

WEEKLY TEST TYJ-02 TEST - 4 Balliwala
SOLUTION Date 11-08-2019

CHEMISTRY

16. $100\text{amu} = (100) \left(\frac{1\text{g}}{6.022 \times 10^{23}} \right) = 1.66 \times 10^{-22}\text{g}$
- Mass of 7.0×10^{22} molecules $= \frac{7.0 \times 10^{22}}{6.022 \times 10^{23}} \times 46\text{g} = 5.35\text{g}$
- Mass of 8.0×10^{-1} mol $= 0.8 \times 46\text{g} = 36.8\text{g}$
17. Ratio of atoms C : H : $:\frac{85.6}{12} : \frac{14.4}{1} : : 7.13 : 14.4 : : 1 : 2$
- Simplest formula : CH_2
18. $490\text{mg H}_2\text{SO}_4 = 490 \times 10^{-3}\text{g H}_2\text{SO}_4 = \frac{490 \times 10^{-3}}{98}\text{mol}$
- $= \frac{490 \times 10^{-3} \times 6.02 \times 10^{23}}{98}$ molecules $= 3.01 \times 10^{21}$ molecules
- Molecules left over $= (3.01 \times 10^{21}) - (10^{20}) = 3.01 \times 10^{21} - 0.1 \times 10^{21}$
 $= (3.01 - 0.1) \times 10^{21} = 2.91 \times 10^{21}$
19. Let the mass of $\text{O}_2 = x$ and that of $\text{N}_2 = 4x$
- No. of molecules of $\text{O}_2 = \frac{x}{32}$
- No. of molecules of $\text{N}_2 = \frac{4x}{28} = \frac{x}{7}$
- Ration $\frac{x}{32} : \frac{x}{7}$ or $7 : 32$
20. Ammonium dichromate is $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$.
- 1 mole consists of 2 atoms of N, 8 atoms of H, 2 atoms of Cr, and 7 atoms of O.
- So, total no. of atoms $= (2 + 8 + 2 + 7) \times 6.023 \times 10^{23}$
 $= 114.437 \times 10^{23}$
21. Moles of water produced $= \frac{0.72}{18} = 0.04$
- Moles of CO_2 produced $= \frac{3.08}{44} = 0.07$
- Equation for combustion of an unknown hydrocarbon, C_xH_y is
- $$\text{C}_x\text{H}_y + \left(x + \frac{y}{4}\right)\text{O}_2 \rightarrow x\text{CO}_2 + \frac{y}{2}\text{H}_2\text{O}$$
- $\Rightarrow x = 0.07$ and $\frac{y}{2} = 0.04 \Rightarrow y = 0.08$ and $\frac{x}{y} = \frac{0.07}{0.08} = \frac{7}{8}$

22. (a) Molecular weight = $2 \times V.D = 2 \times 11.2 = 22.4$
 $\therefore 22.4 \text{ gm}$ of gas occupies 22.4 L at S.T.P.
 $\therefore 11.2 \text{ gm}$ of gas occupies $\frac{22.4}{22.4} \times 11.2 = 11.2 \text{ L}$.
23. (b) Valency of the element = $\frac{2 \times V.D}{E + 35.5} = \frac{2 \times 59.25}{4 + 35.5}$
 $= \frac{118.50}{39.5} = 3$.
24. (c) [\because Molecular weight of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
 $= 63.5 + 32 + 64 + 90 = 249.5$]
 6×10^{23} molecules has weight = 249.5 gm
 1×10^{22} molecules has weight = $\frac{249.5 \times 1 \times 10^{22}}{6 \times 10^{23}}$
 $= 41.58 \times 10^{-1} = 4.158$
25. (b) One ion carries $3 \times 1.6 \times 10^{-19}$ coulomb
 Then 1 gm ion N^{3-} (1 mole) carries
 $= 3 \times 1.6 \times 10^{-19} \times 6.02 \times 10^{23}$
 $= 2.89 \times 10^5$ coulomb
26. (b) $\text{Mg} + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$
 $\therefore 24 \text{ g Mg}$ evolves 22.4 L H_2 at STP
 $\therefore 12 \text{ g Mg}$ evolves H_2 at STP $\frac{22.4}{24} \times 12$
 $= 11.2 \text{ L}$ at STP.
27. (c) 1mole of any gas at STP occupies 22.4 L .