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Questions:

IV. ANSWER ANY FOUR QUESTIONS

1. What is the empirical formula of the following?
   i) Fructose ($C_6H_{12}O_6$) Found in honey
   ii) Caffeine ($C_8H_{10}N_4O_2$) a substance found in tea and Coffee
2. Calculate the empirical and molecular formula of a compound containing 76.6% carbon, 6.38 % hydrogen and rest oxygen its vapour density is 47.
3. Explain displacement reaction ? Explain its two types with an example for each.
4. Balance the following equations by ion electron method
   $C_2O_4^{2-} + Cr_2O_7^{2-} \longrightarrow Cr^{3+} + CO_2$ (in acid medium)
5. The balanced equation for a reaction is given below 2x + 3y → 41 + m
   When 8 moles of x react with 15 moles of y, then
   i) Which is the limiting reagent ?
   ii) Calculate the amount of products formed.
   iii) Calculate the amount of excess reactant left at the end of the reaction
6. Calculate equivalent masses of the following: a) H_2SO_4 b) KOH c) $KMnO_4$

III. ANSWER ANY FOUR QUESTIONS. Q.No: 19 IS COMPULSORY

7. Distinguish between oxidation and reduction.
8. 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.
9. Which contains the greatest number of moles of oxygen atoms
   i) 1 mol of ethanol
   ii) 1 mol of formic acid
   iii) 1 mol of H_2O
10. What is the difference between molecular mass and molar mass ? Calculate the molecular mass and molar mass for carbon monoxide.
11. How many moles of ethane is required to produce 44 g of $CO_{2(g)}$ after combustion.
12. How many moles of hydrogen is required to produce 10 moles of ammonia ?

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II. ANSWER ANY FOUR QUESTIONS. Q.No: 15 IS COMPULSORY

13. Define relative atomic mass.
14. What do you understand by the term mole ?
15. What do you understand by the term oxidation number ?
16. 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]
17. Calculate the number of moles present in 9 grams of ethane.
18. 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.ANSWER ALL THE QUESTIONS

19. 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
20. The equivalent mass of a trivalent metal element is 9 g eq^{-1} the molar mass of its anhydrous oxide is _____.
    (a) 102 g (b) 27 g (c) 270 g (d) 78 g
21. 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%
22. When 22.4 litres of $H_2(g)$ is mixed with 11.2 litres of $Cl_2(g)$, each at 273 K at 1 atm the moles of HCl (g), formed is equal to _____.
    (a) 2 moles of HCl (g) (b) 0.5 moles of HCl (g) (c) 1.5 moles of HCl (g) (d) 1 moles of HCl (g)
23. Choose the disproportionation reaction among the following redox reactions.
    (a) $3Mg_{(s)} + N_{2(g)} \longrightarrow Mg_3N_{2(s)}$ (b) $P_4(s) + 3NaOH + 3H_2O \longrightarrow PH_3(g) + 3NaH_2PO_2(aq)$ (c) $Cl_{2(g)} + 2KI_{(aq)} \longrightarrow 2KCl_{(aq)} + I_2$ (d) $Cr_2O_{3(s)} + 2Al_{(s)} \longrightarrow Al_2O_3(s) + 2Cr(s)$
24. Which one of the following represents 180 g of water ?
    (a) 5 Moles of water (b) 90 moles of water (c) $\frac{6.022\times10^{23}}{180}$ molecules of water (d) 6.022×10^{24}molecules of water
25. 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) $S_2O_6^{2-} < SO_4^{2-} < SO_4^{2-} < SO_3^{2-}$
26. If Avogadro number were changed from 6.022 x 10^{23} to 6.022 x 10^{20}, this would change _____.

(a) the ratio of chemical species to each other in a balanced equation (b) the ratio of elements to each other in a compound (c) the definition of mass in units of grams (d) the mass of one mole of carbon

27. The mass of a gas that occupies a volume of 612.5 ml at room temperature and pressure (25^0 c and 1 atm pressure) is 1.1g. The molar mass of the gas is _____.

(a) 66.25 g mol^{-1} (b) 44 g mol^{-1} (c) 24.5 g mol^{-1} (d) 662.5 g mol^{-1}

28. The equivalent mass of potassium permanganate in alkaline medium is:

$MnO_4^- + 2H_2O + 3e^- \rightarrow MnO_2 + 4OH^-$

(a) 31.6 (b) 52.7 (c) 79 (d) None of these

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