

SHOW ALL WORK TO RECEIVE CREDIT

1. (5 Pts) A 40.0-mL portion of a 0.100 M MgSO_4 solution contains how many grams of MgSO_4 ?
(Atomic Molar Masses: Mg 24.31; O 16.00; S 32.06)

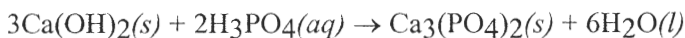
$$\left(\frac{0.100 \text{ mol}}{1 \text{ L}}\right) (0.0400 \text{ L}) = 0.004 \text{ mol MgSO}_4 \frac{120.37 \text{ g MgSO}_4}{1 \text{ mol MgSO}_4} = 0.481 \text{ g MgSO}_4$$

2. (5 Pts) What mass of MgCl_2 is required to prepare 2.00 L of 0.550 M solution?
(Molar mass MgCl_2 95.2 g/mol)

$$\left(\frac{0.550 \text{ mol MgCl}_2}{1 \text{ L MgCl}_2}\right) (2.00 \text{ L MgCl}_2) = 1.100 \text{ mol MgCl}_2 \frac{95.2 \text{ g MgCl}_2}{1 \text{ mol MgCl}_2} = 104.72 \text{ g MgCl}_2$$

S.F.

3. (5 Pts) In the reaction

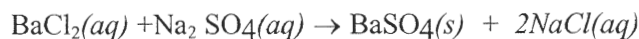


- how many grams of $\text{Ca}(\text{OH})_2$ are required to neutralize 10.0 L of 0.60 M H_3PO_4 solution?
(Molar masses: $\text{Ca}(\text{OH})_2$ 74.1 g/mol; H_3PO_4 98.0 g/mol)

$$\left(\frac{0.60 \text{ mol H}_3\text{PO}_4}{1 \text{ L H}_3\text{PO}_4}\right) (10 \text{ L}) = 6.00 \text{ mol H}_3\text{PO}_4 \frac{3 \text{ mol Ca}(\text{OH})_2}{2 \text{ mol H}_3\text{PO}_4} \frac{74.1 \text{ g Ca}(\text{OH})_2}{1 \text{ mol Ca}(\text{OH})_2} = 666.9 \text{ g Ca}(\text{OH})_2$$

S.F.

4. (5 Pts) What volume of 0.131 M BaCl_2 is required to react completely with 42.0 mL of 0.453 M Na_2SO_4 ?



$$\left(\frac{0.453 \text{ mol Na}_2\text{SO}_4}{1 \text{ L Na}_2\text{SO}_4}\right) (0.0420 \text{ L Na}_2\text{SO}_4) = 0.019 \text{ mol Na}_2\text{SO}_4 \frac{1 \text{ mol BaCl}_2}{1 \text{ mol Na}_2\text{SO}_4} = 0.019 \text{ mol BaCl}_2$$

$$(0.019 \text{ mol BaCl}_2) \left(\frac{0.1 \text{ L BaCl}_2}{0.131 \text{ mol BaCl}_2}\right) = 0.145 \text{ L BaCl}_2 = 145 \text{ mL BaCl}_2$$

5. (5 Pts) How many mL of 3.00 M H_2SO_4 solution are needed to prepare 500.0 mL of 1.25 M H_2SO_4 solution?

$$M_1 V_1 = M_2 V_2$$

$$(3.00 \text{ M H}_2\text{SO}_4) V_1 = (1.25 \text{ M H}_2\text{SO}_4) (500.0 \text{ mL})$$

$$V_1 = 208 \text{ mL H}_2\text{SO}_4$$

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1. (5 Pts) A 90.0-mL portion of a 0.100 M MgSO₄ solution contains how many grams of MgSO₄?
(Atomic Molar Masses: Mg 24.31; O 16.00; S 32.06)

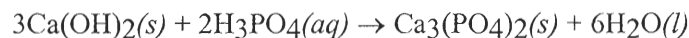
$$\frac{90.0 \text{ mL}}{1000 \text{ mL}} \times \frac{0.100 \text{ mol MgSO}_4}{1 \text{ mol}} \times \frac{120.37 \text{ g}}{1 \text{ mol}} = 1.08 \text{ g MgSO}_4$$

2. (5 Pts) What mass of MgCl₂ is required to prepare 2.00 L of 0.750 M solution?
(Molar mass MgCl₂ 95.2 g/mol)

$$\frac{2.00 \text{ L}}{1 \text{ L}} \times \frac{0.750 \text{ mol MgCl}_2}{1 \text{ mol}} \times \frac{95.2 \text{ g}}{1 \text{ mol}} = 142.8 \text{ g MgCl}_2$$

(143)

3. (5 Pts) In the reaction



- ? g 15.0 L
0.60 mol
- how many grams of Ca(OH)₂ are required to neutralize 15.0 L of 0.60 M H₃PO₄ solution?
(Molar masses: Ca(OH)₂ 74.1 g/mol; H₃PO₄ 98.0 g/mol)

$$\frac{15.0 \text{ L H}_3\text{PO}_4}{1 \text{ L H}_3\text{PO}_4} \times \frac{0.60 \text{ mol H}_3\text{PO}_4}{1 \text{ mol H}_3\text{PO}_4} \times \frac{3 \text{ mol Ca(OH)}_2}{2 \text{ mol H}_3\text{PO}_4} \times \frac{74.1 \text{ g Ca(OH)}_2}{1 \text{ mol Ca(OH)}_2} = 1000 \text{ g Ca(OH)}_2$$

4. (5 Pts) What volume of 0.131 M BaCl₂ is required to react completely with 72.0 mL of 0.453 M Na₂SO₄?

$$\text{BaCl}_2(aq) + \text{Na}_2\text{SO}_4(aq) \rightarrow \text{BaSO}_4(s) + 2\text{NaCl}(aq)$$

$$\frac{72.0 \text{ mL Na}_2\text{SO}_4}{1000 \text{ mL Na}_2\text{SO}_4} \times \frac{0.453 \text{ mol Na}_2\text{SO}_4}{1 \text{ mol Na}_2\text{SO}_4} \times \frac{1 \text{ mol BaCl}_2}{1 \text{ mol Na}_2\text{SO}_4} \times \frac{1000 \text{ mL BaCl}_2}{0.131 \text{ mol BaCl}_2} = 249 \text{ mL BaCl}_2$$

sol'n

5. (5 Pts) How many mL of 3.00 M H₂SO₄ solution are needed to prepare 800.0 mL of 2.25 M H₂SO₄ solution?

$$M_1 V_1 = M_2 V_2$$

$$(3.00 \text{ M}) V_1 = (2.25 \text{ M})(800.0 \text{ mL})$$

$$V_1 = 600 \text{ mL}$$