

Dilution Worksheet (KEY)

$$1. M_f = \frac{M_i V_i}{V_f} = \frac{(0.416 \text{ M})(0.5000 \text{ L})}{0.6000 \text{ L}} = \boxed{0.347 \text{ M}}$$

$$2. M_f = \frac{M_i V_i}{V_f} = \frac{(6.0 \text{ M})(0.4000 \text{ L})}{0.6000 \text{ L}} = \boxed{4.0 \text{ M H}_2\text{SO}_4}$$

$$3. V_f = \frac{M_i V_i}{M_f} = \frac{(3.0 \text{ M})(0.5000 \text{ L})}{1.0 \text{ M}} = \boxed{1.5 \text{ L total}}$$

$$1.5 \text{ L} - 0.5000 \text{ L} = \boxed{1.0 \text{ L H}_2\text{O added or } 1.0 \times 10^3 \text{ mL}}$$

$$4. M_f = \frac{M_i V_i}{V_f} = \frac{(0.200 \text{ M})(0.3000 \text{ L})}{0.5000 \text{ L}} = \boxed{0.120 \text{ M KOH}}$$

$$5. M_f = \frac{M_i V_i}{V_f} = \frac{(0.75 \text{ M})(0.0200 \text{ L})}{0.0900 \text{ L}} = \boxed{0.17 \text{ M HBr}}$$

$$6. M_f = \frac{M_i V_i}{V_f} = \frac{(12 \text{ M})(0.0500 \text{ L})}{0.2500 \text{ L}} = \boxed{2.4 \text{ M HCl}}$$

$$7. \frac{122 \text{ g NH}_4\text{I}}{144.9 \text{ g NH}_4\text{I}} \left| \frac{1 \text{ mol NH}_4\text{I}}{144.9 \text{ g NH}_4\text{I}} \right. = 0.8420 \text{ mol NH}_4\text{I}$$

$$M = \frac{\text{mol}}{V} = \frac{0.8420 \text{ mol}}{0.1000 \text{ L}} = 8.42 \text{ M} = M_i$$

$$M_f = \frac{M_i V_i}{M_f} = \frac{(8.42 \text{ M})(0.1000 \text{ L})}{2.0 \text{ M}} = 0.42 \text{ L (total)}$$

$$0.42 \text{ L} - 0.1000 \text{ L} = \boxed{0.32 \text{ L H}_2\text{O added}}$$

$$8. V_f = \frac{M_i V_i}{M_f} = \frac{(0.10 \text{ M})(0.3000 \text{ L})}{0.0500 \text{ M}} = 0.60 \text{ L (total)}$$

$$0.60 \text{ L} - 0.3000 \text{ L (START)} = \boxed{0.30 \text{ L H}_2\text{O added}}$$

$$9. V_i = \frac{M_f V_f}{M_i} = \frac{(0.15 \text{ M})(0.200 \text{ L})}{0.95 \text{ M}} = \boxed{0.032 \text{ L required}}$$