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\[ N_A = 1 \text{ mole} = 6.02 \times 10^{23} \]

Multiple Choice Questions: Circle the single best answer. No penalty for guessing.

1. What is the length of a 2300 cm long block of wood in km? (4 points)
   A) 2.3 \times 10^{-6} \text{ km}  
   B) 2.3 \times 10^{0} \text{ km}  
   C) 2.3 \times 10^{-2} \text{ km}  
   D) 2.3 \times 10^{1} \text{ km}  
   E) 2.3 \times 10^{-1} \text{ km}

2. Do the following arithmetic with correct significant figures: (4 points)
   \[ (9.212 + 12.44 - 0.9912) / 33.151 \]
   A) 0.62323  
   B) 0. 6232  
   C) 0. 623  
   D) 0. 62  
   E) 0. 6

3. How many neutrons and protons does a \(^{11}\text{C}\) nucleus have? (4 points)
   A) 11 p, 11 n  
   B) 6 n, 6 p  
   C) 6 p, 5 n  
   D) 5 p, 6 n  
   E) 11 p, 0 n

4. What is the name of the \(\text{Cr}O_4^{2-}\) anion? (4 points)
   A) chromate  
   B) chromite  
   C) perchromate  
   D) chlorite  
   E) chromide

5. How many moles are 36.00 g of \(^{12}\text{C}\)? (4 points)
   A) 1.0  
   B) 2.0  
   C) 3.0  
   D) 36.0  
   E) 72.0

6. A compound has 30.45 % by mass nitrogen and 69.55 % oxygen. What is the empirical formula of this compound? (4 points)
   A) NO  
   B) NO\textsubscript{2}  
   C) N\textsubscript{2}O\textsubscript{3}  
   D) N\textsubscript{3}O\textsubscript{4}  
   E) N\textsubscript{2}O\textsubscript{5}

7. Write the balanced chemical equation for the reaction of PBr\textsubscript{3} with H\textsubscript{2}O to produce H\textsubscript{3}PO\textsubscript{4} and HBr. Calculate the mass of HBr produced when 4.305 g of PBr\textsubscript{3} is reacted in excess water. (15 points)
8. Define isotope and give an example. (6 points)

9. Name the following ionic compounds. (4 points each)

   Ca(OH)\textsubscript{2}  
   PCl\textsubscript{3}  
   Ba(NO\textsubscript{2})\textsubscript{2}  
   Cu\textsubscript{3}(PO\textsubscript{4})\textsubscript{2}  

10. Write the empirical formula for the following compounds. (4 points each)

    chromium (II) bisulfate  
    magnesium hydroxide  
    sulfur trioxide  
    iron (III) sulfite  

11. Calculate the molecular weight of the following compound. (5 points)

    Testosterone, C\textsubscript{19}H\textsubscript{28}O\textsubscript{2}  

12. How many atoms are in 5.12g of nitrogen? (8 points)
13. A piece of aluminum foil measuring 12.0 m by 15.5 m has a mass of 51.75 g. Aluminum has a density of 2.70 g/cm³. What thickness is the aluminum foil in millimeters? (15 points)

14. Balance the following two chemical equations. (10 points)

\[ \text{____Li}_3\text{N(s) + ____H}_2\text{O(l) ---\rightarrow ____NH}_3\text{(g) + ____LiOH(aq)}} \]

\[ \text{____C}_4\text{H}_9\text{OH(l) + ____O}_2\text{(l) ---\rightarrow ____CO}_2\text{(g) + ____H}_2\text{O(l)}} \]

15. Balance the following equation and calculate the amount of FeO which could be produced by reacting 5.00 g of Fe₂O₃ and 15.00 g of CO. (15 points)

\[ \text{____Fe}_2\text{O}_3\text{(s) + ____CO(g) ---\rightarrow ____FeO(s) + ____CO}_2\text{(g)}} \]