

1. Describe the procedure a student should use to prepare 250. mL of 0.125 M $\text{CuSO}_4(\text{aq})$ using appropriate equipment selected from the list below. Assume that the student uses appropriate safety equipment.

- 250 mL beaker
- 250 mL graduated cylinder
- 250 mL volumetric flask
- Electronic Balance
- 500 mL wash bottle of distilled water
- $\text{CuSO}_4(\text{s})$

2. A student dilutes 100. mL of 2.00 M $\text{CaCl}_2(\text{aq})$ to a final volume of 400. mL with distilled water.
Note: The CaCl_2 dissociated into one Ca^{+2} and two Cl^- !

- i. How many moles of chloride ion are in the 100. mL solution?

- ii. How many moles of chloride ion are in the 400. mL solution?

- iii. What is the molarity of chloride ion in the 100. mL solution?

- iv. What is the molarity of chloride ion in the 400. mL solution?

3. A 100. mL sample of 0.500 M $\text{NaNO}_3(\text{aq})$ solution is mixed with 100. mL of 0.500 M $\text{Ca}(\text{NO}_3)_2(\text{aq})$ solution. What is the final concentration of the NO_3^- ion?
4. a. Describe and show calculations for how you would create 2.0L of a 6.0M HCl solution from pure HCl and water.
- b. How many moles of HCl is needed to react 1.0g of Mg, according to the equation below?
- $$\text{Mg}_{(s)} + 2\text{HCl}_{(aq)} \rightarrow \text{MgCl}_{2(aq)} + \text{H}_{2(g)}$$
- c. What volume (in mL) of the 6.0M HCl solution from a would you need to react completely with the Mg from #2?