W2 GENERAL LABORATORY WORKSHOP

1. FORMULAS

Write the correct formulas for the following species. Refer to page E2-2 of the Laboratory Handbook if necessary.

sodium chloride		silver nitrate	
ammonium sulfate		barium phosphate	
copper(II) oxide		cobalt(II) sulfite	
lead(II) bromide		lithium dichromate	
potassium permanganate		nickel(II) fluoride	
rubidium iodide		mercury(II) carbonate	
aluminium hydroxide		iron(II) sulfide	
chromium(III) acetate		calcium nitrite	

2. EQUATIONS

Give balanced ionic equations where appropriate for the following reactions.

Dilute sulfuric acid is added to zinc to form hydrogen gas.
Solutions of silver nitrate and sodium chloride are mixed, precipitating silver chloride.
Hydrochloric acid is added to a solution of sodium carbonate, evolving carbon dioxide.
Dilute nitric acid is added to solid sodium carbonate.
Copper(II) hydroxide is heated to form copper(II) oxide.
Solutions of cobalt(II) sulfate and sodium phosphate are mixed to precipitate cobalt(II) phosphate.
Magnesium metal undergoes combustion in oxygen to form magnesium oxide.

Demonstrator's Initials	

3. SIGNIFICANT FIGURES

(a) Indicate the number of significant figures in each of the following.

346.1		2.00		2×10^3	
0.0017		190		4.30×10^{-2}	

(b) Give answers to the following, assuming each quantity is an experimental observation.

$2.433 \times 3.09 / 4.1$		(192.0 + 231) / 2.3	

(c) Round off each of the following to two significant figures.

0.0000231		1.122×10^3	
3.11×10^{-4}		126.1	

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4. DENSITY

(a) Calculate the volume of 1.000 mole of aluminium given its density = 2.70 g cm^{-3}.

(b) Carbon tetrachloride (d_{298} = 1.584 g cm^{-3}) and water (d_{298} = 0.997 g cm^{-3}) are immiscible. In a mixture of the two, which layer will be on the top? Justify your answer.

(c) A rectangular block of wood of dimensions 10.0 × 10.0 × 5.00 cm has a mass = 375 g. Calculate the density of this wood.

(d) The same piece of wood is placed in a container of water and it floats with the smallest side vertical. What height of the wood is exposed above the surface of the water? (Take the density of water as 1.00 g cm^{-3}).

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5. PRESSURE UNITS

Using the following factors, convert the observed barometric pressure in the laboratory to both kPa and atmospheres.
1 atmosphere = 101.325 kPa = 760 mmHg (exactly)

Demonstrator's Initials	

6. CONCENTRATION UNITS

(a) Calculate the molarity of the following solutions. (The Laboratory Handbook contains a periodic table with atomic masses.)

(i) 26.3 g sodium chloride dissolved in water to give a final volume = 750.0 mL.

(ii) 4.751 g sodium oxalate dissolved in water to give a final volume of 250.0 mL.

(b) Give the concentration of Na^+ ions in each of the two solutions prepared in (a).

(c) "Syrup B.P." is prepared by dissolving 667 g sucrose ($C_{12}H_{22}O_{11}$) in 333 g water. The density of the solution = 1.325 g cm^{-3}. Calculate the molar concentration of sucrose in Syrup B.P.

Demonstrator's Initials	