

Dilution Worksheet (KEY)

1. $M_f = \frac{M_i V_i}{V_f} = \frac{(0.416 \text{ M})(0.500 \text{ L})}{0.600 \text{ L}} = \underline{\underline{0.347 \text{ M}}}$

2. $M_f = \frac{M_i V_i}{V_f} = \frac{(6.0 \text{ M})(0.400 \text{ L})}{0.600 \text{ L}} = \underline{\underline{4.0 \text{ M H}_2\text{SO}_4}}$

3. $V_f = \frac{M_i V_i}{M_f} = \frac{(3.0 \text{ M})(0.500 \text{ L})}{1.0 \text{ M}} = 1.5 \text{ L total} = 1.0 \times 10^3 \text{ mL}$
 $1.5 \text{ L} - 0.500 \text{ L} = \underline{\underline{1.0 \text{ L H}_2\text{O added}}}$

4. $M_f = \frac{M_i V_i}{V_f} = \frac{(0.200 \text{ M})(0.300 \text{ L})}{0.500 \text{ L}} = \underline{\underline{0.12 \text{ M KOH}}}$

5. $M_f = \frac{M_i V_i}{V_f} = \frac{(0.75 \text{ M})(0.020 \text{ L})}{0.090 \text{ L}} = \underline{\underline{0.17 \text{ M HBr}}}$

6. $M_f = \frac{M_i V_i}{V_f} = \frac{(12 \text{ M})(0.050 \text{ L})}{0.250 \text{ L}} = \underline{\underline{2.4 \text{ M HCl}}}$

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

$M = \frac{\text{mol}}{V} = \frac{0.8420 \text{ mol}}{0.100 \text{ L}} = 8.42 \text{ M} = M_i$

$M_f = \frac{M_i V_i}{M_f} = \frac{(8.42 \text{ M})(0.100 \text{ L})}{2.0 \text{ M}} = 0.421 \text{ L (total)}$

$0.421 \text{ L} - 0.100 \text{ L} = \underline{\underline{0.32 \text{ L H}_2\text{O added}}}$

8. $V_f = \frac{M_i V_i}{M_f} = \frac{(0.10 \text{ M})(0.300 \text{ L})}{0.050 \text{ M}} = 0.60 \text{ L (total)}$

$0.60 \text{ L} - 0.300 \text{ L (START)} = \underline{\underline{0.30 \text{ L H}_2\text{O added}}}$

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