

**Atoms Molecule and Chemical Arithmetic Assignment – II**

- If the density of water is  $1 \text{ g cm}^{-3}$  then the volume occupied by one molecule of water is approximately  
(a)  $18 \text{ cm}^3$  (b)  $22400 \text{ cm}^3$  (c)  $6.02 \times 10^{-23} \text{ cm}^3$  (d)  $3.0 \times 10^{-23} \text{ cm}^3$
- Caffeine has a molecular weight of 194. If it contains 28.9% by mass of nitrogen, number of atoms of nitrogen in one molecule of caffeine is  
(a) 4 (b) 6 (c) 2 (d) 3
- A 400 mg iron capsule contains 100 mg of ferrous fumarate,  $(\text{CHCOO})_2\text{Fe}$ . The percentage of iron present in it is approximately  
(a) 33% (b) 25% (c) 14% (d) 8%
- The element whose a atom has mass of  $10.86 \times 10^{-26} \text{ kg}$  is  
(a) Boron (b) Calcium (c) Silver (d) Zinc
- The number of gram atoms of oxygen present in 0.3 gram mole of  $(\text{COOH})_2 \cdot 2\text{H}_2\text{O}$  is  
(a) 0.6 (b) 1.8 (c) 1.2 (d) 3.6
- A gaseous mixture contains  $\text{CH}_4$  and  $\text{C}_2\text{H}_6$  in equimolecular proportion. The weight of 2.24 litres of this mixture at NTP is  
(a) 4.6 g (b) 1.6 g (c) 2.3 g (d) 23 g
- Vapour density of a metal chloride is 66. Its oxide contains 53% metal. The atomic weight of the metal is  
(a) 21 (b) 54 (c) 27.06 (d) 2.086
- One gram of Hydrogen is found to combine with 80g of bromine one gram of calcium valency=2 combines with 4g of bromine the equivalent weight of calcium is  
(a) 10 (b) 20 (c) 40 (d) 80
- The equivalent weight of  $\text{MnSO}_4$  is half its molecular weight when it is converted to  
(a)  $\text{Mn}_2\text{O}_3$  (b)  $\text{MnO}_2$  (c)  $\text{MnO}_4$  (d)  $\text{MnO}_4^{2-}$
- The molar heat capacity of water at constant pressure is  $75 \text{ JK}^{-1} \text{ mol}^{-1}$ . When 1.0 kJ of heat is supplied to 100 g of water which is free to expand, the increases in temperature of water is  
(a) 6.6 K (b) 1.2 K (c) 2.4 K (d) 4.8 K
- 100 mL of  $\text{PH}_3$  on decomposition produced phosphorus and hydrogen. The change in volume is  
(a) 50 mL increase (b) 500 mL decrease (c) 900 mL decrease (d) Nil.
- 12g of Mg (at. mass 24) on reacting completely with acid gives hydrogen gas, the volume of which at STP would be  
(a) 22.4 L (b) 11.2 L (c) 44.8 L (d) 6.1 L
- Which of the following has least mass  
(a) 2 g atom of nitrogen (b)  $3 \times 10^{23}$  atoms of C (c) 1 mole of S (d) 7.0 g of Ag
- How many mole of helium gas occupy 22.4 L at  $0^\circ\text{C}$  at 1 atm. pressure  
(a) 0.11 (b) 0.90 (c) 1.0 (d) 1.11
- Volume of a gas at STP is  $1.12 \times 10^{-7} \text{ cc}$ . Calculate the number of molecules in it  
(a)  $3.01 \times 10^{20}$  (b)  $3.01 \times 10^{12}$  (c)  $3.01 \times 10^{23}$  (d)  $3.01 \times 10^{24}$
- 4.4 g of an unknown gas occupies 2.24 L of volume at standard temperature and pressure. The gas may be  
(a) Carbon dioxide (b) Carbon monoxide (c) Oxygen (d) Sulphur dioxide
- The number of moles of oxygen in 1 L of air containing 21% oxygen by volume, in standard conditions, is  
(a) 0.186 mol (b) 0.21 mol (c) 2.10 mol (d) 0.0093 mol
- The number of molecules in 8.96 L of a gas at  $0^\circ\text{C}$  and 1 atmosphere pressure is approximately  
(a)  $6.02 \times 10^{23}$  (b)  $12.04 \times 10^{23}$  (c)  $18.06 \times 10^{23}$  (d)  $24.08 \times 10^{22}$
- A compound possesses 8% sulphur by mass. The least molecular mass is  
(a) 200 (b) 400 (c) 155 (d) 355
- How many moles of oxygen are present in 1 litre of air at NTP  
(a) 2.1 mole (b) 0.0093 mole (c) 0.21 mole (d) 0.186 mole
- 54 grams of aluminium (atomic weight =27) will react with how many grams of oxygen  
(a) 16 g (b) 48 g (c) 40 g (d) 15 g
- If  $10^{21}$  molecules are removed from 200mg of  $\text{CO}_2$ , then the number of moles of  $\text{CO}_2$  left are  
(a)  $2.68 \times 10^{-3}$  (b)  $28.8 \times 10^{-3}$  (c)  $0.288 \times 10^{-3}$  (d)  $1.68 \times 10^{-2}$

## GRAVITY CLASSES

23.  $H_2$  evolved at STP on complete reaction of 27 g of Aluminium with excess of aqueous  $NaOH$  would be  
(a) 22.4 (b) 44.8 (c) 67.2 (d) 33.6 litres
24. What volume of Hydrogen gas, at 273 K and 1 atm pressure will be consumed in obtaining 21.6 g of elemental boron (atomic mass = 10.8) from the reduction of boron trichloride by Hydrogen  
(a) 22.4 L (b) 89.6 L (c) 67.2 L (d) 44.8 L
25. A sample was weighted using two different balances. The result's were (i) 3.929 g (ii) 4.0 g. How would the weight of the sample be reported  
(a) 3.929 g (b) 3 g (c) 3.9 g (d) 3.93 g
26. The amount of water that should be added to 500 ml of 0.5 N solution of  $NaOH$  to give a concentration of 10 mg per ml is  
(a) 100 (b) 200 (c) 250 (d) 500
27. Number of moles of  $KMnO_4$  required to oxidize one mole of  $Fe(C_2O_4)$  in acidic medium is  
(a) 0.6 (b) 0.167 (c) 0.2 (d) 0.4
28. 3.92 g/L of a sample of ferrous ammonium sulphate reacts completely with 50ml,  $N/10$   $KMnO_4$   
(a) 60 (b) 78.4 (c) 80.0 (d) 39.2
29. A hydrocarbon contains 86% carbon, 488ml of the hydrocarbon weight 1.68 g at STP. Then the hydrocarbon is an  
(a) Alkane (b) Alkene (c) Alkyne (d) Arene
30. The ratio of amounts of  $H_2S$  needed to precipitate all the metal ions from 100 ml of 1 M  $AgNO_3$  and 100 ml of 1 M  $CuSO_4$  will be  
(a) 1:1 (b) 1:2 (c) 2:1 (d) None of these
31. An electric discharge is passed through a mixture containing 50 c.c. of  $O_2$  and 50 c.c. of  $H_2$ . The volume of the gases formed (i) at room temperature and (ii) at  $110^\circ C$  will be  
(a) (i) 25 c.c. (ii) 50 c.c. (b) (i) 50 c.c. (ii) 75 c.c. (c) (i) 25 c.c. (ii) 75 c.c. (d) (i) 75 c.c. (ii) 75 c.c.
32. 100 ml of 0.1 N hypo decolourised iodine by the addition of x g of crystalline copper sulphate to excess of KI. The value of 'x' is  
(molecular wt. of  $CuSO_4 \cdot 5H_2O$  is 250)  
(a) 5.0 g (b) 1.25 g (c) 2.5 g (d) 4 g
33. How many grams of caustic potash required to completely neutralise 12.6 gm  $HNO_3$   
(a) 22.4 KOH (b) 1.01 KOH (c) 6.02 KOH (d) 11.2 KOH
34. If isobutane and n-butane are present in a gas, then how much oxygen should be required for complete combustion of 5 kg of this gas  
(a) 17.9 kg (b) 9 kg (c) 27 kg (d) 1.8 kg
35. What will be the amount of graphite from water  
(a) 36 g (b) 32 g (c) 8 g (d) 10 g
36. 16.8 litre gas containing  $H_2$  and  $O_2$  is formed at NTP on electrolysis of water. What should be the weight of electrolysed water  
(a) 5 g (b) 9 g (c) 10 g (d) 12 g
37. On electrical decomposition of 150 ml dry and pure  $O_2$ , 10% of  $O_2$  gets changed to O, then the volume of gaseous mixture after reaction and volume of remaining gas left after passing in turpentine oil will be  
(a) 145 ml (b) 143 ml (c) 128 ml (d) 125 ml
38. The normality of orthophosphoric acid having purity of 70% by weight and specific gravity 1.54 would be  
(a) 11N (b) 22N (c) 33N (d) 44N
39. How many g of a dibasic acid (Mol. wt. = 200) should be present in 100 ml of its aqueous solution to give decinormal strength  
(a) 1 g (b) 2 g (c) 10 g (d) 20 g
40. The solution of sulphuric acid contains 80% by weight  $H_2SO_4$ . Specific gravity of this solution is 1.71. Its normality is about  
(a) 18.0 (b) 27.9 (c) 1.0 (d) 10.0
41. Mohr's salt is dissolved in dil.  $H_2SO_4$  instead of distilled water to  
(a) Enhance the rate of dissolution (b) Prevent cationic hydrolysis  
(c) Increase the rate of ionisation (d) Increase its reducing strength
42. Acidified potassium permanganate solution is decolourised by  
(a) Bleaching powder (b) White vitriol (c) Mohr's salt (d) Microcosmic salt
43. The equivalent weight of phosphoric acid ( $H_3PO_4$ ) in the reaction,  $NaOH + H_3PO_4 \rightarrow NaH_2PO_4 + H_2O$  is  
(a) 25 (b) 49 (c) 59 (d) 98

## GRAVITY CLASSES

44. Approximate atomic weight of an element is 26.89. If its equivalent weight is 8.9, the exact atomic weight of element would be  
(a) 26.89 (b) 8.9 (c) 17.8 (d) 26.7
45. One *g* of hydrogen is found to combine with 80 *g* of bromine. One *g* of calcium (valency 2) combines with 4 *g* of bromine. The equivalent weight of calcium is  
(a) 10 (b) 20 (c) 40 (d) 80
46. Equivalent weight of  $KMnO_4$  acting as an oxidant in acidic medium is  
(a) The same as its molecular weight (b) Half of its molecular weight  
(c) One-third of its molecular weight (d) One-fifth of its molecular weight
47. In standardization of  $Na_2S_2O_3$  using  $K_2Cr_2O_7$  by iodometry, the equivalent weight of  $K_2Cr_2O_7$  is  
(a)  $MW / 2$  (b)  $MW / 3$  (c)  $MW / 6$  (d)  $MW / 1$
48. 0.16 *g* of dibasic acid required 25 *ml* of decinormal  $NaOH$  solution for complete neutralisation. The molecular weight of the acid will be  
(a) 32 (b) 64 (c) 128 (d) 256
49. 10 *ml* of 1 *M*  $NaOH$  solution will be neutralised by the following volume of 1 *M*  $H_2SO_4$   
(a) 25 *ml* (b) 20 *ml* (c) 10 *ml* (d) 5 *ml*
50. To neutralise 20 *ml* of  $M / 10$  sodium hydroxide, the volume of  $M / 20$  hydrochloric acid required is  
(a) 10 *ml* (b) 15 *ml* (c) 20 *ml* (d) 40 *ml*