Chemistry 11 – Percent Composition, Empirical and Molecular Formulas, Molarity Calculations and Dilution

1. Find the percent composition (% by mass of each element) in the following compound: $Ba_3(PO_4)_2$. Show your work. (3 marks)

    Answer _____%Ba, _____%P, _____%O

2. Calculate the percent by mass of water (H_2O) in strontium hydroxide octahydrate, $Sr(OH)_2·8H_2O$. (2 marks)

    Answer _____% H_2O

3. A compound was analyzed and the following results were obtained:
    Molar mass: 162.0 g/mol
    Mass of sample: 0.8821 g
    Mass of hydrogen: 0.0220 g
    Mass of phosphorus: 0.3374 g
    Mass of oxygen: the remainder of the sample is oxygen

    a. Determine the mass of oxygen in the sample. (1 mark)

    Answer _____

b. Determine the empirical formula for this compound. (4 marks)

Answer: Empirical Formula: _____

c. Determine the molecular formula for this compound. (2 marks)

Answer: Molecular Formula: _____

4. 89.523 g of sodium sulphate Na_2SO_4 are dissolved in enough water to form 850.0 mL of solution. Calculate the molar concentration of Na_2SO_4 ($[Na_2SO_4]$) Include proper units in your work and in your answers. (2 marks)

Answer _____

5. Calculate the mass of potassium carbonate (K_2CO_3) needed to make 400.0 mL of a 0.200 M solution of K_2CO_3. Include proper units in your work and in your answers. (2 marks)

Answer _____

6.   What volume of 2.50 M Li_2SO_3 would need to be evaporated in order to obtain 422.55 g of solid Li_2SO_3? Include proper units in your work and in your answers. (2 marks)

Answer _____

7.   150.0 mL of water are added to 200.0 mL of 0.60 M HNO_3 . Calculate the final $[HNO_3]$.
     Include proper units in your work and in your answers. (2 marks)

Answer _____

8.   What volume of water needs to be added to 50.0 mL of 6.00 M H_2SO_4 in order to bring the concentration down to 2.50 M? Include proper units in your work and in your answers.
     (2 marks)

Answer _____

9.   What volume of 12.0 M HCl must be used in order to produce 500.0 mL of 0.250 M HCl?
     Include proper units in your work and in your answers. (2 marks)

Answer _____

10. 200.0 mL of 0.450 M NaOH is diluted to a total volume of 1.00 L. Calculate the final concentration of NaOH. Include proper units in your work and in your answers. (2 marks)

Answer _____

11. Give directions on how to make 400.0 mL of 0.020 M $KMnO_4$ using solid $KMnO_4$ and water. Include proper units in your work and in your answers. (2 marks)

Answer _____