SCH 3U – Problem Set 1 /26

Name

1. Chlorine (atomic number 17) has two naturally occurring isotopes. One isotope has a mass of 34.966 and an abundance of 75.77%. The other has a mass of 36.966 and an abundance of 24.23 %. Calculate the average atomic mass of chlorine. (3)

2. Calculate the number of atoms in 3.75 mol of an element. (2)

3. Calculate the number of atoms in 5.5 mol of an element. (2)

4. Calculate the mass of 2.75 mol of nickel. (2)

5. Calculate the mass of 2.5 mol of aluminum. (2)

6. Determine the mass of 1.6×10^{23} atoms of hydrogen. (2)

7. Determine the amount of substance in 8.40 g of copper. (2)

8. Calculate the mass of 3.4×10^{24} atoms of sodium. (2)

9. Determine the mass of 1.5×10^{24} atoms of the following: (4)

    a. potassium

    b. nitrogen

10. Determine the number of atoms in 4.60 g of boron. (2)

11. Calculate the number of atoms in 55.3 g of zinc. (2)

12. Determine the molar mass of propane (C_3H_8). (2)

13. Determine the molar mass of $BaHPO_4$. (2)

14. Calculate the molar mass of barium carbonate, $BaCO_3$.(2)

15. Calculate the molar mass of $AgClO_4$. (2)

16. Calculate the molar mass of cobalt(II) chloride hexahydrate. (2)

17. Calculate the molar mass of $FePO_4 \bullet 3H_2O$. (2)

18. Determine the percent composition by mass of each of the following:

    a. silver nitrate (5)

    b. cobalt (II) chromate (5)

c. barium chromate (5)

d. iron (III) chloride hexadyrate (5)

19. Lactic acid consists of 40.0% carbon and 6.71% hydrogen. If the other ingredient is oxygen, what is the empirical formula? (2)

20. The empirical formula for moth repellent is C_3H_2Cl. Its molar mass is 147 g/mol. Determine its molecular formula. (3)

21. When a 3.862g sample of silver oxide is heated, the remaining silver has a mass of 3.363 g. Determine the empirical formula of this compound. (4)

22. When 3.62g of CaCl2 is left open to the air, 1.17 g of water is absorbed. Determine the formula of the hydrated compound that is formed. (4)