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Questions:

IV. Answer any 3

1. The reaction between aluminium and ferric oxide can generate temperatures up to 3273 K and is used in welding metals. (Atomic mass of Al = 27 u atomic mass of O = 16 u)
   $2Al + Fe_2O_3 \longrightarrow Al_2O_3 + 2Fe$; If in this process, 324 g of aluminum is allowed to react with 1.12 kg of ferric oxide
   i) Calculate the mass of Al_2O_3 formed
   ii) How much of the excess reagent is left at the end of the reaction ?
2. Balance the following equations by ion electron method.
   i) $KMnO_4 + SnCl_2 + HCI \longrightarrow MnCI_2 + SnCI_4 + H_2O + KCI$
   ii)
   $C_2O_4^{2-} + Cr_2O_7^{2-} \longrightarrow Cr^{3+} + CO_2$ (in acid medium)

   iii)
   $Na_2S_2O_3 + I_2 \longrightarrow Na_2S_4O_6 + NaI$

   iv)
   $Zn + NO_3^- \longrightarrow Zn^{2+} + NO$ (in acid medium)
3. Experimental analysis of a compound containing the elements x,y,z on analysis gave the following data.
   x = 32 %, y = 24 %, z = 44 %. The relative number of atoms of x, y and z are 2, 1 and 0.5, respectively. (Molecular mass of the compound is 400 g) Find out.
   i) The atomic masses of the element x,y,z.
   ii) Empirical formula of the compound and
   iii) Molecular formula of the compound.
4. Balance the following equations by oxidation number method.
   $NH_3 + F_2 \longrightarrow HF + N_2$
5. A Compound on analysis gave the following percentage composition C = 54.55%, H = 9.09%, O = 36.36%. Determine the empirical formula of the compound.

III. Answer any 4

6. The density of carbon dioxide is equal to 1.965 kgm^{-3} at 273 K and 1 atm pressure. calculate the molar mass of CO_2.
7. What is the difference between molecular mass and molar mass ? Calculate the molecular mass and molar mass for carbon monoxide.
8. 0.456 g of a metal gives 0.606 g of its chloride. Calculate the equivalent mass of the metal.
9. How many moles of hydrogen is required to produce 10 moles of ammonia ?
10. An acid found in tamarinds on analysis shows the following percentage composition : 32% Carbon; 4% Hydrogen ; 64% Oxygen Find the empirical formula of the compound.

II. Answer any 4

11. What do you understand by the term mole ?
12. Define equivalent mass.
13. What do you understand by the term oxidation number ?
14. Calculate the molar mass of the following compounds.
    i) urea $[CO(NH_2)_2]$
    ii) Acetone $[CH_3COCH_3]$
    iii) Boric Acid $[H_3BO_3]$
    iv) Sulphuric Acid $[H_2SO_4]$
15. By applying the knowledge of chemical classification, classify each of the following into elements, compounds or mixtures.
    (i) Sugar
    (ii) Sea water
    (iii) Distilled water
    (iv) Carbon dioxide
    (v) Copper wire
    (vi) Table salt
    (vii) Silver plate
    (viii) Naphthalene balls

I. Choose the correct answer

16. 40 ml of methane is completely burnt using 80 ml of oxygen at room temperature The volume of gas left after cooling to room temperature is _____.
    (a) 40 ml CO_2 gas (b) 40 ml CO_2 gas and 80 ml H_2O gas (c) 60 ml CO_2 gas and 60 ml H_2O gas (d) 120 ml CO_2 gas
17. Carbon forms two oxides, namely carbon monoxide and carbon dioxide. The equivalent mass of which element remains constant ?
    (a) Carbon (b) Oxygen (c) Both carbon and oxygen (d) Neither carbon nor oxygen
18. The number of water molecules in a drop of water weighing 0.018 g is _____.
    (a) 6.022×10^{26} (b) 6.022×10^{23} (c) 6.022×10^{20} (d) 9.9×10^{22}
19. 1 g of an impure sample of magnesium carbonate (containing no thermally decomposable impurities) on complete thermal decomposition gave 0.44 g of carbon dioxide gas. The percentage of impurity in the sample is _____.
    (a) 0% (b) 4.4% (c) 16% (d) 8.4%
20. The correct increasing order of the oxidation state of sulphur in the anions $SO_4^{2-}, SO_3^{2-}, S_2O_4^{2-}, S_2O_6^{2-}$ is _____.
    (a) $SO_3^{2-} < SO_4^{2-} < S_2O_4^{2-} < S_2O_6^{2-}$ (b) $SO_4^{2-} < SO_4^{2-} < S_2O_6^{2-} < SO_3^{2-}$ (c) $S_2O_4^{2-} < SO_3^{2-} < S_2O_6^{2-} < SO_4^{2-}$ (d) $S_2O_6^{2-} < SO_4^{2-} < SO_4^{2-} < SO_3^{2-}$