Oxford Cambridge and RSA

GCSE Chemistry B (Twenty First Century Science)

J258/04 Depth in chemistry (Higher Tier)

Question Set 2

1. About 150 years ago, Dimitri Mendeleev developed an early version of the Periodic Table.
His Periodic Table had eight groups. He put elements with similar properties into the same group.
The table shows some of the elements that Mendeleev grouped together.

Mendeleev's groups							
1	2	3	4	5	6	7	8
Li Na K Cu	Be Mg Zn	B Al	C Si	N P	O S Cr	F Cl Br	Fe Co Ni

(a) Some of Mendeleev's groups contain similar elements to groups in the modern Periodic Table.

Which group in Mendeleev's table contains the elements now found in Group 14 of the modern Periodic Table?

Group ..... **[1]**

(b) None of the elements from Group 18 of the modern Periodic Table are shown on Mendeleev's table.

Suggest a reason why. **[1]**

(c) Mendeleev put some of the transition metals into his Group 8.

He put some other transition metals into the other groups.

Give the symbols for **three** transition metals in Mendeleev's table that he did not put in Group 8.

[2]

(d) The transition metals are in the same block of the modern Periodic Table because their properties are similar to each other.

Which property do all the transition metals have?

Tick (✓) **one** box.

- They act as catalysts in reactions. ☐
- They have low melting points and boiling points. ☐
- They react very quickly with cold water. ☐
- They are coloured gases at room temperature. ☐

[1]

(e) Transition metal salts are acidic.

Sundip does an experiment to test the acidity of some solutions of transition metal salts.

She uses Universal Indicator and a colour chart to find the pH of each salt.

These are Sundip's results.

Name of salt	pH
copper sulfate	3
iron sulfate	3
zinc sulfate	4
nickel sulfate	4

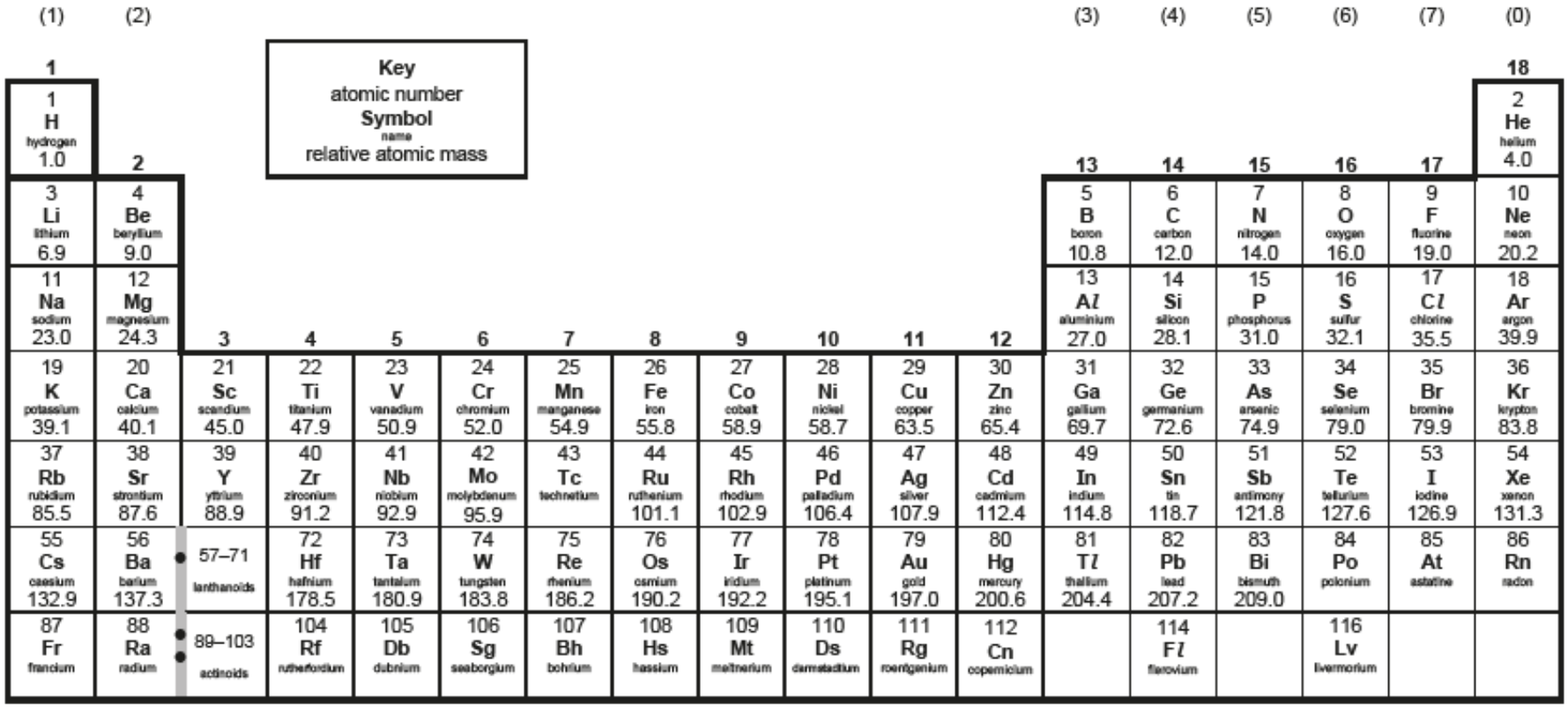
(i) Describe how Sundip uses Universal Indicator to test the pH of the solutions of the salts. **[2]**

(ii) Explain why she needs to improve her precision and suggest how she can change her experiment to do this. **[2]**

Total Marks for Question Set 2: 9

Resource Materials

The Periodic Table of the Elements



(1)	(2)											(3)	(4)	(5)	(6)	(7)	(0)
1																	18
1 H hydrogen 1.0	2											13	14	15	16	17	2 He helium 4.0
3 Li lithium 6.9	4 Be beryllium 9.0											5 B boron 10.8	6 C carbon 12.0	7 N nitrogen 14.0	8 O oxygen 16.0	9 F fluorine 19.0	10 Ne neon 20.2
11 Na sodium 23.0	12 Mg magnesium 24.3	3	4	5	6	7	8	9	10	11	12	13 Al aluminium 27.0	14 Si silicon 28.1	15 P phosphorus 31.0	16 S sulfur 32.1	17 Cl chlorine 35.5	18 Ar argon 39.9
19 K potassium 39.1	20 Ca calcium 40.1	21 Sc scandium 45.0	22 Ti titanium 47.9	23 V vanadium 50.9	24 Cr chromium 52.0	25 Mn manganese 54.9	26 Fe iron 55.8	27 Co cobalt 58.9	28 Ni nickel 58.7	29 Cu copper 63.5	30 Zn zinc 65.4	31 Ga gallium 69.7	32 Ge germanium 72.6	33 As arsenic 74.9	34 Se selenium 79.0	35 Br bromine 79.9	36 Kr krypton 83.8
37 Rb rubidium 85.5	38 Sr strontium 87.6	39 Y yttrium 88.9	40 Zr zirconium 91.2	41 Nb niobium 92.9	42 Mo molybdenum 95.9	43 Tc technetium	44 Ru ruthenium 101.1	45 Rh rhodium 102.9	46 Pd palladium 106.4	47 Ag silver 107.9	48 Cd cadmium 112.4	49 In indium 114.8	50 Sn tin 118.7	51 Sb antimony 121.8	52 Te tellurium 127.6	53 I iodine 126.9	54 Xe xenon 131.3
55 Cs caesium 132.9	56 Ba barium 137.3	57–71 lanthanoids	72 Hf hafnium 178.5	73 Ta tantalum 180.9	74 W tungsten 183.8	75 Re rhenium 186.2	76 Os osmium 190.2	77 Ir iridium 192.2	78 Pt platinum 195.1	79 Au gold 197.0	80 Hg mercury 200.6	81 Tl thallium 204.4	82 Pb lead 207.2	83 Bi bismuth 209.0	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		114 Fl flerovium		116 Lv livermorium		

Key
atomic number
Symbol
name
relative atomic mass