



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CO-ORDINATED SCIENCES

0654/13

Paper 1 Multiple Choice

May/June 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 **15** printed pages and **1** blank page.

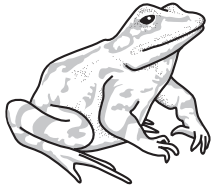


1 Which process releases energy in all living things?

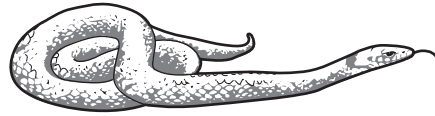
- A breathing
- B digestion
- C muscle contraction
- D respiration

2 The diagram shows four vertebrate animals.

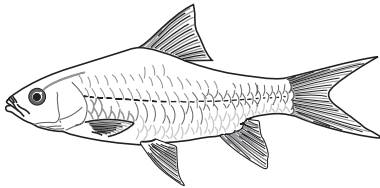
P



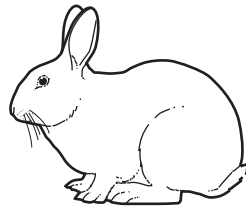
Q



R



S



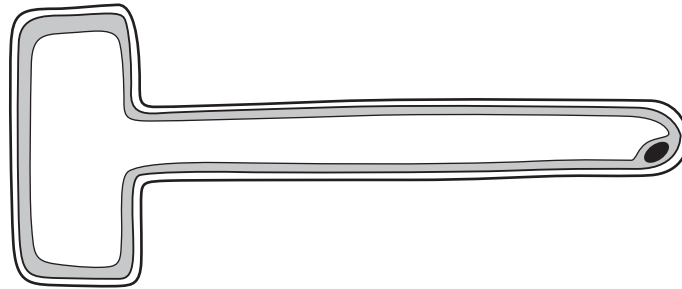
Which animals have lungs?

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

3 Which molecule carries energy into a cell and which is a process that uses this energy?

	molecule	process
A	glucose	growth
B	iron	movement
C	protein	digestion
D	starch	storage

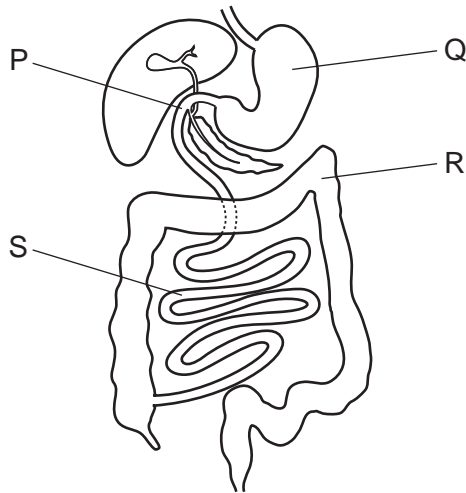
- 4 The diagram shows a root hair cell.



What shows that it is a plant cell?

- A It has a large surface area.
 - B It has a large vacuole.
 - C It has no cell membrane.
 - D It has no cell wall.
- 5 What happens shortly after eating a large amount of sugar?
- A More insulin is secreted by the pancreas.
 - B More urea is made in the liver.
 - C More urine is excreted by the kidneys.
 - D More water is removed from the blood.

6 The diagram shows part of the alimentary canal.



Where is bile added and where is acid released?

	addition of bile	release of acid
A	P	Q
B	Q	R
C	R	S
D	S	P

7 Tests were carried out on a clear liquid. The table shows the results.

test	result
biuret	purple colour
ethanol	white colour
iodine	brown colour

What did the clear liquid contain?

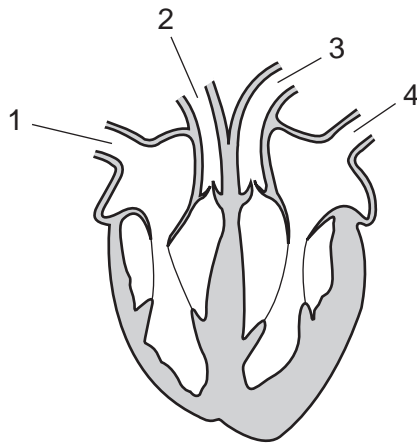
	fat	protein	starch
A	✓	✓	✓
B	✓	✓	x
C	✓	x	✓
D	x	✓	✓

key

✓ = yes

x = no

8 The diagram shows a section through the heart.



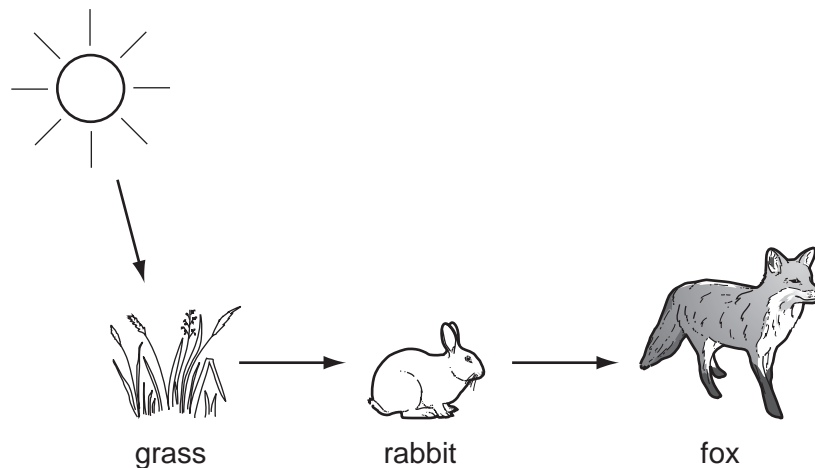
Which two blood vessels are arteries?

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

9 What is an ecosystem?

- A** a community and its habitat
B a group of organisms and their predators
C all the organisms in a food chain
D where an organism lives

10 The diagram shows a short food chain.



In the food chain, what is the importance of the rabbit?

- A** It absorbs carbon dioxide.
B It absorbs the Sun's energy.
C It passes on energy from plants.
D It releases oxygen.

11 Which is an example of cloning?

- A pollinating flowers by insects
- B producing offspring by sexual intercourse
- C producing plants by tissue culture
- D seeds forming in an ovary

12 Why is seed dispersal important?

- A It causes the development of a fruit.
- B It makes seeds more fertile.
- C It prevents asexual reproduction.
- D It reduces competition between seedlings.

13 What passes from a mother to a fetus in her uterus?

- A blood platelets
- B mineral ions
- C plasma
- D red blood cells

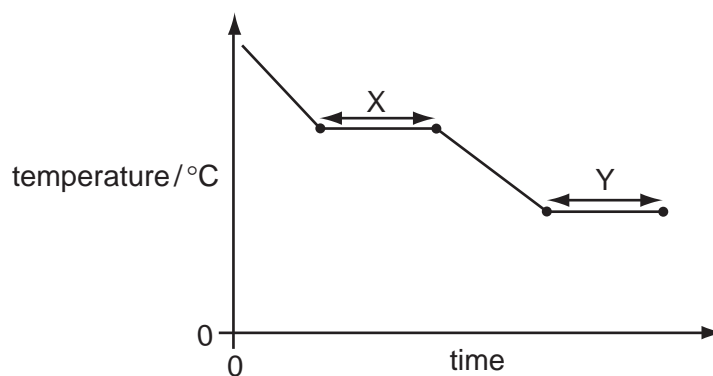
14 Which trends in physical properties are correct for the alkali metals down Group I?

	hardness	melting point
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

15 What is made when amino acids join together in a large chain?

- A cellulose
- B glucose
- C protein
- D starch

16 The graph shows the changes in temperature when a substance is cooled.



Which describes the processes occurring at X and Y?

	X	Y
A	boiling	melting
B	condensing	freezing
C	freezing	condensing
D	melting	boiling

17 Some properties of three substances are shown.

substance	melting point /°C	boiling point /°C	electrical conductivity when molten
W	801	1413	good
X	-111	-78	poor
Y	1610	2230	poor

What are the structures of W, X and Y?

	giant covalent structure	giant ionic structure	molecular structure
A	W	Y	X
B	X	W	Y
C	Y	W	X
D	Y	X	W

18 Large hydrocarbons can be1..... to make smaller, more useful molecules.

Small hydrocarbon molecules can be2..... to make long molecules.

Which words correctly complete gaps 1 and 2?

	1	2
A	cracked	distilled
B	cracked	polymerised
C	distilled	polymerised
D	distilled	cracked

19 Electrolysis of sodium chloride is used to obtain chlorine.

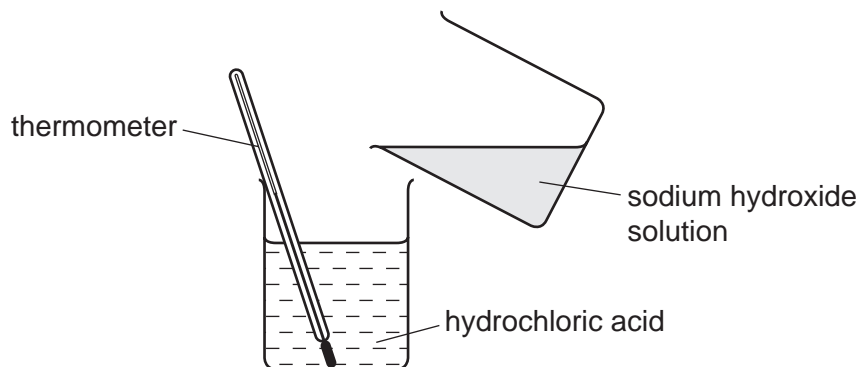
In what form is sodium chloride electrolysed and at which electrode is the chlorine obtained?

	form of sodium chloride	electrode at which chlorine is obtained
A	in aqueous solution	anode
B	in aqueous solution	cathode
C	solid	anode
D	solid	cathode

20 How is carbon (coke) used in the extraction of iron from iron oxide?

- A** as an anode
- B** as a cathode
- C** as an oxidising agent
- D** as a reducing agent

21 Sodium hydroxide solution is added to hydrochloric acid.



Which shows how the pH and temperature change as the reaction takes place?

	pH	temperature
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

22 Which statements about a positive test for a nitrate ion are correct?

- 1 Aluminium is used.
- 2 The nitrate ion is reduced to ammonia.
- 3 Ammonia turns damp litmus paper red.

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

23 A solution is tested by adding acidified silver nitrate solution.

Which ion causes the white precipitate to form?

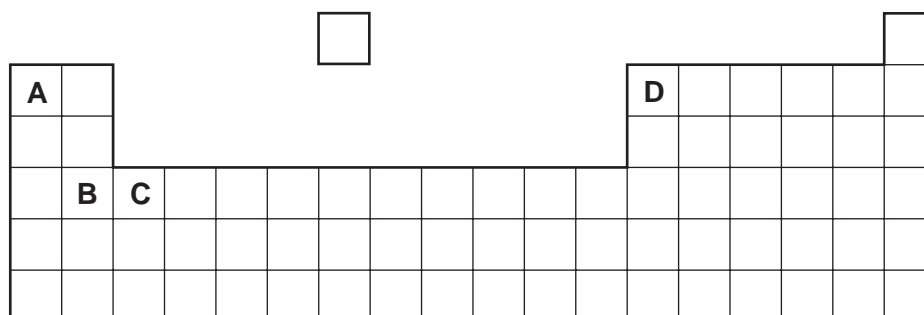
- A** chloride ions, Cl^-
- B** copper ions, Cu^{2+}
- C** hydroxide ions, OH^-
- D** sodium ions, Na^+

24 Which statement about methane is **not** correct?

- A Methane burns in air to form carbon dioxide and water.
- B Methane can be obtained from the decay of waste material.
- C Methane is a fossil fuel.
- D When methane burns, an endothermic reaction takes place.

25 The diagram shows part of the Periodic Table.

Which element has atoms containing three electrons in the outer shell?



26 Aspirin can be used to relieve headaches.

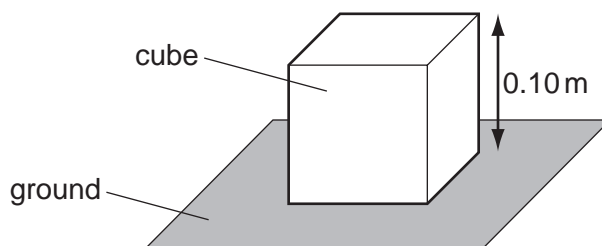
Which terms correctly describe aspirin?

	analgesic	chemotherapy agent	drug	
A	✓	✓	x	key ✓ = yes x = no
B	✓	x	✓	
C	x	✓	x	
D	x	x	✓	

27 Which is **not** a colloid?

- A cellulose
- B milk
- C paint
- D smoke

- 28 One side of a cube stands on the ground.



The cube weighs 200 N and its sides are 0.10 m long.

How much pressure does the cube exert on the ground?

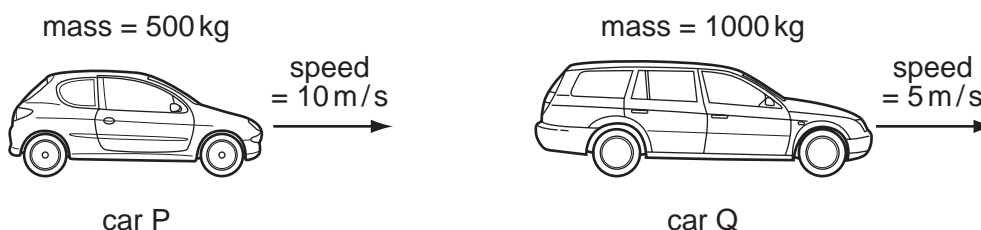
- A** 2.0 Pa **B** 20 Pa **C** 2000 Pa **D** 20 000 Pa
- 29 A student needs to find the density of a large cubic block of wood.
- Which two pieces of apparatus should she use?
- A** balance and metre rule
B balance and thermometer
C measuring cylinder and metre rule
D measuring cylinder and thermometer
- 30 In an experiment, a student measures the time taken for an object to fall to the ground. He carries out the experiment ten times. The table shows his results.

time/s	26.4	26.8	26.4	24.4	24.0	26.8	25.4	23.4	26.4	24.0
--------	------	------	------	------	------	------	------	------	------	------

Which value should the student use?

- A** 24.0 s **B** 25.4 s **C** 26.4 s **D** 26.8 s
- 31 Which group contains only secondary colours of light?
- A** cyan, green, magenta
B cyan, green, yellow
C green, magenta, yellow
D yellow, cyan, magenta

32 Two cars have different masses and different speeds as shown.



How do the momentum and the kinetic energy of the two cars compare?

	momentum	kinetic energy
A	P greater than Q	P less than Q
B	P equal to Q	P greater than Q
C	P equal to Q	P equal to Q
D	P less than Q	P equal to Q

33 A satellite orbits the Earth.

Is the satellite in a gravitational field and is the satellite in a magnetic field?

	a gravitational field	a magnetic field
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = in field

✗ = not in field

34 What is meant by the current in a wire?

- A** the charge flowing through the wire per second
- B** the energy the wire can transfer elsewhere per second
- C** the power the wire can produce per second
- D** the work the wire does per second

- 35 An electronic circuit is used as a temperature detector.



The current in the detector is small. The detector operates a component that allows it to control a larger current in a heater.

Which component is suitable?

- A a diode
 - B a dynamo
 - C a reed relay
 - D a transformer
- 36 Microphones and earphones are both used with audio equipment.

Which energy change takes place in a microphone and which takes place in an earphone?

	microphone	earphone
A	electrical to sound	electrical to sound
B	electrical to sound	sound to electrical
C	sound to electrical	electrical to sound
D	sound to electrical	sound to electrical

- 37 Electrical energy from a power station is used a long distance away from it.

Which row shows the type of current needed and the device used for efficient transmission?

	type of current	device
A	alternating	dynamo
B	alternating	transformer
C	direct	dynamo
D	direct	transformer

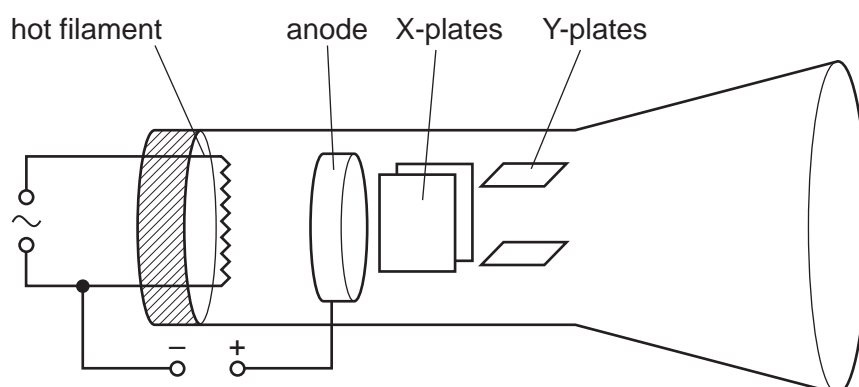
38 Which process is used in a nuclear power station and which nuclear change happens in this process?

	process used	nuclear change
A	fission	heavy nuclei split
B	fission	light nuclei join together
C	fusion	heavy nuclei split
D	fusion	light nuclei join together

39 Which row describes the properties of beta radiation?

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

40 The diagram shows the basic structure of a cathode-ray tube in an oscilloscope.



From which component do the cathode rays start?

- A** the anode
- B** the hot filament
- C** the X-plates
- D** the Y-plates

DATA SHEET

The Periodic Table of the Elements

Group		I	II	III	IV	V	VI	VII	0
7 Li Lithium 3	9 Be Beryllium 4	1 H Hydrogen 1							2 He Helium 2
23 Na Sodium 11	24 Mg Magnesium 12			5 B Boron 5	6 C Carbon 6	7 N Nitrogen 7	8 O Oxygen 8	9 F Fluorine 9	10 Ne Neon 10
39 K Potassium 19	40 Ca Calcium 20			11 B Boron 5	12 C Carbon 6	13 Al Aluminium 13	14 N Nitrogen 7	15 P Phosphorus 15	16 S Sulfur 16
85 Rb Rubidium 37	86 Sr Strontium 38			27 Al Aluminium 13	28 Si Silicon 14	29 K Potassium 19	30 Ca Calcium 20	31 Sc Scandium 21	32 Ti Titanium 22
133 Cs Caesium 55	137 Ba Barium 56			59 Co Cobalt 27	56 Fe Iron 26	57 Mn Manganese 25	58 Cr Chromium 24	59 V Vanadium 23	60 Ti Titanium 22
226 Ra Radium 88	227 Ac Actinium 89 †			64 Cu Copper 29	65 Zn Zinc 30	66 Ni Nickel 28	67 Co Cobalt 27	68 Ni Nickel 28	69 Cd Cadmium 48
				70 Ga Gallium 31	71 Ge Germanium 32	72 As Arsenic 33	73 Se Selenium 34	74 Br Bromine 35	75 Kr Krypton 36
				76 Os Osmium 76	77 Ir Iridium 77	78 Pt Platinum 78	79 Au Gold 79	80 Hg Mercury 80	81 Tl Thallium 81
				82 Pb Lead 82	83 Bi Bismuth 83	84 Po Polonium 84	85 At Astatine 85	86 Rn Radon 86	
				87 Fr Francium 87	88 Ra Radium 88	89 Ac Actinium 89 †			
140 Ce Cerium 58	141 Pr Praseodymium 59	142 Nd Neodymium 60	143 Pm Promethium 61	144 Sm Samarium 62	145 Eu Europium 63	146 Gd Gadolinium 64	147 Tb Terbium 65	148 Dy Dysprosium 66	149 Ho Holmium 67
232 Th Thorium 90	231 Pa Protactinium 91	232 U Uranium 92	233 Np Neptunium 93	234 Pu Plutonium 94	235 Am Americium 95	236 Cm Curium 96	237 Bk Berkelium 97	238 Cf Californium 98	239 Es Einsteinium 99
				150 Sm Samarium 62	151 Eu Europium 63	152 Gd Gadolinium 64	153 Tb Terbium 65	154 Dy Dysprosium 66	155 Ho Holmium 67
				156 Sm Samarium 62	157 Eu Europium 63	158 Gd Gadolinium 64	159 Tb Terbium 65	160 Dy Dysprosium 66	161 Ho Holmium 67
				162 Sm Samarium 62	163 Eu Europium 63	164 Gd Gadolinium 64	165 Tb Terbium 65	166 Dy Dysprosium 66	167 Ho Holmium 67
				168 Sm Samarium 62	169 Eu Europium 63	170 Gd Gadolinium 64	171 Tb Terbium 65	172 Dy Dysprosium 66	173 Ho Holmium 67
				174 Sm Samarium 62	175 Eu Europium 63	176 Gd Gadolinium 64	177 Tb Terbium 65	178 Dy Dysprosium 66	179 Ho Holmium 67
				180 Sm Samarium 62	181 Eu Europium 63	182 Gd Gadolinium 64	183 Tb Terbium 65	184 Dy Dysprosium 66	185 Ho Holmium 67
				186 Sm Samarium 62	187 Eu Europium 63	188 Gd Gadolinium 64	189 Tb Terbium 65	190 Dy Dysprosium 66	191 Ho Holmium 67
				192 Sm Samarium 62	193 Eu Europium 63	194 Gd Gadolinium 64	195 Tb Terbium 65	196 Dy Dysprosium 66	197 Ho Holmium 67
				198 Sm Samarium 62	199 Eu Europium 63	200 Gd Gadolinium 64	201 Tb Terbium 65	202 Dy Dysprosium 66	203 Ho Holmium 67
				204 Sm Samarium 62	205 Eu Europium 63	206 Gd Gadolinium 64	207 Tb Terbium 65	208 Dy Dysprosium 66	209 Ho Holmium 67
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				222 Sm Samarium 62	223 Eu Europium 63	224 Gd Gadolinium 64	225 Tb Terbium 65	226 Dy Dysprosium 66	227 Ho Holmium 67
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				264 Sm Samarium 62	265 Eu Europium 63	266 Gd Gadolinium 64	267 Tb Terbium 65	268 Dy Dysprosium 66	269 Ho Holmium 67
				270 Sm Samarium 62	271 Eu Europium 63	272 Gd Gadolinium 64	273 Tb Terbium 65	274 Dy Dysprosium 66	275 Ho Holmium 67
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				282 Sm Samarium 62	283 Eu Europium 63	284 Gd Gadolinium 64	285 Tb Terbium 65	286 Dy Dysprosium 66	287 Ho Holmium 67
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				306 Sm Samarium 62	307 Eu Europium 63	308 Gd Gadolinium 64	309 Tb Terbium 65	310 Dy Dysprosium 66	311 Ho Holmium 67
				312 Sm Samarium 62	313 Eu Europium 63	314 Gd Gadolinium 64	315 Tb Terbium 65	316 Dy Dysprosium 66	317 Ho Holmium 67
				318 Sm Samarium 62	319 Eu Europium 63	320 Gd Gadolinium 64	321 Tb Terbium 65	322 Dy Dysprosium 66	323 Ho Holmium 67
				324 Sm Samarium 62	325 Eu Europium 63	326 Gd Gadolinium 64	327 Tb Terbium 65	328 Dy Dysprosium 66	329 Ho Holmium 67
				330 Sm Samarium 62	331 Eu Europium 63	332 Gd Gadolinium 64	333 Tb Terbium 65	334 Dy Dysprosium 66	335 Ho Holmium 67
				336 Sm Samarium 62	337 Eu Europium 63	338 Gd Gadolinium 64	339 Tb Terbium 65	340 Dy Dysprosium 66	341 Ho Holmium 67
				342 Sm Samarium 62	343 Eu Europium 63	344 Gd Gadolinium 64	345 Tb Terbium 65	346 Dy Dysprosium 66	347 Ho Holmium 67
				348 Sm Samarium 62	349 Eu Europium 63	350 Gd Gadolinium 64	351 Tb Terbium 65	352 Dy Dysprosium 66	353 Ho Holmium 67
				354 Sm Samarium 62	355 Eu Europium 63	356 Gd Gadolinium 64	357 Tb Terbium 65	358 Dy Dysprosium 66	359 Ho Holmium 67
				360 Sm Samarium 62	361 Eu Europium 63	362 Gd Gadolinium 64	363 Tb Terbium 65	364 Dy Dysprosium 66	365 Ho Holmium 67
				366 Sm Samarium 62	367 Eu Europium 63	368 Gd Gadolinium 64	369 Tb Terbium 65	370 Dy Dysprosium 66	371 Ho Holmium 67
				372 Sm Samarium 62	373 Eu Europium 63	374 Gd Gadolinium 64	375 Tb Terbium 65	376 Dy Dysprosium 66	377 Ho Holmium 67
				378 Sm Samarium 62	379 Eu Europium 63	380 Gd Gadolinium 64	381 Tb Terbium 65	382 Dy Dysprosium 66	383 Ho Holmium 67
				384 Sm Samarium 62	385 Eu Europium 63	386 Gd Gadolinium 64	387 Tb Terbium 65	388 Dy Dysprosium 66	389 Ho Holmium 67
				390 Sm Samarium 62	391 Eu Europium 63	392 Gd Gadolinium 64	393 Tb Terbium 65	394 Dy Dysprosium 66	395 Ho Holmium 67
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				402 Sm Samarium 62	403 Eu Europ				