

### Chemistry 105 Laboratory Test Study Exercises

1. Perform the following calculations and record the answers with the correct number of significant figures.

a.  $21.2405 + 5.80$

b.  $13.377 - 21.6$

c.  $(5.03 \times 10^{-4})(3.6675)$

d.  $0.05770/75.3$

e.  $(250.0\text{g})(4.184 \frac{\text{J}}{\text{g}^\circ\text{C}})(58.2^\circ\text{C} - 49.0^\circ\text{C})$

2. For the following series of measurements calculate the average deviation from the mean.

4.8 g 5.0 g 4.7 g

3. The density of  $\text{CH}_2\text{Cl}_2(l)$  is 1.2 g/mL. An experiment calls for the use of 20.0 g of  $\text{CH}_2\text{Cl}_2$ . How many mL should be used?

4. After a distillation 144 mL of ethyl alcohol are recovered. The density of ethyl alcohol is 0.79 g/mL. What is the mass of the ethyl alcohol recovered?

5. Give the names for the following.



6. Give formulas for the following.

a. pernitric acid

b. ammonium carbonate

c. chromium (VI) oxide

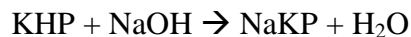
d. dinitrogen pentoxide

7. Give the molecular, complete ionic, and net ionic reactions for the following.

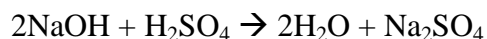


8. When 7.35 g of Cr reacts with oxygen 10.74 g of metal oxide are produced. What's the empirical formula?

9. If 24.05 mL of NaOH solution is required to react with 0.6816 g of KHP (potassium hydrogen phthalate) what is the molarity of the NaOH solution? Recall that KHP has one acidic proton. The molar mass for KHP is 204.2 g.

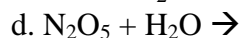
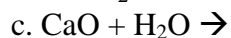
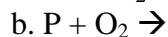
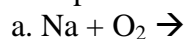


10. Consider the following neutralization reaction:

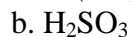
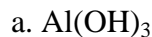


If it takes 14.20 mL of 0.09801 M NaOH to neutralize 10.00 mL of  $\text{H}_2\text{SO}_4$  solution, what is the concentration of  $\text{H}_2\text{SO}_4$ ?

11. Complete and balance the following.



12. Give the formula for the anhydride (oxide) from which each of the following formed.



### Answers

1. a. 27.04    b. -8.2    c.  $1.84 \times 10^{-3}$     d.  $7.66 \times 10^{-4}$     e.  $9.6 \times 10^3 \text{J}$

2. 0.1 g

3. 16.7 mL (17 mL)

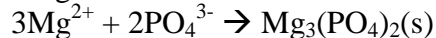
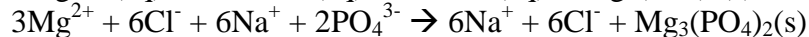
4. 113.8 g ( $1.1 \times 10^2 \text{g}$ )

5. a. potassium peroxide    b. potassium oxide    c. potassium sulfite    d. nitrogen monoxide

e. phosphorous acid    f. iron (III) oxide

6a.  $\text{HNO}_4$     b.  $(\text{NH}_4)_2\text{CO}_3$     c.  $\text{CrO}_3$     d.  $\text{N}_2\text{O}_5$

7.  $3\text{MgCl}_2(\text{aq}) + 2\text{Na}_3\text{PO}_4(\text{aq}) \rightarrow 6\text{NaCl}(\text{aq}) + \text{Mg}_3(\text{PO}_4)_2(\text{s})$



8.  $\text{Cr}_2\text{O}_3$

9. 0.1388 M

10. 0.0695 M

11a.  $4\text{Na} + \text{O}_2 \rightarrow 2\text{Na}_2\text{O}$     c.  $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$

b.  $4\text{P} + 5\text{O}_2 \rightarrow 2\text{P}_2\text{O}_5$     d.  $\text{N}_2\text{O}_5 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{N}_2\text{O}_6 \rightarrow 2\text{HNO}_3$

12a.  $\text{Al}_2\text{O}_3$     b.  $\text{SO}_2$