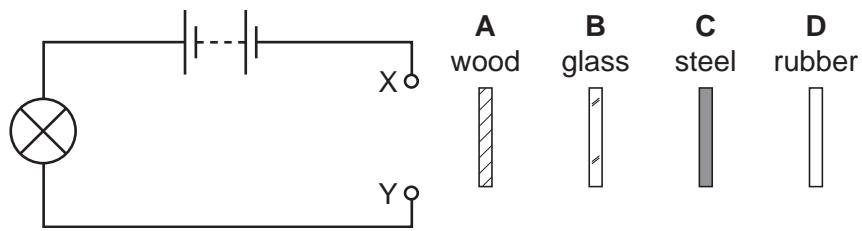


Which angles are the angles of incidence and reflection?

	angle of incidence	angle of reflection
A	1	4
B	2	3
C	3	2
D	4	1

- 37 A circuit is set up with a gap between two terminals X and Y. The four strips of material shown in the diagram are connected in turn across the gap.

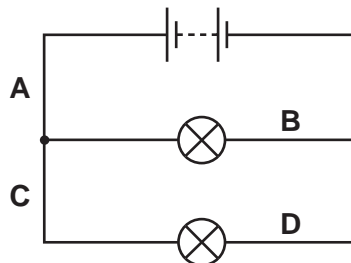
Which strip completes the circuit so that the lamp lights?



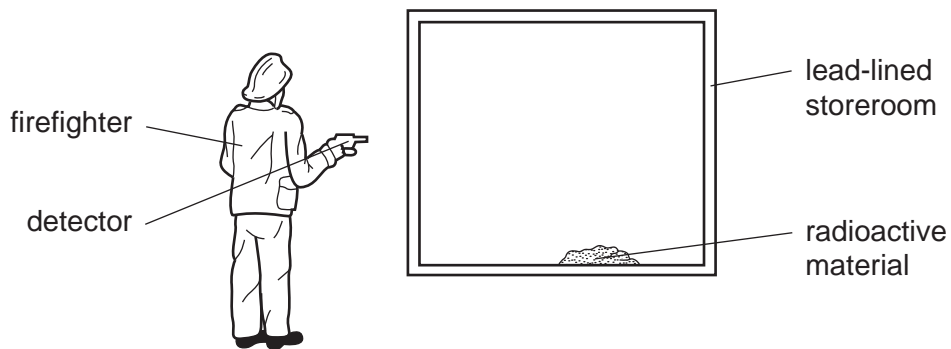
- 38 A pupil measures the voltage across a device and the current in it.

Which calculation gives the resistance of the device?

- A current + voltage
 - B current \div voltage
 - C voltage \div current
 - D voltage \times current
- 39 In which position in the circuit shown should a switch be placed so that both lamps can be switched on or off at the same time?



- 40 During a fire in a laboratory storeroom, some radioactive material was spilled. A firefighter detected radiation through the lead-lined walls of the storeroom. The radiation was emitted by the radioactive material.



Which type of radiation was being detected?

- A alpha-particles
- B beta-particles
- C gamma-rays
- D X-rays

DATA SHEET
The Periodic Table of the Elements

		Group																													
		I	II	III	IV	V	VI	VII	VIII	IX	X																				
7	3	Li Lithium 4	Be Beryllium 4	<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">H Hydrogen 1</td> </tr> </table>										1	H Hydrogen 1	B Boron 5	C Carbon 6	N Nitrogen 7	O Oxygen 8	F Fluorine 9	Ne Neon 10										
1	H Hydrogen 1																														
23	11	Na Sodium 11	Mg Magnesium 12	Al Aluminium 13	Si Silicon 14	P Phosphorus 15	S Sulphur 16	Cl Chlorine 17	Ar Argon 18																						
39	19	K Potassium 19	Ca Calcium 20	Sc Scandium 21	Ti Titanium 22	V Vanadium 23	Cr Chromium 24	Mn Manganese 25	Fe Iron 26	Co Cobalt 27	Ni Nickel 28	Cu Copper 29	Zn Zinc 30	Ga Gallium 31	Ge Germanium 32	As Arsenic 33	Se Selenium 34	Br Bromine 35	Kr Krypton 36												
85	37	Rb Rubidium 37	Sr Strontium 38	Y Yttrium 39	Zr Zirconium 40	Nb Niobium 41	Mo Molybdenum 42	Tc Technetium 43	Ru Ruthenium 44	Rh Rhodium 45	Pd Palladium 46	Ag Silver 47	Cd Cadmium 48	In Indium 49	Sn Tin 50	Sb Antimony 51	Te Tellurium 52	I Iodine 53	Xe Xenon 54												
133	55	Cs Caesium 55	Ba Barium 56	La Lanthanum 57	Hf Hafnium 72	Ta Tantalum 73	W Tungsten 74	Re Rhenium 75	Os Osmium 76	Ir Iridium 77	Pt Platinum 78	Au Gold 79	Hg Mercury 80	Tl Thallium 81	Pb Lead 82	Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86												
87	88	Fr Francium 87	Ra Radium 88	Ac Actinium 89	<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="text-align: center;">a</td> <td style="text-align: center;">X</td> <td style="text-align: center;">b</td> </tr> </table>										a	X	b	Lu Lutetium 71	Yb Ytterbium 70	Tm Thulium 69	Er Erbium 68	Ho Holmium 67	Dy Dysprosium 66	Tb Terbium 65	Gd Gadolinium 64	Eu Europium 63	Sm Samarium 62	Pm Promethium 61	Nd Neodymium 60	Pr Praseodymium 59	Ce Cerium 58
a	X	b																													
227	89	Fr Francium 87	Ra Radium 88	Ac Actinium 89	La Lanthanum 57	Ta Tantalum 73	W Tungsten 74	Re Rhenium 75	Os Osmium 76	Ir Iridium 77	Pt Platinum 78	Au Gold 79	Hg Mercury 80	Tl Thallium 81	Pb Lead 82	Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86												
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