1. \(\frac{3.23 \times 10^4}{2.67 \times 10^5} = \)

2. How many hydrogen, oxygen, carbon and/or nitrogen atoms are in 2.5 moles of methane, \(\text{CH}_4\).

3. In every day life, which of the following atoms are more likely to be in the form of cations, anions, or neutral atoms? Na, Br, Ar. What is the charge on each? Explain why?

4. If enough water is added to 0.13 mole of NaCl to achieve a total liquid volume of 100 mL, what is the molarity of the resulting solution?

5. Under 1.0 atm pressure, propane boils at -42.1 °C. What is its boiling point in K?

6. Solve for \(x\): \((x -1.34)(x + 1.34) = 19.55\)

7. Balance the following reaction and name each of the species: \(\text{Fe}_2\text{O}_3(s) +\text{CO}(g) \rightarrow \text{Fe}(s) +\text{CO}_2(g)\)

8. The empirical formula of a compound is \(\text{C}_2\text{H}_3\text{O}\). Its molecular mass is 86. What is its molecular formula?

9. 1.0 atm of nitrogen gas is placed in a steel bulb at 298 K. Next, the temperature is increased to 325 K. (The volume of the bulb remains constant to a good approximation.) Will the gas pressure in the bulb increase, or decrease? Calculate the final pressure according to the ideal gas law: \(PV=nRT\).

10. What is the H\(^+\) concentration in a 0.5 M solution of hydrochloric acid, \(\text{HCl (aq)}\). What is the pH?

11. Identify the difference between Co and CO.

12. A 10.0 mL sample of 2.0 M NaCl is added to a 40.0 mL sample of water. What is the concentration of NaCl?

13. Write the net ionic equation for \(\text{AgNO}_3(aq) + \text{NaCl(aq)} \rightarrow \text{AgCl(s)} + \text{NaNO}_3(aq)\). Identify the spectator ions and precipitate.

14. If 0.2 g of \(\text{H}_2\) is reacted with 0.2 g of \(\text{O}_2\) to form water vapor, what is the limiting reactant? How many moles of water vapor is formed?

Answers: 1) \(1.21 \times 10^{-1}\) (make sure you put the right number of significant figures for this and the following problems!) 2) \(1.5 \times 10^{-24}\) C atoms, \(6.0 \times 10^{24}\) H atoms, 0 N or O atoms. 3) Na will be in the form of a cation (Na\(^+\)), Br in the form of anion (Br\(^-\)), Ar will be neutral. The atoms are most stable when they have a noble gas configuration. 4) \(1.3\) M 5) \(231.0\) K 6) \(4.62\) 7) \(\text{Fe}_2\text{O}_3(s) +3\text{CO}(g) \rightarrow 2\text{Fe(s)}+3\text{CO}_2(g)\) \(\text{Fe}_2\text{O}_3(s)\) is Iron(III) Oxide OR Ferric Oxide: CO= carbon monoxide: Fe= Iron CO\(_2\)= Carbon Dioxide 8) \(\text{C}_2\text{H}_6\text{O}_2\) 9) The pressure will increase. You should know this before doing a calculation. The calculation tells you that it increases to 1.09 atm. 10) \(0.5\) M, 0.3 11) Co is the symbol for cobalt atoms, CO is the symbol for carbon monoxide molecules. 12) \(0.40\) M 13) \(\text{Ag}^+(aq) +\text{Cl}^-(aq) \rightarrow \text{AgCl(s)}\); spectator ions are Na\(^+\) and NO\(_3^-\); the precipitate is AgCl(s) 14) O\(_2\) is the limiting reagent. \(0.0125\) mol \(\text{H}_2\text{O}\) is formed.