



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**CHEMISTRY**

**5070/11**

Paper 1 Multiple Choice

**October/November 2010**

**1 hour**

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

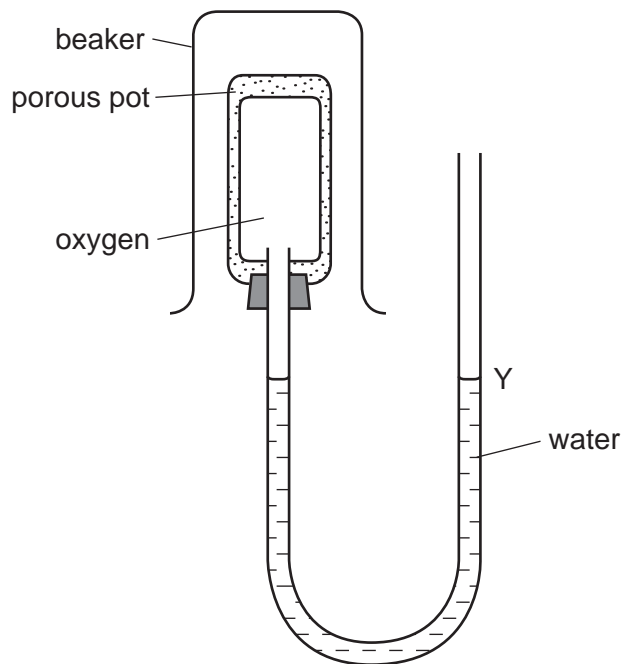
This document consists of **16** printed pages.



- 1 Substance X dissolves in water to form a colourless solution. This solution reacts with aqueous lead(II) nitrate in the presence of dilute nitric acid to give a yellow precipitate.

What is substance X?

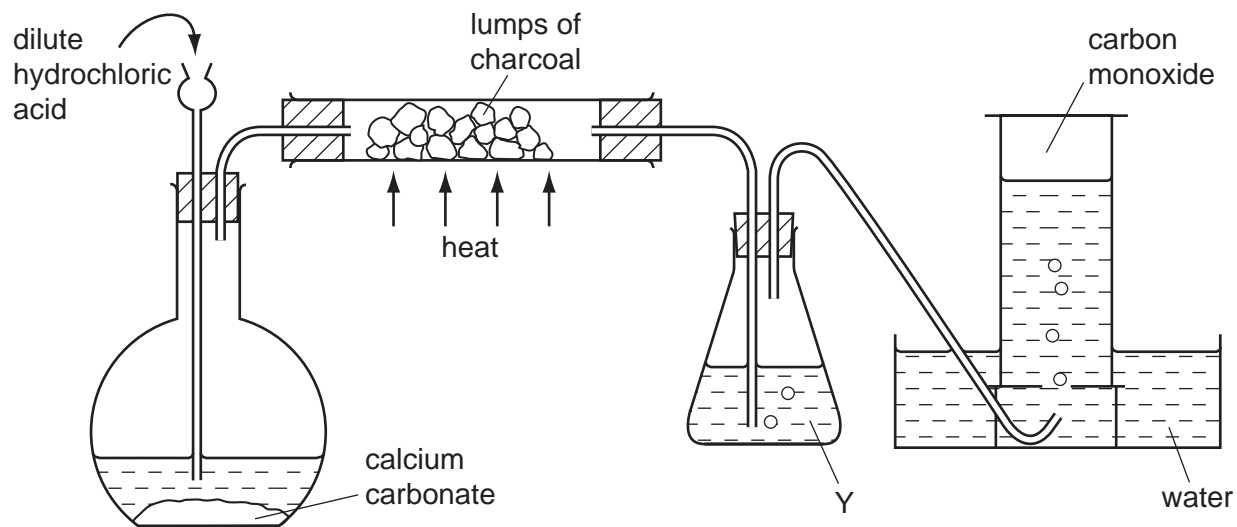
- A calcium iodide
  - B copper(II) chloride
  - C iron(II) iodide
  - D sodium chloride
- 2 The diagram shows a diffusion experiment.



Which gas, when present in the beaker over the porous pot, will cause the water level at Y to rise?

- A carbon dioxide,  $\text{CO}_2$
- B chlorine,  $\text{Cl}_2$
- C methane,  $\text{CH}_4$
- D nitrogen dioxide,  $\text{NO}_2$

- 3 The diagram shows apparatus used to obtain carbon monoxide.



What is the main purpose of Y?

- A to dry the gas
  - B to prevent water being sucked back on to the hot carbon
  - C to remove carbon dioxide from the gas
  - D to remove hydrogen chloride from the gas
- 4 The boiling points of various gases found in the air are shown below.

	°C
argon	-186
carbon dioxide	-78
nitrogen	-198
oxygen	-183

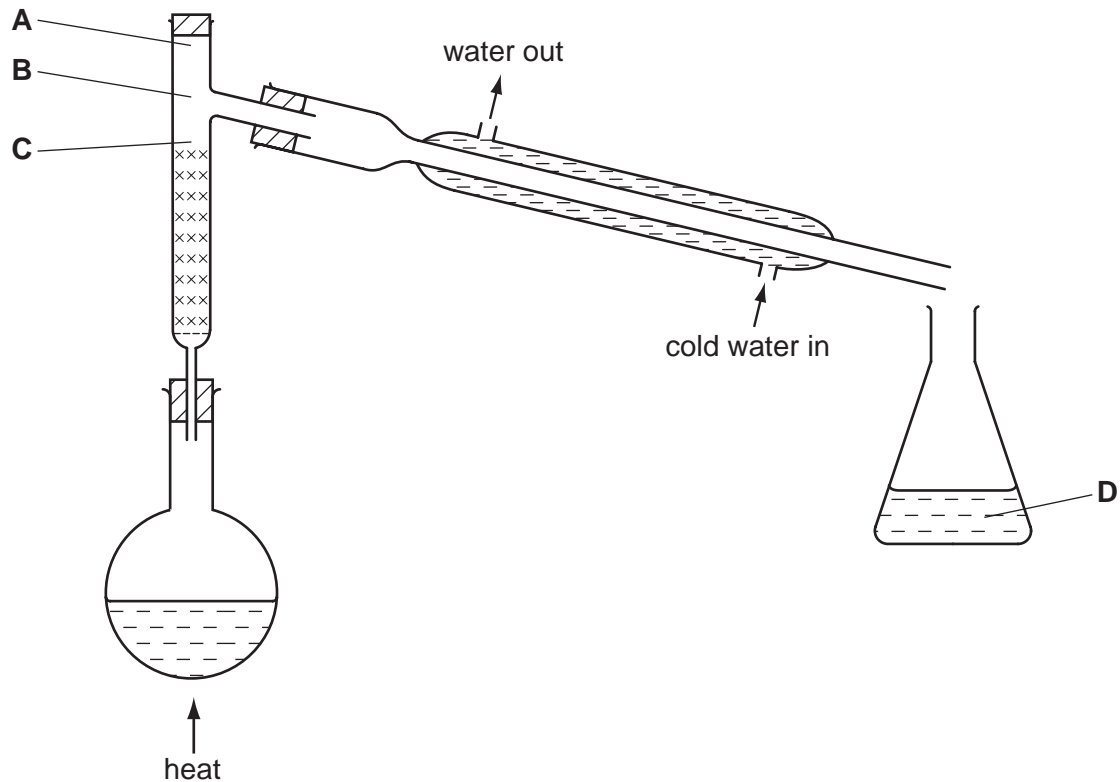
If the air is cooled, the first substance to condense is water.

If the temperature is lowered further, what is the next substance to condense?

- A argon
- B carbon dioxide
- C nitrogen
- D oxygen

- 5 The fractional distillation apparatus shown is to be used for separating a mixture of two colourless liquids. A thermometer is missing from the apparatus.

Where should the bulb of the thermometer be placed?



- 6 Hydrogen can form both  $\text{H}^+$  ions and  $\text{H}^-$  ions.

Which one of the statements below is correct?

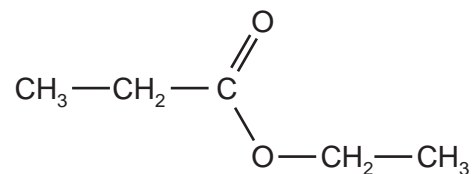
- A An  $\text{H}^+$  ion has more protons than an  $\text{H}^-$  ion.  
 B An  $\text{H}^+$  ion has no electrons.  
 C An  $\text{H}^-$  ion has one more electron than an  $\text{H}^+$  ion.  
 D An  $\text{H}^-$  ion is formed when a hydrogen atom loses an electron.
- 7 A dark, shiny solid, X, conducts electricity.

Oxygen combines with X to form a gaseous oxide.

What is X?

- A graphite  
 B iodine  
 C iron  
 D lead

- 8 The diagram shows the molecule ethyl propanoate.



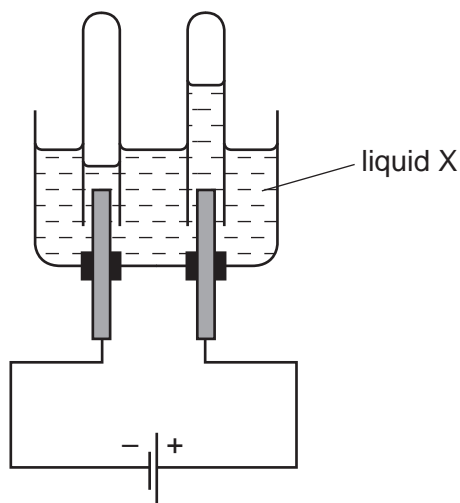
How many bonding pairs of electrons are there in the molecule?

- A 13                      B 16                      C 17                      D 20
- 9 The conduction of electricity by metals is carried out by the movement of
- A electrons only.  
 B electrons and positive ions.  
 C negative ions only.  
 D negative ions and positive ions.
- 10 Which substance could be sodium chloride?

	melting point / °C	conduction of electricity	
		when liquid	in aqueous solution
A	–114	nil	good
B	180	nil	nil (insoluble)
C	808	good	good
D	3550	nil	nil (insoluble)

- 11 What is the concentration of iodine molecules, I<sub>2</sub>, in a solution containing 2.54 g of iodine in 250 cm<sup>3</sup> of solution?
- A 0.01 mol / dm<sup>3</sup>  
 B 0.02 mol / dm<sup>3</sup>  
 C 0.04 mol / dm<sup>3</sup>  
 D 0.08 mol / dm<sup>3</sup>

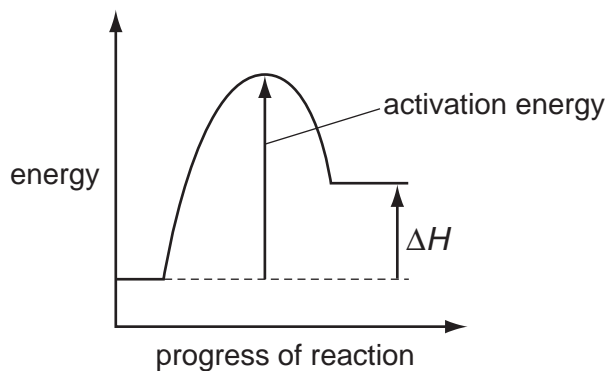
12 The diagram shows the results of an electrolysis experiment using inert electrodes.



Which could be liquid X?

- A aqueous copper(II) sulfate
- B concentrated aqueous sodium chloride
- C dilute sulfuric acid
- D ethanol

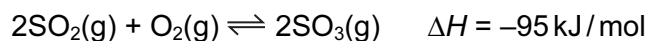
13 The energy profile for the forward direction of a **reversible** reaction is shown.



Which row correctly shows the sign of both the activation energy and the type of the enthalpy change for the **reverse** reaction?

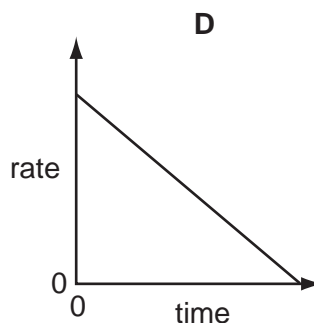
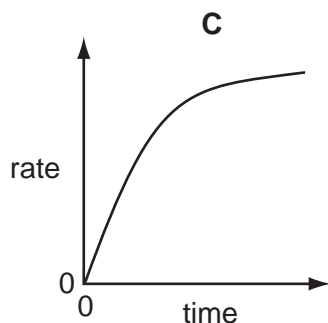
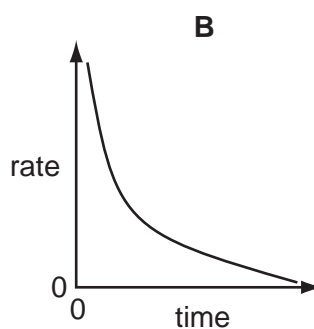
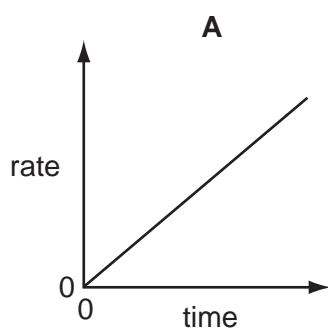
	sign of activation energy	type of enthalpy change
A	negative	endothermic
B	negative	exothermic
C	positive	endothermic
D	positive	exothermic

- 14 The equation shows the formation of sulfur trioxide in the Contact process.



What would **decrease** the yield of sulfur trioxide in a given time?

- A addition of more oxygen  
 B an increase in pressure  
 C an increase in temperature  
 D removal of  $\text{SO}_3(\text{g})$  from the reaction chamber
- 15 Which graph represents how the rate of reaction varies with time when an excess of calcium carbonate reacts with dilute hydrochloric acid?



- 16 In which reaction is nitric acid acting as an oxidising agent?

- A  $\text{Cu} + 4\text{HNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{H}_2\text{O} + 2\text{NO}_2$   
 B  $\text{CuO} + 2\text{HNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + \text{H}_2\text{O}$   
 C  $\text{Na}_2\text{CO}_3 + 2\text{HNO}_3 \rightarrow 2\text{NaNO}_3 + \text{H}_2\text{O} + \text{CO}_2$   
 D  $\text{NaOH} + \text{HNO}_3 \rightarrow \text{NaNO}_3 + \text{H}_2\text{O}$

17 A student mixed together aqueous solutions of Y and Z. A white precipitate formed.

Which could **not** be solutions Y and Z?

	solution Y	solution Z
<b>A</b>	hydrochloric acid	silver nitrate
<b>B</b>	hydrochloric acid	sodium nitrate
<b>C</b>	sodium chloride	lead(II) nitrate
<b>D</b>	sodium chloride	silver nitrate

18 The tests below were carried out on a solution containing ions of the metal X.

test	observation
add sodium chloride solution	no change
add sodium sulfate solution	no change
add sodium hydroxide solution	a precipitate was formed, soluble in excess of the hydroxide

What is metal X?

- A** calcium
- B** iron
- C** lead
- D** zinc

19 Which property is common to calcium, potassium and sodium?

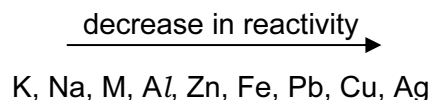
- A** Their atoms all lose two electrons when they form ions.
- B** They all form carbonates which are insoluble in water.
- C** They are all less dense than water.
- D** They are all metallic.

20 Which set of the electronic structures are **only** found in metals?

- A** 2, 1            2, 8, 1            2, 8, 8, 1
- B** 2, 5            2, 6                2, 7
- C** 2, 7            2, 8, 7            2, 8, 18, 7
- D** 2, 8, 3        2, 8, 4            2, 8, 5



21 The position of metal M in the reactivity series is shown.



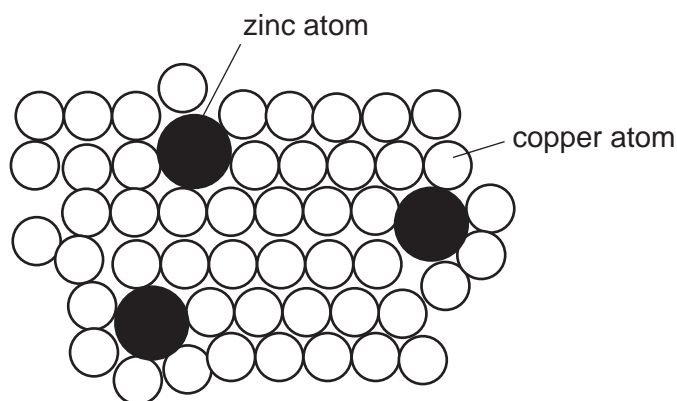
Which method will be used to extract M from its ore?

- A electrolysis of its aqueous sulfate
  - B electrolysis of its molten oxide
  - C reduction of its oxide by heating with coke
  - D reduction of its oxide by heating with hydrogen
- 22 When zinc is added to a solution of a metal sulfate, the metal is deposited and zinc ions are produced in solution.

Which metal is deposited?

- A calcium
- B copper
- C magnesium
- D potassium

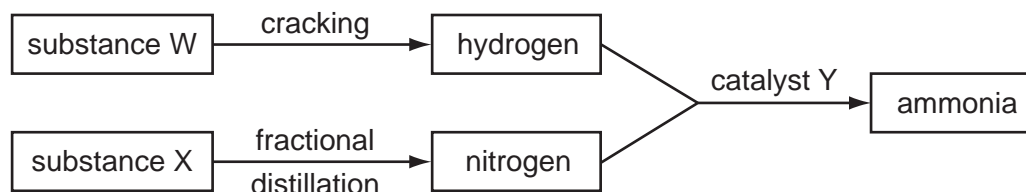
23 The diagram shows the structure of brass.



Why is brass harder than pure copper?

- A The zinc atoms form strong covalent bonds with copper atoms.
- B The zinc atoms prevent layers of copper atoms from slipping over each other easily.
- C The zinc atoms prevent the 'sea of electrons' from moving freely in the solid.
- D Zinc atoms have more electrons than copper atoms.

24 The diagram shows processes that take place in the manufacture of ammonia.



What are substances W and X and catalyst Y?

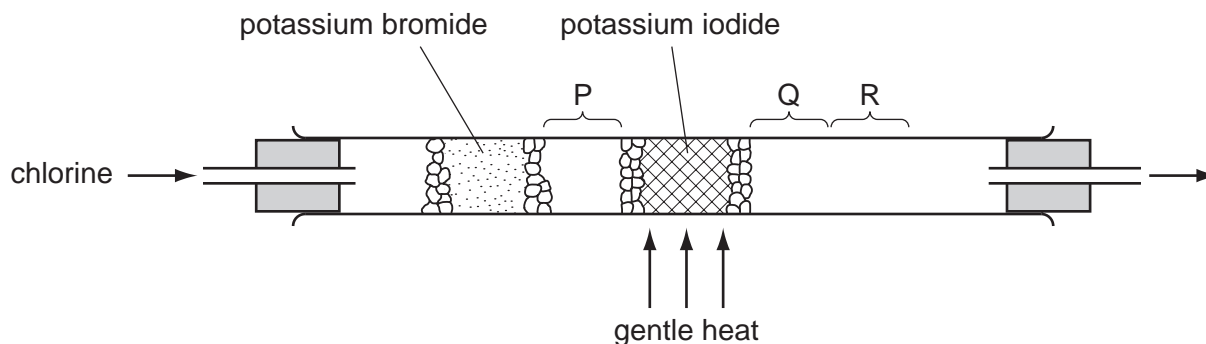
	W	X	Y
<b>A</b>	air	oil	iron
<b>B</b>	air	oil	vanadium(V) oxide
<b>C</b>	oil	air	iron
<b>D</b>	oil	air	vanadium(V) oxide

25 Sulfur is burnt in air.

Which statement about this reaction is correct?

- A** Sulfur is oxidised to sulfur trioxide.
- B** The gas formed turns aqueous potassium dichromate(VI) from orange to green.
- C** The reaction is reversible.
- D** The reaction needs a catalyst.

26 Using the apparatus shown, chlorine is passed through the tube.

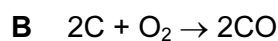
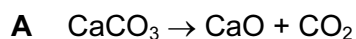


After a short time, coloured substances are seen at P, Q and R.

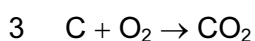
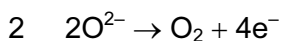
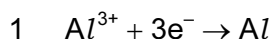
What are these coloured substances?

	at P	at Q	at R
<b>A</b>	green gas	red brown vapour	violet vapour
<b>B</b>	green gas	violet vapour	black solid
<b>C</b>	red brown vapour	violet vapour	black solid
<b>D</b>	violet vapour	red brown vapour	red brown vapour

27 Which equation in the blast furnace extraction of iron is **not** a redox reaction?



28 In the electrolysis of molten aluminium oxide for the extraction of aluminium, the following three reactions take place.



Which reactions take place at the anode?

**A** 1 only

**B** 2 only

**C** 1 and 3

**D** 2 and 3

29 Which statement about the material used for aircraft bodies is correct?

Aircraft bodies are made from

- A an aluminium alloy because pure aluminium is too soft.
- B pure aluminium because of its high melting point.
- C pure aluminium because of its low density.
- D pure aluminium because of its resistance to corrosion.

30 A catalytic converter in a car exhaust system speeds up the change of pollutants into less harmful products.

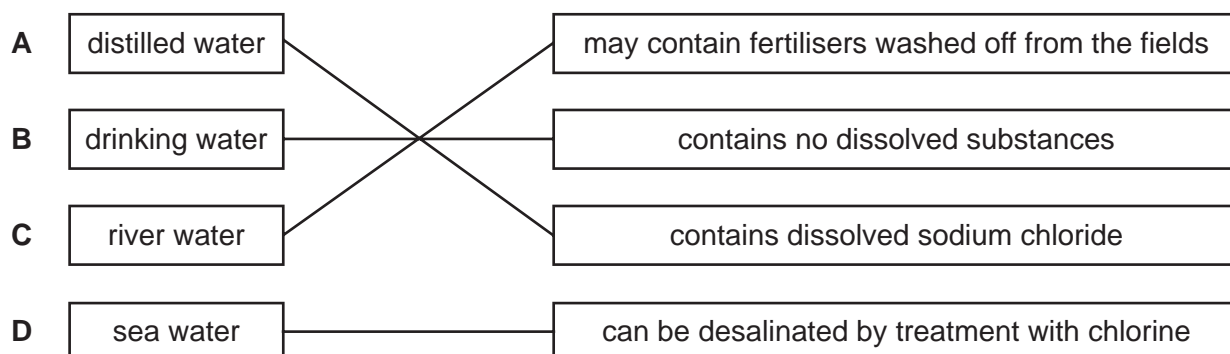
Which change does **not** occur in a catalytic converter?

- A carbon dioxide → carbon
- B carbon monoxide → carbon dioxide
- C nitrogen oxides → nitrogen
- D unburned hydrocarbons → carbon dioxide and water

31 Which natural process can cause nitrogen oxides to be formed in the atmosphere?

- A bacterial decay of plants
- B lightning activity
- C photosynthesis
- D respiration

32 Which type of water in the left hand column is linked correctly to a statement in the right hand column?

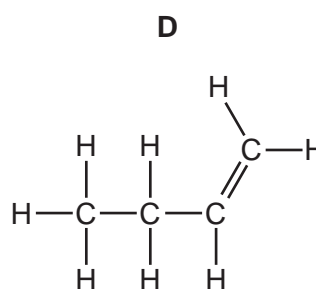
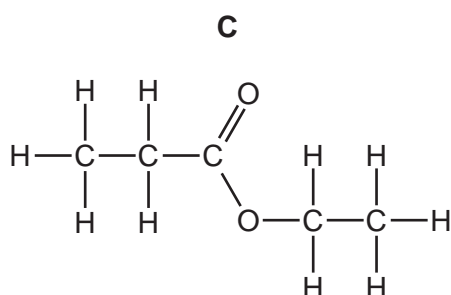
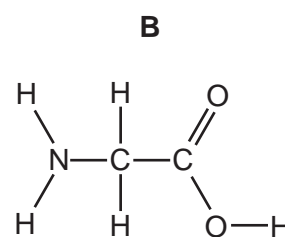
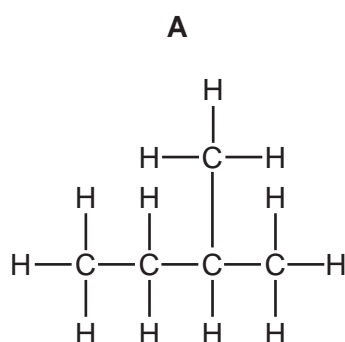


33 An organic compound has an empirical formula  $C_2H_4O$ .

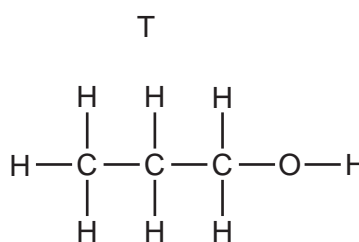
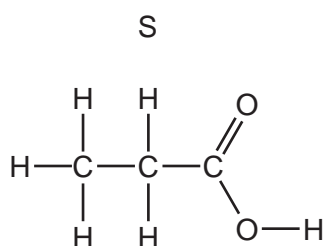
What is the compound?

- A butanoic acid
- B butanol
- C ethanoic acid
- D ethanol

34 Which formula represents a compound likely to undergo addition polymerisation?



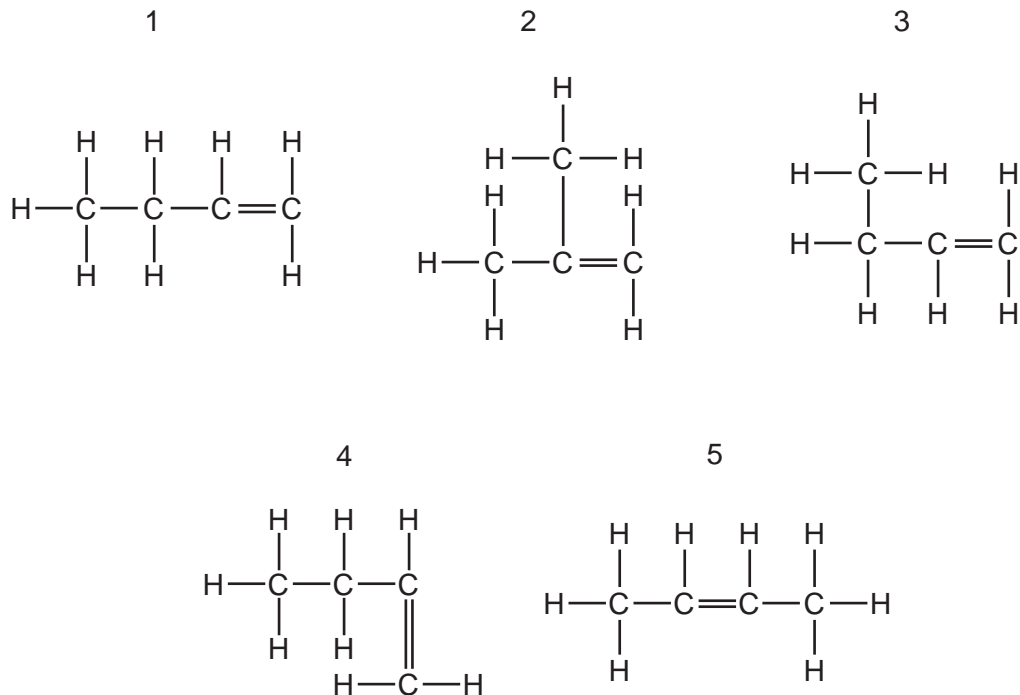
35 The diagrams show two organic compounds.



Which statement about the compounds S and T is correct?

- A Both S and T react with sodium carbonate.
- B S and T react together to form the ester ethyl propanoate.
- C T can be changed into S using acidified potassium dichromate(VI).
- D They are in the same homologous series.

36 Five structures are shown.



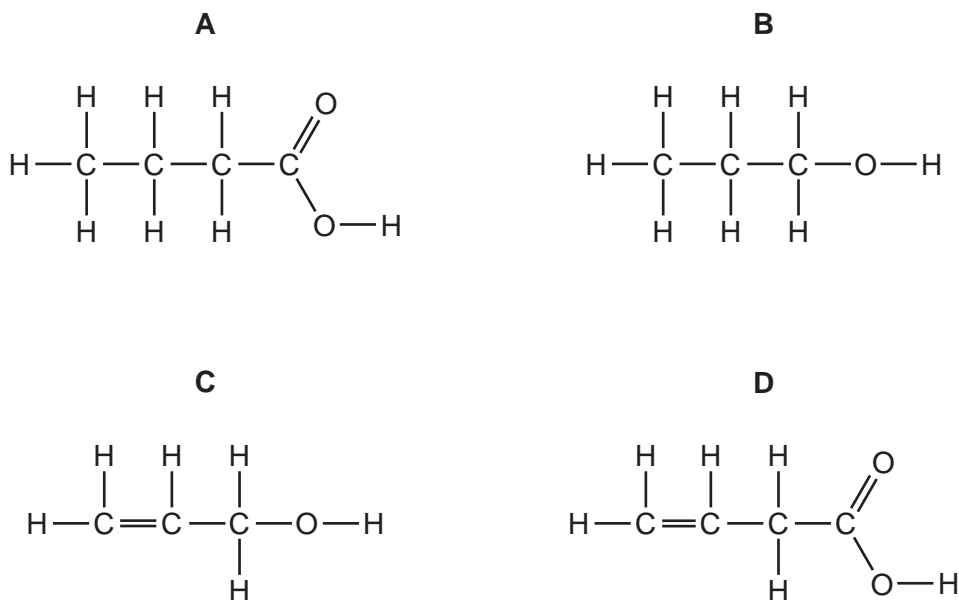
Which structures represent identical molecules?

- A** 1 and 3 only
- B** 2 and 3 only
- C** 1, 3 and 4 only
- D** 1, 3 and 5 only
- 37 Which statement about ethanol is correct?
- A** It is an unsaturated compound.
- B** It is formed by the catalytic addition of steam to ethene.
- C** It is formed by the oxidation of ethanoic acid.
- D** It reacts with ethyl ethanoate to form an acid.
- 38 In which reaction is water produced?
- A** manufacture of ethanol from ethene
- B** manufacture of margarine from vegetable oils
- C** manufacture of poly(ethene) from ethene
- D** manufacture of *Terylene* from a carboxylic acid and an alcohol

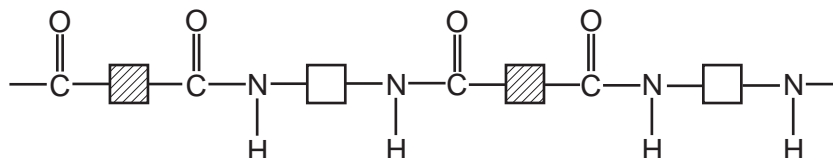
39 The results of tests on compound Z are shown.

test	result
add bromine water	turns colourless
add aqueous sodium carbonate	carbon dioxide formed

What is compound Z?



40 Polymer X has the structure shown.



The list shows four terms that can be applied to polymers.

- 1 addition polymer
- 2 condensation polymer
- 3 polyamide
- 4 polyester

Which two terms can be applied to polymer X?

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

**DATA SHEET**  
**The Periodic Table of the Elements**

		Group										
		I	II	III	IV	V	VI	VII	VIII	IX	X	
		1 <b>H</b> Hydrogen 1										2 <b>He</b> Helium 2
3	4	7 <b>Li</b> Lithium	9 <b>Be</b> Beryllium									10 <b>Ne</b> Neon
11	12	23 <b>Na</b> Sodium	24 <b>Mg</b> Magnesium	13 <b>Al</b> Aluminium	14 <b>Si</b> Silicon	15 <b>P</b> Phosphorus	16 <b>S</b> Sulfur	17 <b>Cl</b> Chlorine	18 <b>Ar</b> Argon			
19	20	39 <b>K</b> Potassium	40 <b>Ca</b> Calcium	31 <b>Ga</b> Gallium	32 <b>Ge</b> Germanium	33 <b>As</b> Arsenic	34 <b>Se</b> Selenium	35 <b>Br</b> Bromine	36 <b>Kr</b> Krypton			
37	38	85 <b>Rb</b> Rubidium	88 <b>Sr</b> Strontium	37 <b>In</b> Indium	48 <b>Cu</b> Copper	49 <b>Cd</b> Cadmium	50 <b>Tl</b> Thallium	51 <b>Pb</b> Lead	52 <b>Hg</b> Mercury	53 <b>I</b> Iodine	54 <b>Xe</b> Xenon	
55	56	133 <b>Cs</b> Caesium	137 <b>Ba</b> Barium	44 <b>Ru</b> Ruthenium	45 <b>Rh</b> Rhodium	46 <b>Pd</b> Palladium	47 <b>Ag</b> Silver	48 <b>Au</b> Gold	49 <b>Hg</b> Mercury	50 <b>Tl</b> Thallium	51 <b>Pb</b> Lead	
87	88	226 <b>Fr</b> Francium	226 <b>Ra</b> Radium	44 <b>Ru</b> Ruthenium	45 <b>Rh</b> Rhodium	46 <b>Pd</b> Palladium	47 <b>Ag</b> Silver	48 <b>Au</b> Gold	49 <b>Hg</b> Mercury	50 <b>Tl</b> Thallium	51 <b>Pb</b> Lead	
		*58-71 Lanthanoid series †90-103 Actinoid series		55 <b>Mn</b> Manganese	56 <b>Fe</b> Iron	57 <b>Co</b> Cobalt	58 <b>Ni</b> Nickel	59 <b>Cu</b> Copper	60 <b>Zn</b> Zinc	61 <b>Pm</b> Promethium	62 <b>Sm</b> Samarium	
				63 <b>Cr</b> Chromium	64 <b>Mn</b> Manganese	65 <b>Fe</b> Iron	66 <b>Co</b> Cobalt	67 <b>Ni</b> Nickel	68 <b>Cu</b> Copper	69 <b>Zn</b> Zinc	70 <b>Ga</b> Gallium	
				71 <b>V</b> Vanadium	72 <b>Cr</b> Chromium	73 <b>Mn</b> Manganese	74 <b>Fe</b> Iron	75 <b>Co</b> Cobalt	76 <b>Ni</b> Nickel	77 <b>Cu</b> Copper	78 <b>Zn</b> Zinc	
				79 <b>Ti</b> Titanium	80 <b>V</b> Vanadium	81 <b>Cr</b> Chromium	82 <b>Mn</b> Manganese	83 <b>Fe</b> Iron	84 <b>Co</b> Cobalt	85 <b>Ni</b> Nickel	86 <b>Cu</b> Copper	
				87 <b>Zr</b> Zirconium	88 <b>Nb</b> Niobium	89 <b>Mo</b> Molybdenum	90 <b>Tc</b> Technetium	91 <b>Ru</b> Ruthenium	92 <b>Rh</b> Rhodium	93 <b>Pd</b> Palladium	94 <b>Ag</b> Silver	
				95 <b>Hf</b> Hafnium	96 <b>Ta</b> Tantalum	97 <b>W</b> Tungsten	98 <b>Re</b> Rhenium	99 <b>Os</b> Osmium	100 <b>Ir</b> Iridium	101 <b>Pt</b> Platinum	102 <b>Au</b> Gold	
				103 <b>La</b> Lanthanum	104 <b>Ce</b> Cerium	105 <b>Pr</b> Praseodymium	106 <b>Nd</b> Neodymium	107 <b>Pm</b> Promethium	108 <b>Sm</b> Samarium	109 <b>Eu</b> Europium	110 <b>Gd</b> Gadolinium	
				111 <b>Ac</b> Actinium	112 <b>Th</b> Thorium	113 <b>Pa</b> Protactinium	114 <b>U</b> Uranium	115 <b>Np</b> Neptunium	116 <b>Pu</b> Plutonium	117 <b>Am</b> Americium	118 <b>Cm</b> Curium	
				119 <b>Rn</b> Radon	120 <b>Fr</b> Francium	121 <b>Ra</b> Radium	122 <b>Ac</b> Actinium	123 <b>Th</b> Thorium	124 <b>Pa</b> Protactinium	125 <b>U</b> Uranium	126 <b>Np</b> Neptunium	
				127 <b>At</b> Astatine	128 <b>Po</b> Polonium	129 <b>Bi</b> Bismuth	130 <b>Pb</b> Lead	131 <b>Tl</b> Thallium	132 <b>Pb</b> Lead	133 <b>Bi</b> Bismuth	134 <b>Po</b> Polonium	
				135 <b>At</b> Astatine	136 <b>Po</b> Polonium	137 <b>Bi</b> Bismuth	138 <b>Pb</b> Lead	139 <b>Tl</b> Thallium	140 <b>Pb</b> Lead	141 <b>Bi</b> Bismuth	142 <b>Po</b> Polonium	
				143 <b>At</b> Astatine	144 <b>Po</b> Polonium	145 <b>Bi</b> Bismuth	146 <b>Pb</b> Lead	147 <b>Tl</b> Thallium	148 <b>Pb</b> Lead	149 <b>Bi</b> Bismuth	150 <b>Po</b> Polonium	
				151 <b>At</b> Astatine	152 <b>Po</b> Polonium	153 <b>Bi</b> Bismuth	154 <b>Pb</b> Lead	155 <b>Tl</b> Thallium	156 <b>Pb</b> Lead	157 <b>Bi</b> Bismuth	158 <b>Po</b> Polonium	
				159 <b>At</b> Astatine	160 <b>Po</b> Polonium	161 <b>Bi</b> Bismuth	162 <b>Pb</b> Lead	163 <b>Tl</b> Thallium	164 <b>Pb</b> Lead	165 <b>Bi</b> Bismuth	166 <b>Po</b> Polonium	
				167 <b>At</b> Astatine	168 <b>Po</b> Polonium	169 <b>Bi</b> Bismuth	170 <b>Pb</b> Lead	171 <b>Tl</b> Thallium	172 <b>Pb</b> Lead	173 <b>Bi</b> Bismuth	174 <b>Po</b> Polonium	
				175 <b>At</b> Astatine	176 <b>Po</b> Polonium	177 <b>Bi</b> Bismuth	178 <b>Pb</b> Lead	179 <b>Tl</b> Thallium	180 <b>Pb</b> Lead	181 <b>Bi</b> Bismuth	182 <b>Po</b> Polonium	
				183 <b>At</b> Astatine	184 <b>Po</b> Polonium	185 <b>Bi</b> Bismuth	186 <b>Pb</b> Lead	187 <b>Tl</b> Thallium	188 <b>Pb</b> Lead	189 <b>Bi</b> Bismuth	190 <b>Po</b> Polonium	
				191 <b>At</b> Astatine	192 <b>Po</b> Polonium	193 <b>Bi</b> Bismuth	194 <b>Pb</b> Lead	195 <b>Tl</b> Thallium	196 <b>Pb</b> Lead	197 <b>Bi</b> Bismuth	198 <b>Po</b> Polonium	
				199 <b>At</b> Astatine	200 <b>Po</b> Polonium	201 <b>Bi</b> Bismuth	202 <b>Pb</b> Lead	203 <b>Tl</b> Thallium	204 <b>Pb</b> Lead	205 <b>Bi</b> Bismuth	206 <b>Po</b> Polonium	
				207 <b>At</b> Astatine	208 <b>Po</b> Polonium	209 <b>Bi</b> Bismuth	210 <b>Pb</b> Lead	211 <b>Tl</b> Thallium	212 <b>Pb</b> Lead	213 <b>Bi</b> Bismuth	214 <b>Po</b> Polonium	
				215 <b>At</b> Astatine	216 <b>Po</b> Polonium	217 <b>Bi</b> Bismuth	218 <b>Pb</b> Lead	219 <b>Tl</b> Thallium	220 <b>Pb</b> Lead	221 <b>Bi</b> Bismuth	222 <b>Po</b> Polonium	
				223 <b>At</b> Astatine	224 <b>Po</b> Polonium	225 <b>Bi</b> Bismuth	226 <b>Pb</b> Lead	227 <b>Tl</b> Thallium	228 <b>Pb</b> Lead	229 <b>Bi</b> Bismuth	230 <b>Po</b> Polonium	
				231 <b>At</b> Astatine	232 <b>Po</b> Polonium	233 <b>Bi</b> Bismuth	234 <b>Pb</b> Lead	235 <b>Tl</b> Thallium	236 <b>Pb</b> Lead	237 <b>Bi</b> Bismuth	238 <b>Po</b> Polonium	
				239 <b>At</b> Astatine	240 <b>Po</b> Polonium	241 <b>Bi</b> Bismuth	242 <b>Pb</b> Lead	243 <b>Tl</b> Thallium	244 <b>Pb</b> Lead	245 <b>Bi</b> Bismuth	246 <b>Po</b> Polonium	
				247 <b>At</b> Astatine	248 <b>Po</b> Polonium	249 <b>Bi</b> Bismuth	250 <b>Pb</b> Lead	251 <b>Tl</b> Thallium	252 <b>Pb</b> Lead	253 <b>Bi</b> Bismuth	254 <b>Po</b> Polonium	
				255 <b>At</b> Astatine	256 <b>Po</b> Polonium	257 <b>Bi</b> Bismuth	258 <b>Pb</b> Lead	259 <b>Tl</b> Thallium	260 <b>Pb</b> Lead	261 <b>Bi</b> Bismuth	262 <b>Po</b> Polonium	
				263 <b>At</b> Astatine	264 <b>Po</b> Polonium	265 <b>Bi</b> Bismuth	266 <b>Pb</b> Lead	267 <b>Tl</b> Thallium	268 <b>Pb</b> Lead	269 <b>Bi</b> Bismuth	270 <b>Po</b> Polonium	
				271 <b>At</b> Astatine	272 <b>Po</b> Polonium	273 <b>Bi</b> Bismuth	274 <b>Pb</b> Lead	275 <b>Tl</b> Thallium	276 <b>Pb</b> Lead	277 <b>Bi</b> Bismuth	278 <b>Po</b> Polonium	
				279 <b>At</b> Astatine	280 <b>Po</b> Polonium	281 <b>Bi</b> Bismuth	282 <b>Pb</b> Lead	283 <b>Tl</b> Thallium	284 <b>Pb</b> Lead	285 <b>Bi</b> Bismuth	286 <b>Po</b> Polonium	
				287 <b>At</b> Astatine	288 <b>Po</b> Polonium	289 <b>Bi</b> Bismuth	290 <b>Pb</b> Lead	291 <b>Tl</b> Thallium	292 <b>Pb</b> Lead	293 <b>Bi</b> Bismuth	294 <b>Po</b> Polonium	
				295 <b>At</b> Astatine	296 <b>Po</b> Polonium	297 <b>Bi</b> Bismuth	298 <b>Pb</b> Lead	299 <b>Tl</b> Thallium	300 <b>Pb</b> Lead	301 <b>Bi</b> Bismuth	302 <b>Po</b> Polonium	
				303 <b>At</b> Astatine	304 <b>Po</b> Polonium	305 <b>Bi</b> Bismuth	306 <b>Pb</b> Lead	307 <b>Tl</b> Thallium	308 <b>Pb</b> Lead	309 <b>Bi</b> Bismuth	310 <b>Po</b> Polonium	
				311 <b>At</b> Astatine	312 <b>Po</b> Polonium	313 <b>Bi</b> Bismuth	314 <b>Pb</b> Lead	315 <b>Tl</b> Thallium	316 <b>Pb</b> Lead	317 <b>Bi</b> Bismuth	318 <b>Po</b> Polonium	
				319 <b>At</b> Astatine	320 <b>Po</b> Polonium	321 <b>Bi</b> Bismuth	322 <b>Pb</b> Lead	323 <b>Tl</b> Thallium	324 <b>Pb</b> Lead	325 <b>Bi</b> Bismuth	326 <b>Po</b> Polonium	
				327 <b>At</b> Astatine	328 <b>Po</b> Polonium	329 <b>Bi</b> Bismuth	330 <b>Pb</b> Lead	331 <b>Tl</b> Thallium	332 <b>Pb</b> Lead	333 <b>Bi</b> Bismuth	334 <b>Po</b> Polonium	
				335 <b>At</b> Astatine	336 <b>Po</b> Polonium	337 <b>Bi</b> Bismuth	338 <b>Pb</b> Lead	339 <b>Tl</b> Thallium	340 <b>Pb</b> Lead	341 <b>Bi</b> Bismuth	342 <b>Po</b> Polonium	
				343 <b>At</b> Astatine	344 <b>Po</b> Polonium	345 <b>Bi</b> Bismuth	346 <b>Pb</b> Lead	347 <b>Tl</b> Thallium	348 <b>Pb</b> Lead	349 <b>Bi</b> Bismuth	350 <b>Po</b> Polonium	
				351 <b>At</b> Astatine	352 <b>Po</b> Polonium	353 <b>Bi</b> Bismuth	354 <b>Pb</b> Lead	355 <b>Tl</b> Thallium	356 <b>Pb</b> Lead	357 <b>Bi</b> Bismuth	358 <b>Po</b> Polonium	
				359 <b>At</b> Astatine	360 <b>Po</b> Polonium	361 <b>Bi</b> Bismuth	362 <b>Pb</b> Lead	363 <b>Tl</b> Thallium	364 <b>Pb</b> Lead	365 <b>Bi</b> Bismuth	366 <b>Po</b> Polonium	
				367 <b>At</b> Astatine	368 <b>Po</b> Polonium	369 <b>Bi</b> Bismuth	370 <b>Pb</b> Lead	371 <b>Tl</b> Thallium	372 <b>Pb</b> Lead	373 <b>Bi</b> Bismuth	374 <b>Po</b> Polonium	
				375 <b>At</b> Astatine	376 <b>Po</b> Polonium	377 <b>Bi</b> Bismuth	378 <b>Pb</b> Lead	379 <b>Tl</b> Thallium	380 <b>Pb</b> Lead	381 <b>Bi</b> Bismuth	382 <b>Po</b> Polonium	
				383 <b>At</b> Astatine	384 <b>Po</b> Polonium	385 <b>Bi</b> Bismuth	386 <b>Pb</b> Lead	387 <b>Tl</b> Thallium	388 <b>Pb</b> Lead	389 <b>Bi</b> Bismuth	390 <b>Po</b> Polonium	
				391 <b>At</b> Astatine	392 <b>Po</b> Polonium	393 <b>Bi</b> Bismuth	394 <b>Pb</b> Lead	395 <b>Tl</b> Thallium	396 <b>Pb</b> Lead	397 <b>Bi</b> Bismuth	398 <b>Po</b> Polonium	
				399 <b>At</b> Astatine	400 <b>Po</b> Polonium	401 <b>Bi</b> Bismuth	402 <b>Pb</b> Lead	403 <b>Tl</b> Thallium	404 <b>Pb</b> Lead	405 <b>Bi</b> Bismuth	406 <b>Po</b> Polonium	
				407 <b>At</b> Astatine	408 <b>Po</b> Polonium	409 <b>Bi</b> Bismuth	410 <b>Pb</b> Lead	411 <b>Tl</b> Thallium	412 <b>Pb</b> Lead	413 <b>Bi</b> Bismuth	414 <b>Po</b> Polonium	
				415 <b>At</b> Astatine	416 <b>Po</b> Polonium	417 <b>Bi</b> Bismuth	418 <b>Pb</b> Lead	419 <b>Tl</b> Thallium	420 <b>Pb</b> Lead	421 <b>Bi</b> Bismuth	422 <b>Po</b> Polonium	
				423 <b>At</b> Astatine	424 <b>Po</b> Polonium	425 <b>Bi</b> Bismuth	426 <b>Pb</b> Lead	427 <b>Tl</b> Thallium	428 <b>Pb</b> Lead	429 <b>Bi</b> Bismuth	430 <b>Po</b> Polonium	
				431 <b>At</b> Astatine	432 <b>Po</b> Polonium	433 <b>Bi</b> Bismuth	434 <b>Pb</b> Lead	435 <b>Tl</b> Thallium	436 <b>Pb</b> Lead	437 <b>Bi</b> Bismuth	438 <b>Po</b> Polonium	
				439 <b>At</b> Astatine	440 <b>Po</b> Polonium	441 <b>Bi</b> Bismuth	442 <b>Pb</b> Lead	443 <b>Tl</b> Thallium	444 <b>Pb</b> Lead	445 <b>Bi</b> Bismuth	446 <b>Po</b> Polonium	
				447 <b>At</b> Astatine	448 <b>Po</b> Polonium	449 <b>Bi</b> Bismuth	450 <b>Pb</b> Lead	451 <b>Tl</b> Thallium	452 <b>Pb</b> Lead	453 <b>Bi</b> Bismuth	454 <b>Po</b> Polonium	
				455 <b>At</b> Astatine	456 <b>Po</b> Polonium	457 <b>Bi</b> Bismuth	458 <b>Pb</b> Lead	459 <b>Tl</b> Thallium	460 <b>Pb</b> Lead	461 <b>Bi</b> Bismuth	462 <b>Po</b> Polonium	
				463 <b>At</b> Astatine	464 <b>Po</b> Polonium	465 <b>Bi</b> Bismuth	466 <b>Pb</b> Lead	467 <b>Tl</b> Thallium	468 <b>Pb</b> Lead	469 <b>Bi</b> Bismuth	470 <b>Po</b> Polonium	
				471 <b>At</b> Astatine	472 <b>Po</b> Polonium	473 <b>Bi</b> Bismuth	474 <b>Pb</b> Lead	475 <b>Tl</b> Thallium	476 <b>Pb</b> Lead	477 <b>Bi</b> Bismuth	478 <b>Po</b> Polonium	
				479 <b>At</b> Astatine	480 <b>Po</b> Polonium	481 <b>Bi</b> Bismuth	482 <b>Pb</b> Lead	483 <b>Tl</b> Thallium	484 <b>Pb</b> Lead	485 <b>Bi</b> Bismuth	486 <b>Po</b> Polonium	
				487 <b>At</b> Astatine	488 <b>Po</b> Polonium	489 <b>Bi</b> Bismuth	490 <b>Pb</b> Lead	491 <b>Tl</b> Thallium	492 <b>Pb</b> Lead	493 <b>Bi</b> Bismuth	494 <b>Po</b> Polonium	
				495 <b>At</b> Astatine	496 <b>Po</b> Polonium	497 <b>Bi</b> Bismuth	498 <b>Pb</b> Lead	499 <b>Tl</b> Thallium	500 <b>Pb</b> Lead	501 <b>Bi</b> Bismuth	502 	