

Cambridge IGCSE™

CHEMISTRY

Paper 2 Multiple Choice (Extended)

0620/22

May/June 2020

45 minutes

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- 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 multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has **16** pages. Blank pages are indicated.

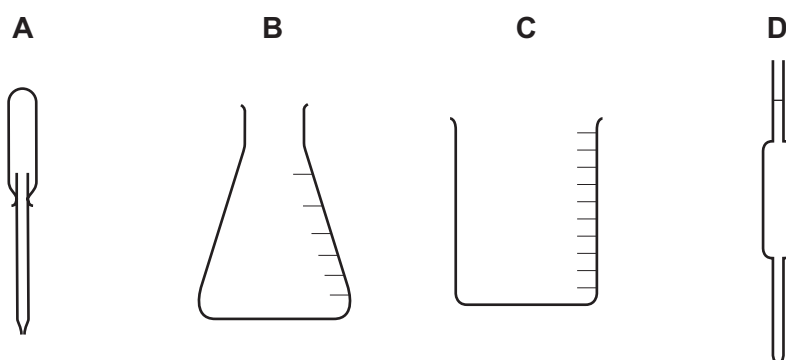


- 1 A mixture of ice and water is left to stand and the ice melts.

Which row describes what happens as the ice is melting?

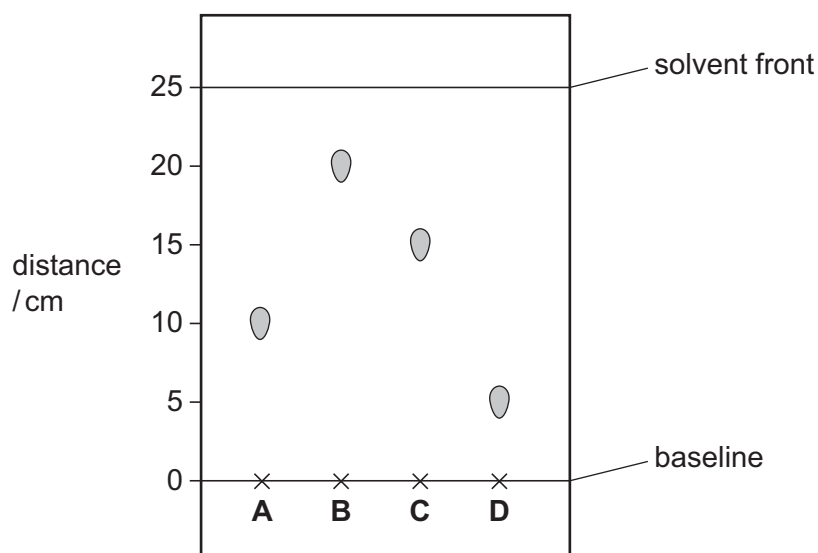
	temperature of mixture	energy changes
A	increases	average kinetic energy of particles increases
B	increases	energy is used to overcome attractive forces
C	stays the same	average kinetic energy of particles increases
D	stays the same	energy is used to overcome attractive forces

- 2 Which piece of apparatus is used to measure 25.0 cm³ of aqueous sodium hydroxide?

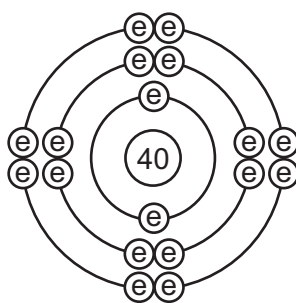


- 3 Paper chromatography is used to determine the R_f values for four different food colourings.

Which food colouring has an R_f value of 0.6?



- 4 The diagram shows the electronic structure of a particle with a nucleon number (mass number) of 40.



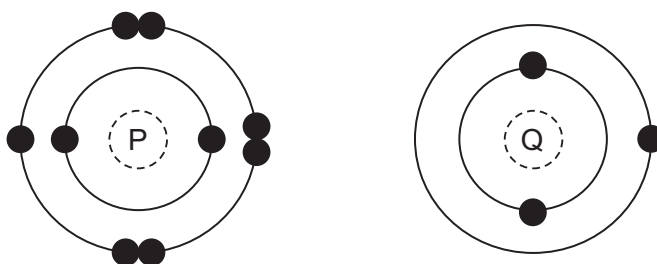
The table shows the suggestions that three students, 1, 2 and 3, made to identify the particle.

	student		
	1	2	3
particle	Ar	Cl	Ca ²⁺

Which students are correct?

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

- 5 The electronic structures of two atoms, P and Q, are shown.



P and Q combine together to form a compound.

What is the type of bonding in the compound and what is the formula of the compound?

	type of bonding	formula
A	ionic	PQ
B	ionic	PQ ₂
C	covalent	PQ ₂
D	covalent	PQ

- 6 Which statement about the structure of a metal explains why metals are malleable?
- A** The electrons can move freely throughout the lattice.
- B** The layers of metal ions can slide over each other.
- C** The metal ions are positively charged.
- D** There is a strong force of attraction between the metal ions and the electrons.
- 7 The bonding, structure and melting point of sodium chloride and sulfur dichloride are shown.

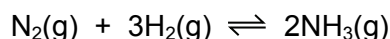
compound	bonding	structure	melting point / °C
sodium chloride	ionic	giant lattice	801
sulfur dichloride	covalent	simple molecular	-121

Why does sulfur dichloride have a lower melting point than sodium chloride?

- A** The covalent bonds in sulfur dichloride are weaker than the attractive forces between molecules in sodium chloride.
- B** The covalent bonds in sulfur dichloride are weaker than the ionic bonds in sodium chloride.
- C** The attractive forces between molecules in sulfur dichloride are weaker than the attractive forces between molecules in sodium chloride.
- D** The attractive forces between molecules in sulfur dichloride are weaker than the ionic bonds in sodium chloride.
- 8 Lead(II) nitrate, $\text{Pb}(\text{NO}_3)_2$, reacts with potassium iodide, KI , to form a yellow precipitate, PbI_2 , and a soluble salt, KNO_3 .

What is the equation for the reaction?

- A** $\text{Pb}(\text{NO}_3)_2 + \text{KI} \rightarrow \text{PbI}_2 + \text{KNO}_3$
- B** $\text{Pb}(\text{NO}_3)_2 + 2\text{KI} \rightarrow \text{PbI}_2 + \text{KNO}_3$
- C** $2\text{Pb}(\text{NO}_3)_2 + 2\text{KI} \rightarrow \text{PbI}_2 + 2\text{KNO}_3$
- D** $\text{Pb}(\text{NO}_3)_2 + 2\text{KI} \rightarrow \text{PbI}_2 + 2\text{KNO}_3$
- 9 The Haber process is a reversible reaction.



The reaction has a 30% yield of ammonia.

Which volume of ammonia gas, NH_3 , measured at room temperature and pressure, is obtained by reacting 0.75 moles of hydrogen with excess nitrogen?

- A** 3600 cm^3 **B** 5400 cm^3 **C** $12\,000 \text{ cm}^3$ **D** $18\,000 \text{ cm}^3$

10 Electrolytes can be broken down by electrolysis.

Which rows are correct for each electrolyte?

	electrolyte	reaction at cathode	product at anode
1	dilute aqueous sodium chloride	$2\text{H}^+ + 2\text{e}^- \rightarrow \text{H}_2$	oxygen
2	concentrated hydrochloric acid	$2\text{H}^+ + 2\text{e}^- \rightarrow \text{H}_2$	chlorine
3	molten aluminium oxide	$2\text{O}^{2-} \rightarrow \text{O}_2 + 4\text{e}^-$	aluminium
4	concentrated aqueous sodium bromide	$\text{Na}^+ + \text{e}^- \rightarrow \text{Na}$	bromine

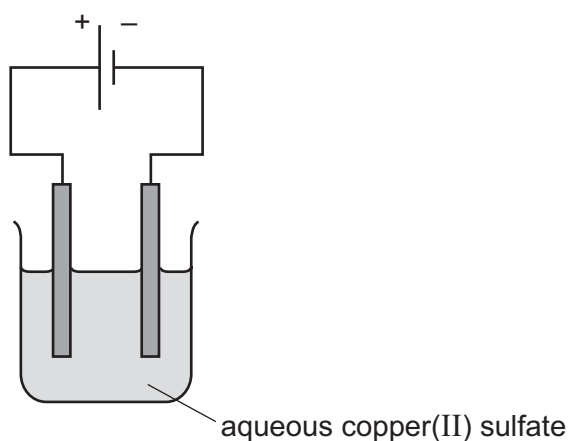
A 1 and 2

B 1 and 4

C 2 and 3

D 3 and 4

11 The electrolysis of aqueous copper(II) sulfate, using inert electrodes, is shown.



Which statement about a reaction at an electrode is correct?

A Copper ions gain electrons at the negative electrode.

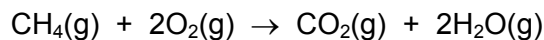
B Copper ions gain electrons at the positive electrode.

C Hydrogen ions gain electrons at the negative electrode.

D Hydrogen ions gain electrons at the positive electrode.

12 Methane burns in excess oxygen.

The equation is shown.



Bond energies are shown.

bond	bond energy / kJ mol ⁻¹
C=O	805
C–H	410
O=O	496
O–H	460

What is the energy change for the reaction?

- A** $(4 \times 410 + 2 \times 496) - (2 \times 805 + 4 \times 460)$
B $(2 \times 805 + 2 \times 460) - (410 + 2 \times 496)$
C $(410 + 2 \times 496) - (805 + 2 \times 460)$
D $(410 + 496) - (805 + 460)$

13 Which statements about hydrogen fuel cells are correct?

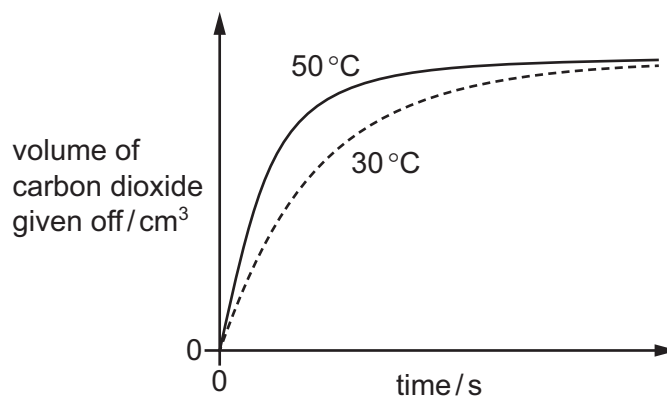
- 1 Water is formed as the only waste product.
- 2 Both water and carbon dioxide are formed as waste products.
- 3 The overall reaction is $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$.
- 4 The overall reaction is endothermic.

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

14 Which list contains **only** chemical changes?

- A** melting, evaporating, dissolving
B rusting, freezing, subliming
C neutralisation, polymerisation, combustion
D boiling, condensing, distillation

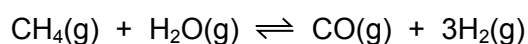
- 15 The results of adding excess marble chips (calcium carbonate) to hydrochloric acid at 50 °C and at 30 °C are shown. Only the temperature is changed.



Which row describes the reacting particles at 30 °C compared to those at 50 °C?

	collision rate	collision energy
A	higher	higher
B	higher	lower
C	lower	higher
D	lower	lower

- 16 Methane reacts with steam and an equilibrium is reached.



The forward reaction is endothermic.

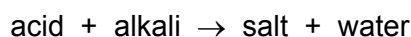
Which row shows how the amount of hydrogen at equilibrium changes when the pressure or temperature is changed as indicated?

	change in temperature	change in pressure	amount of hydrogen
A	decrease	no change	increase
B	increase	no change	decrease
C	no change	increase	decrease
D	no change	decrease	decrease

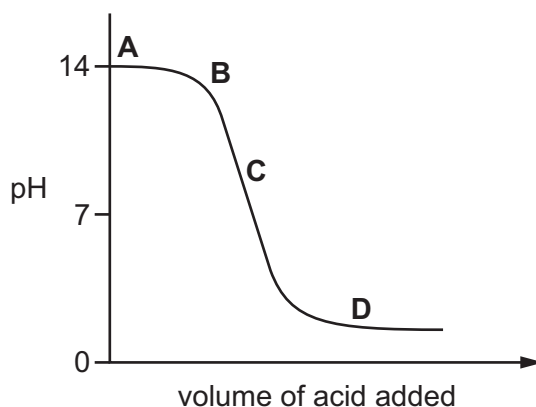
- 17 When aqueous iron(III) chloride is added to aqueous potassium iodide a chemical reaction occurs and iodine is formed.

Which statement is correct?

- A Iodide ions are oxidised, they gain electrons in this reaction.
 - B Iodide ions are oxidised, they lose electrons in this reaction.
 - C Iron(III) chloride is oxidised in this reaction.
 - D Neither iodide ions nor iron(III) chloride is oxidised in this reaction.
- 18 The graph shows how the pH of a solution changes as an acid is added to an alkali.

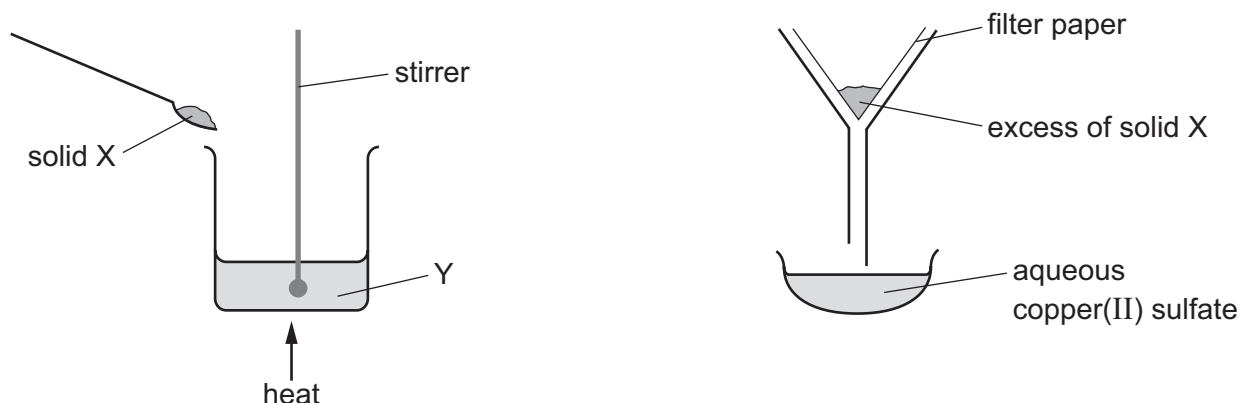


Which letter represents the area of the graph where both acid and salt are present?



- 19 Which statement describes a weak acid?
- A It is a proton acceptor and is fully ionised in aqueous solution.
 - B It is a proton acceptor and is partially ionised in aqueous solution.
 - C It is a proton donor and is fully ionised in aqueous solution.
 - D It is a proton donor and is partially ionised in aqueous solution.

20 The apparatus shown is used to prepare aqueous copper(II) sulfate.



What are X and Y?

	X	Y
A	copper	aqueous iron(II) sulfate
B	copper(II) chloride	dilute sulfuric acid
C	copper(II) oxide	dilute sulfuric acid
D	sulfur	aqueous copper(II) chloride

21 Which process is **not** used in the preparation of an insoluble salt?

- A** filtration
- B** washing
- C** crystallisation
- D** drying

22 Which statement about Group I and Group VII elements is correct?

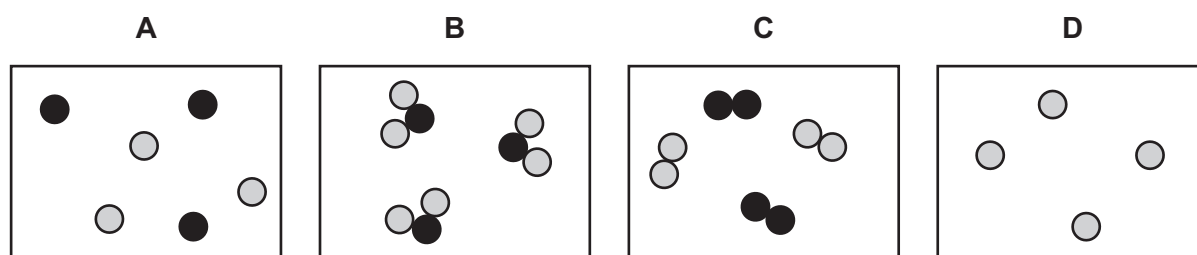
- A** Group VII elements are monoatomic non-metals.
- B** Lithium is more reactive with water than caesium.
- C** The melting points of Group I metals increase down the group.
- D** Potassium bromide reacts with chlorine to produce an orange solution.

23 The properties of the element titanium, Ti, can be predicted from its position in the Periodic Table.

Which row identifies the properties of titanium?

	can be used as a catalyst	conducts electricity when solid	has low density	forms coloured compounds
A	✓	✓	✓	✗
B	✓	✓	✗	✓
C	✓	✗	✓	✓
D	✗	✓	✓	✓

24 Which diagram shows a mixture of noble gases?



25 Which property is shown by **all** metals?

- A** They are extracted from their ores by heating with carbon.
- B** They conduct electricity.
- C** They form acidic oxides.
- D** They react with hydrochloric acid to form hydrogen.

26 Many metal carbonates decompose when they are heated.

Which row describes what happens when potassium carbonate, calcium carbonate and copper(II) carbonate are heated using a Bunsen burner?

	decomposes easily	decomposes with difficulty	does not decompose at Bunsen temperatures
A	calcium carbonate	copper(II) carbonate	potassium carbonate
B	copper(II) carbonate	calcium carbonate	potassium carbonate
C	copper(II) carbonate	potassium carbonate	calcium carbonate
D	potassium carbonate	calcium carbonate	copper(II) carbonate

27 Molten iron from the blast furnace contains impurities.

The process of turning the impure iron into steel involves blowing oxygen into the molten iron and adding calcium oxide.

What are the reasons for blowing in oxygen and adding calcium oxide?

	blowing in oxygen	adding calcium oxide
A	carbon is removed by reacting with oxygen	reacts with acidic impurities making slag
B	carbon is removed by reacting with oxygen	reacts with slag and so removes it
C	iron reacts with the oxygen	reacts with acidic impurities making slag
D	iron reacts with the oxygen	reacts with slag and so removes it

28 Four iron nails are added to four different metal sulfate solutions.

In which solution does a displacement reaction occur?

- A** copper(II) sulfate
- B** magnesium sulfate
- C** sodium sulfate
- D** zinc sulfate

29 Which statement about pure water is **not** correct?

- A** It condenses at 100 °C.
- B** It freezes at 0 °C.
- C** It turns cobalt(II) chloride paper blue.
- D** It turns anhydrous copper(II) sulfate blue.

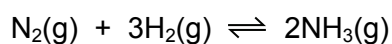
30 Three processes in the carbon cycle are shown.

- 1 Methane reacts with oxygen producing carbon dioxide and water.
- 2 Carbon dioxide and water are absorbed and used by plants to make oxygen.
- 3 Oxygen is used by living things to release energy.

Which processes have taken place?

	1	2	3
A	combustion	photosynthesis	respiration
B	combustion	respiration	photosynthesis
C	photosynthesis	combustion	respiration
D	respiration	photosynthesis	combustion

31 In the Haber process, nitrogen and hydrogen are reacted to make ammonia.



The forward reaction is exothermic.

Which conditions produce the maximum yield of ammonia?

	pressure	temperature
A	high	high
B	high	low
C	low	high
D	low	low

32 Which process, used to prevent iron from rusting, involves sacrificial protection?

- A** alloying
- B** electroplating
- C** galvanising
- D** painting

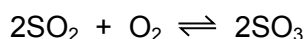
33 A student suggests three uses of calcium carbonate (limestone).

- 1 manufacture of cement
- 2 manufacture of iron
- 3 treating alkaline soils

Which suggestions are correct?

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

34 One of the reactions used in the manufacture of sulfuric acid is shown.



Which catalyst is used to increase the rate of this reaction?

- A** iron
B manganese(IV) oxide
C vanadium(V) oxide
D nickel

35 Ethanol is made on an industrial scale by the fermentation of sugars or by the reaction of ethene with steam in the presence of a suitable catalyst.

What is a **disadvantage** of making ethanol from ethene rather than by fermentation?

- A** A continuous production process is used.
B A non-renewable raw material is used.
C The product is very pure.
D The rate of reaction is very high.

36 Which statement about compounds in the same homologous series is correct?

- A** They have the same chemical properties because they have the same number of carbon atoms.
B They have the same physical properties because they have the same number of carbon atoms.
C They have different chemical properties because they have different numbers of carbon atoms.
D They have different physical properties because they have different numbers of carbon atoms.

- 37 Increasing the number of atoms in one molecule of a hydrocarbon increases the amount of energy released when it burns.

What is the correct order?

	less energy released	→	more energy released
A	ethene	ethane	methane
B	ethene	methane	ethane
C	methane	ethane	ethene
D	methane	ethene	ethane

- 38 An organic compound, P, reacts with zinc to produce a gas, Q.

What are P and Q?

	P	Q
A	ethanoic acid	carbon dioxide
B	ethanoic acid	hydrogen
C	ethanol	carbon dioxide
D	ethanol	hydrogen

- 39 Alkanes undergo substitution reactions in the presence of UV light.

Which equation represents a substitution reaction of ethane?

- A** $\text{C}_2\text{H}_6 + \text{Cl}_2 \rightarrow \text{C}_2\text{H}_4 + 2\text{HCl}$
B $\text{C}_2\text{H}_6 + \text{Cl}_2 \rightarrow \text{C}_2\text{H}_5\text{Cl} + \text{HCl}$
C $\text{C}_2\text{H}_6 + \text{Cl}_2 \rightarrow \text{C}_2\text{H}_4\text{Cl}_2 + \text{H}_2$
D $\text{C}_2\text{H}_6 + \text{HCl} \rightarrow \text{C}_2\text{H}_5\text{Cl} + \text{H}_2$

- 40 Which substances are natural polymers?

- 1 proteins
- 2 carbohydrates
- 3 nylon
- 4 poly(ethene)

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

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The Periodic Table of Elements

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11 Na sodium 23	12 Mg magnesium 24	13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40	19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84	37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium —	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131	55 Cs caesium 133	56 Ba barium 137	57–71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium —	85 At astatine —	86 Rn radon —	87 Fr francium —	88 Ra radium —	89–103 actinoids	104 Rf rutherfordium —	105 Db dubnium —	106 Sg seaborgium —	107 Bh bohrium —	108 Hs hassium —	109 Mt meitnerium —	110 Ds darmstadtium —	111 Rg roentgenium —	112 Cn copernicium —	113 Nh nihonium —	114 Fl flerovium —	115 Lv livermorium —	116 Ts tennessine —	117 Uu unseptennium —	118 Og oganeson —	119 Uus unseptennium —	120 Uuo unoktium —	121 Uus unseptennium —	122 Uuo unoktium —	123 Uus unseptennium —	124 Uuo unoktium —	125 Uus unseptennium —	126 Uuo unoktium —	127 Uus unseptennium —	128 Uuo unoktium —	129 Uus unseptennium —	130 Uuo unoktium —	131 Uus unseptennium —	132 Uuo unoktium —	133 Uus unseptennium —	134 Uuo unoktium —	135 Uus unseptennium —	136 Uuo unoktium —	137 Uus unseptennium —	138 Uuo unoktium —	139 Uus unseptennium —	140 Uuo unoktium —	141 Uus unseptennium —	142 Uuo unoktium —	143 Uus unseptennium —	144 Uuo unoktium —	145 Uus unseptennium 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unseptennium —	194 Uuo unoktium —	195 Uus unseptennium —	196 Uuo unoktium —	197 Uus unseptennium —	198 Uuo unoktium —	199 Uus unseptennium —	200 Uuo unoktium —	201 Uus unseptennium —	202 Uuo unoktium —	203 Uus unseptennium —	204 Uuo unoktium —	205 Uus unseptennium —	206 Uuo unoktium —	207 Uus unseptennium —	208 Uuo unoktium —	209 Uus unseptennium —	210 Uuo unoktium —	211 Uus unseptennium —	212 Uuo unoktium —	213 Uus unseptennium —	214 Uuo unoktium —	215 Uus unseptennium —	216 Uuo unoktium —	217 Uus unseptennium —	218 Uuo unoktium —	219 Uus unseptennium —	220 Uuo unoktium —	221 Uus unseptennium —	222 Uuo unoktium —	223 Uus unseptennium —	224 Uuo unoktium —	225 Uus unseptennium —	226 Uuo unoktium —	227 Uus unseptennium —	228 Uuo unoktium —	229 Uus unseptennium —	230 Uuo unoktium —	231 Uus unseptennium —	232 Uuo unoktium —	233 Uus unseptennium —	234 Uuo unoktium —	235 Uus unseptennium —	236 Uuo unoktium —	237 Uus unseptennium —	238 Uuo unoktium —	239 Uus unseptennium —	240 Uuo unoktium —	241 Uus unseptennium —	242 Uuo unoktium —	243 Uus unseptennium —	244 Uuo unoktium —	245 Uus unseptennium —	246 Uuo unoktium —	247 Uus unseptennium —	248 Uuo unoktium —	249 Uus unseptennium —	250 Uuo unoktium —	251 Uus unseptennium —	252 Uuo unoktium —	253 Uus unseptennium —	254 Uuo unoktium —	255 Uus unseptennium —	256 Uuo unoktium —	257 Uus unseptennium —	258 Uuo unoktium —	259 Uus unseptennium —	260 Uuo unoktium —	261 Uus unseptennium —	262 Uuo unoktium —	263 Uus unseptennium —	264 Uuo unoktium —	265 Uus unseptennium —	266 Uuo unoktium —	267 Uus unseptennium —	268 Uuo unoktium —	269 Uus unseptennium —	270 Uuo unoktium —	271 Uus unseptennium —	272 Uuo unoktium —	273 Uus unseptennium —	274 Uuo unoktium —	275 Uus unseptennium —	276 Uuo unoktium —	277 Uus unseptennium —	278 Uuo unoktium —	279 Uus unseptennium —	280 Uuo unoktium —	281 Uus unseptennium —	282 Uuo unoktium —	283 Uus unseptennium —	284 Uuo unoktium —	285 Uus unseptennium —	286 Uuo unoktium —	287 Uus unseptennium —	288 Uuo unoktium —	289 Uus unseptennium —	290 Uuo unoktium —	291 Uus unseptennium —	292 Uuo unoktium —	293 Uus unseptennium —	294 Uuo unoktium —	295 Uus unseptennium —	296 Uuo unoktium —	297 Uus unseptennium —	298 Uuo unoktium —	299 Uus unseptennium —	300 Uuo unoktium —	301 Uus unseptennium —	302 Uuo unoktium —	303 Uus unseptennium —	304 Uuo unoktium —	305 Uus unseptennium —	306 Uuo unoktium —	307 Uus unseptennium —	308 Uuo unoktium —	309 Uus unseptennium —	310 Uuo unoktium —	311 Uus unseptennium —	312 Uuo unoktium —	313 Uus unseptennium —	314 Uuo unoktium —	315 Uus unseptennium —	316 Uuo unoktium —	317 Uus unseptennium —	318 Uuo unoktium —	319 Uus unseptennium —	320 Uuo unoktium —	321 Uus unseptennium —	322 Uuo unoktium —	323 Uus unseptennium —	324 Uuo unoktium —	325 Uus unseptennium —	326 Uuo unoktium —	327 Uus unseptennium —	328 Uuo unoktium —	329 Uus unseptennium —	330 Uuo unoktium —	331 Uus unseptennium —	332 Uuo unoktium —	333 Uus unseptennium —	334 Uuo unoktium —	335 Uus unseptennium —	336 Uuo unoktium —	337 Uus unseptennium —	338 Uuo unoktium —	339 Uus unseptennium —	340 Uuo unoktium —	341 Uus unseptennium —	342 Uuo unoktium —	343 Uus unseptennium —	344 Uuo unoktium —	345 Uus unseptennium —	346 Uuo unoktium —	347 Uus unseptennium —	348 Uuo unoktium —	349 Uus unseptennium —	350 Uuo unoktium —	351 Uus unseptennium —	352 Uuo unoktium —	353 Uus unseptennium —	354 Uuo unoktium —	355 Uus unseptennium —	356 Uuo unoktium —	357 Uus unseptennium —	358 Uuo unoktium —	359 Uus unseptennium —	360 Uuo unoktium —	361 Uus unseptennium —	362 Uuo unoktium —	363 Uus unseptennium —	364 Uuo unoktium —	365 Uus unseptennium —	366 Uuo unoktium —	367 Uus unseptennium —	368 Uuo unoktium —	369 Uus unseptennium —	370 Uuo unoktium —	371 Uus unseptennium —	372 Uuo unoktium —	373 Uus unseptennium —	374 Uuo unoktium —	375 Uus unseptennium —	376 Uuo unoktium —	377 Uus unseptennium —	378 Uuo unoktium —	379 Uus unseptennium —	380 Uuo unoktium —	381 Uus unseptennium —	382 Uuo unoktium —	383 Uus unseptennium —	384 Uuo unoktium —	385 Uus unseptennium —	386 Uuo unoktium —	387 Uus unseptennium —	388 Uuo unoktium —	389 Uus unseptennium —	390 Uuo unoktium —	391 Uus unseptennium —	392 Uuo unoktium —	393 Uus unseptennium —	394 Uuo unoktium —	395 Uus unseptennium —	396 Uuo unoktium —	397 Uus unseptennium —	398 Uuo unoktium —	399 Uus unseptennium —	400 Uuo unoktium —	401 Uus unseptennium —	402 Uuo unoktium —	403 Uus unseptennium —	404 Uuo unoktium —	405 Uus unseptennium —	406 Uuo unoktium —	407 Uus unseptennium —	408 Uuo unoktium —	409 Uus unseptennium —	410 Uuo unoktium —	411 Uus unseptennium —	412 Uuo unoktium —	413 Uus unseptennium —	414 Uuo unoktium —	415 Uus unseptennium —	416 Uuo unoktium —	417 Uus unseptennium —	418 Uuo unoktium —	419 Uus unseptennium —	420 Uuo unoktium —	421 Uus unseptennium —	422 Uuo unoktium —	423 Uus unseptennium —	424 Uuo unoktium —	425 Uus unseptennium —	426 Uuo unoktium —	427 Uus unseptennium —	428 Uuo unoktium —	429 Uus unseptennium —	430 Uuo unoktium —	431 Uus unseptennium —	432 Uuo unoktium —	433 Uus unseptennium —	434 Uuo unoktium —	435 Uus unseptennium —	436 Uuo unoktium —	437 Uus unseptennium —	438 Uuo unoktium —	439 Uus unseptennium —	440 Uuo unoktium —	441 Uus unseptennium —	442 Uuo unoktium —	443 Uus unseptennium —	444 Uuo unoktium —	445 Uus unseptennium —	446 Uuo unoktium —	447 Uus unseptennium —	448 Uuo unoktium —	449 Uus unseptennium —	450 Uuo unoktium —	451 Uus unseptennium —	452 Uuo unoktium —	453 Uus unseptennium —	454 Uuo unoktium —	455 Uus unseptennium —	456 Uuo unoktium —	457 Uus unseptennium —	458 Uuo unoktium —	459 Uus unseptennium —	460 Uuo unoktium —	461 Uus unseptennium —	462 Uuo unoktium —	463 Uus unseptennium —	464 Uuo unoktium —	465 Uus unseptennium —	466 Uuo unoktium —	467 Uus unseptennium —	468 Uuo unoktium —	469 Uus unseptennium —	470 Uuo unoktium —	471 Uus unseptennium —	472 Uuo unoktium —	473 Uus unseptennium —	474 Uuo unoktium —	475 Uus unseptennium —	476 Uuo unoktium —	477 Uus unseptennium —	478 Uuo unoktium —	479 Uus unseptennium —	480 Uuo unoktium —	481 Uus unseptennium —	482 Uuo unoktium —	483 Uus unseptennium —	484 Uuo unoktium —	485 Uus unseptennium —	486 Uuo unoktium —	487 Uus unseptennium —	488 Uuo unoktium —	489 Uus unseptennium —	490 Uuo unoktium —	491 Uus unseptennium —	492 Uuo unoktium —	493 Uus unseptennium —	494 Uuo unoktium —	495 Uus unseptennium —	496 Uuo unoktium —	497 Uus unseptennium —	498 Uuo unoktium —	499 Uus unseptennium —	500 Uuo unoktium —	501 Uus unseptennium —	502 Uuo unoktium —	503 Uus unseptennium —	504 Uuo unoktium —	505 Uus unseptennium —	506 Uuo unoktium —	507 Uus unseptennium —	508 Uuo unoktium —	509 Uus unseptennium —	510 Uuo unoktium —	511 Uus unseptennium —	512 Uuo unoktium —	513 Uus unseptennium —	514 Uuo unoktium —	515 Uus unseptennium —	516 Uuo unoktium —	517 Uus unseptennium —	518 Uuo unoktium —	519 Uus unseptennium —	520 Uuo unoktium —	521 Uus unseptennium —	522 Uuo unoktium —	523 Uus unseptennium —	524 Uuo unoktium —	525 Uus unseptennium —	526 Uuo unoktium —	527 Uus unseptennium —	528 Uuo unoktium —	529 Uus unseptennium —	530 Uuo unoktium —	531 Uus unseptennium —	532 Uuo unoktium —	533 Uus unseptennium —	534 Uuo unoktium —	535 Uus unseptennium —	536 Uuo unoktium —	537 Uus unseptennium —	538 Uuo unoktium —	539 Uus unseptennium —	540 Uuo unoktium —	541 Uus unseptennium —	542 Uuo unoktium —	543 Uus unseptennium —	544 Uuo unoktium —	545 Uus unseptennium —	546 Uuo unoktium —	547 Uus unseptennium —	548 Uuo unoktium —	549 Uus unseptennium —	550 Uuo unoktium —	551 Uus unseptennium —	552 Uuo unoktium —	553 Uus unseptennium —	554 Uuo unoktium —	555 Uus unseptennium —	556 Uuo unoktium —	557 Uus unseptennium —	558 Uuo unoktium —	559 Uus unseptennium —	560 Uuo unoktium —	561 Uus unseptennium —	562 Uuo unoktium —	563 Uus