Year 10 Chemistry Data Sheet

Symbols and names of monatomic ions:

1+		2+		3+		4+	
hydrogen	H^+	cobalt(II)	Co^{2+}	aluminium	Al^{3+}	tin(IV)	Sn^{4+}
lithium	Li^+	magnesium	Mg^{2+}	iron(III)	Fe^{3+}	lead(IV)	Pb^{4+}
sodium	Na^+	calcium	Ca^{2+}	chromium(III)	Cr^{3+}		
potassium	K^+	barium	Ba^{2+}	gold(III)	Au^{3+}		
silver	Ag^+	manganese(II)	Mn^{2+}				
copper(I)	Cu^+	iron(II)	Fe^{2+}				
gold(I)	Au^+	copper(II)	Cu^{2+}				
		zinc	Zn^{2+}				
		mercury(II)	Hg^{2+}				
		tin(II)	Sn^{2+}				
		lead(II)	Pb^{2+}				
		strontium	Sr^{2+}				
		nickel(II)	Ni^{2+}				
		cadmium(II)	Cd^{2+}				
1-		2-		3-			
hydride	H^-	oxide	O^{2-}	nitride	N^{3-}		
fluoride	F^-	sulfide	S^{2-}	phosphide	P^{3-}		
chloride	Cl^-						
bromide	Br^-						
iodide	I^-						

Formulae and names of polyatomic ions:

1-		2-		3-	
hydroxide	OH^-	carbonate	CO_3^{2-}	phosphate	PO_4^{3-}
nitrate	NO_3^-	sulfate	SO_4^{2-}		
nitrite	NO_2^-	sulfite	SO_3^{2-}		
hydrogencarbonate	HCO_3^-	dichromate	$Cr_2O_7^{2-}$		
hydrogensulfate	HSO_4^-	chromate	CrO_4^{2-}		
ethanoate (acetate)	CH_3COO^-	peroxide	O_2^{2-}		
hypochlorite	ClO^-				
permanganate	MnO_4^-				
cyanide	CN^-				
1+		2+			
ammonium	NH_4^+	mercury(I)	Hg_2^{2+}		

Solubility rules for ionic solids in water:

Soluble in water

Soluble	Exceptions	
	Insoluble	Slightly soluble
Most chlorides	$AgCl$, Hg_2Cl_2	$PbCl_2$
Most bromides	$AgBr$, Hg_2Br_2, $HgBr_2$	$PbBr_2$
Most iodides	AgI, Hg_2I_2, HgI_2, PbI_2	
All nitrates	Nil	
Most sulfates	$SrSO_4$, $BaSO_4$, $HgSO_4$, $PbSO_4$	$CaSO_4$, Ag_2SO_4

Insoluble in water

Insoluble	Exceptions	
	Soluble	Slightly soluble
Most hydroxides	$NaOH$, KOH, $Ba(OH)_2$ (NH_4OH does not exist)	$Ca(OH)_2$, $Sr(OH)_2$
Most carbonates	Na_2CO_3, K_2CO_3, $(NH_4)_2CO_3$	
Most phosphates	Na_3PO_4, K_3PO_4, $(NH_4)_3PO_4$	
Most sulfides	Na_2S, K_2S, $(NH_4)_2S$	

Soluble = more than 0.1 mole dissolves per litre
Slightly soluble = between 0.01 and 0.1 mole dissolves per litre
Insoluble = less than 0.01 mole dissolves per litre

Colours of aqueous ions:

$Cu^{2+}_{(aq)}$	blue	$Cr^{3+}_{(aq)}$	deep green
$Cu(NH_3)_4^{2+}_{(aq)}$	deep blue	$Mn^{2+}_{(aq)}$	very pale pink
$CrO_4^{2-}_{(aq)}$	yellow	$Fe^{2+}_{(aq)}$	pale green
$Cr_2O_7^{2-}_{(aq)}$	orange	$Fe^{3+}_{(aq)}$	brown
$MnO_4^-_{(aq)}$	purple	$Ni^{2+}_{(aq)}$	green
		$Co^{2+}_{(aq)}$	pink

Note:

1. It is acceptable if a student infers the colour of the solid from the colour of the constituent ions.
2. It is acceptable if a student assumes that a white solid forms from colourless ions.

Periodic Table

	1A												3A	4A	5A	6A	7A	8A
1	1 1.0079 H Hydrogen 0 neutrons	2A																2 4.0026 He Helium
2	3 6.941 Li Lithium	4 9.0122 Be Beryllium											5 10.81 B Boron	6 12.011 C Carbon	7 14.0067 N Nitrogen	8 15.9994 O Oxygen	9 18.9984 F Fluorine	10 20.179 Ne Neon
3	11 22.9898 Na Sodium	12 24.305 Mg Magnesium	3B	4B	5B	6B	7B	8B			1B	2B	13 26.9815 Al Aluminum	14 28.086 Si Silicon	15 30.9738 P Phosphorus	16 32.06 S Sulfur	17 35.453 Cl Chlorine	18 39.948 Ar Argon
4	19 39.098 K Potassium	20 40.08 Ca Calcium	21 44.9559 Sc Scandium	22 47.9 Ti Titanium	23 50.9414 V Vanadium	24 51.996 Cr Chromium	25 54.938 Mn Manganese	26 55.847 Fe Iron	27 58.9332 Co Cobalt	28 58.71 Ni Nickel	29 63.546 Cu Copper	30 65.38 Zn Zinc	31 69.72 Ga Gallium	32 72.59 Ge Germanium	33 74.9216 As Arsenic	34 78.96 Se Selenium	35 79.904 Br Bromine	36 83.8 Kr Krypton
5	37 85.4678 Rb Rubidium	38 87.62 Sr Strontium	39 88.9059 Y Yttrium	40 91.22 Zr Zirconium	41 92.9064 Nb Niobium	42 95.94 Mo Molybdenum	43 98.9062 Tc Technetium	44 101.07 Ru Ruthenium	45 102.9055 Rh Rhodium	46 106.4 Pd Palladium	47 107.868 Ag Silver	48 112.4 Cd Cadmium	49 114.82 In Indium	50 118.69 Sn Tin	51 121.75 Sb Antimony	52 127.6 Te Tellurium	53 126.9045 I Iodine	54 131.3 Xe Xenon
6	55 132.9054 Cs Cesium	56 137.34 Ba Barium	57 138.9055 La Lanthanum	72 178.49 Hf Hafnium	73 180.9479 Ta Tantalum	74 183.85 W Tungsten	75 186.2 Re Rhenium	76 190.2 Os Osmium	77 192.22 Ir Iridium	78 195.09 Pt Platinum	79 196.9665 Au Gold	80 200.59 Hg Mercury	81 204.37 Tl Thallium	82 207.2 Pb Lead	83 208.9804 Bi Bismuth	84 210 Po Polonium	85 210 At Astatine	86 222 Rn Radon
7	87 223 Fr Francium	88 226.0254 Ra Radium	89 227 Ac Actinium	104 261 Unq Unnilquadium	105 262 Unp Unnilpentium	106 263 Unh Unnilhexium												

Alkali Alkaline

58 140.12 Ce Cerium	59 140.9077 Pr Praseodymium	60 144.24 Nd Neodymium	61 145 Pm Promethium	62 150.4 Sm Samarium	63 151.96 Eu Europium	64 157.25 Gd Gadolinium	65 158.9254 Tb Terbium	66 162.5 Dy Dysprosium	67 164.9304 Ho Holmium	68 167.26 Er Erbium	69 168.9342 Tm Thulium	70 173.04 Yb Ytterbium	71 174.97 Lu Lutetium
90 232.0381 Th Thorium	91 231.0359 Pa Protactinium	92 238.029 U Uranium	93 237.0482 Np Neptunium	94 242 Pu Plutonium	95 243 Am Americium	96 247 Cm Curium	97 249 Bk Berkelium	98 251 Cf Californium	99 254 Es Einsteinium	100 253 Fm Fermium	101 256 Md Mendelevium	102 254 No Nobelium	103 257 Lw Lawrencium