

**DPP-01 : Units, Atoms, Molecules, Atomic mass, Molecular mass, Gram atomic mass, Gram molecular mass, RAM, Average atomic**

- Torr is unit of :  
 (1) Temperature                      (2) Pressure                      (3) Volume                      (4) Density
- Centigrade and Fahrenheit scales are related as :  
 (1)  $\frac{C}{5} = \frac{F-32}{9}$                       (2)  $\frac{C}{9} = \frac{F-32}{5}$                       (3)  $\frac{C}{8} = \frac{F-32}{5}$                       (4) None of these
- Which the following is not equal to  $10^{-2}$  atm :  
 (1) 0.76 cm of Hg                      (2) 7.6 torr                      (3) 0.076 dm of Hg                      (4) 0.0076 torr
- The modern atomic weight scale is based on :  
 (1)  $^{12}\text{C}$                       (2)  $^{16}\text{O}$                       (3)  $^1\text{H}$                       (4)  $^{18}\text{O}$
- 1 amu is equal to  
 (1)  $\frac{1}{12}$  of C-12                      (2)  $\frac{1}{14}$  of O-16                      (3) 1 g of  $\text{H}_2$                       (4)  $1.66 \times 10^{-23}$  kg
- If we consider that  $1/6$ , in place of  $1/12$  mass of carbon atom is taken to be the relative atomic mass unit, the mass of one mole of a substance will :  
 (1) decrease twice  
 (2) increase two fold  
 (3) remain unchanged  
 (4) be a function of the molecular mass of the substance

**DPP-02 : Relation between Mole, Mass and Gaseous volume.**

- If the atomic mass of Sodium is 23, the number of moles in 46 g of sodium is :  
 (1) 1                      (2) 2                      (3) 2.3                      (4) 4.6
- Which of the following would contain 1 mole of particles?  
 (1) 0.5 mole of  $\text{H}_2$                       (2) 2 g of H-atoms                      (3) 16 g of O-18                      (4) 16 g of methane

3. How many atoms are there in 100 amu of He ?  
 (1) 25 (2) 50 (3) 75 (4) 100
4. Number of molecules of water in a drop of water weighing 0.09 g are :  
 (1)  $3.01 \times 10^{21}$  (2)  $6.02 \times 10^{21}$  (3)  $3.01 \times 10^{22}$  (4)  $3.01 \times 10^{20}$
5. The largest number of molecules is present in 1 g of  
 (1)  $\text{CO}_2$  (2)  $\text{H}_2\text{O}$  (3)  $\text{C}_2\text{H}_5\text{OH}$  (4)  $\text{N}_2\text{O}_5$ .
6. The total number of g-molecules of  $\text{SO}_2\text{Cl}_2$  in 13.5 g of sulphuryl chloride is  
 (1) 0.1 (2) 0.2 (3) 0.3 (4) 0.4
7. The number of sodium atoms in 2 moles of sodium ferrocyanide ( $\text{Na}_4[\text{Fe}(\text{CN})_6]$ ) is :  
 (1)  $12 \times 23$  (2)  $26 \times 10^{23}$  (3)  $34 \times 10^{23}$  (4)  $48 \times 10^{23}$
8. Total number of atoms in 196 amu  $\text{H}_2\text{SO}_4$  are :  
 (1)  $14 N_A$  (2) 14 (3)  $7 N_A$  (4) 7
9. The number of molecules of  $\text{CO}_2$  present in 44 g of  $\text{CO}_2$  is :  
 (1)  $6.0 \times 10^{23}$  (2)  $3 \times 10^{23}$  (3)  $12 \times 10^{23}$  (4)  $3 \times 10^{10}$
10. The number of mole of ammonia in 4.25 g of ammonia is :  
 (1) 0.425 (2) 0.25 (3) 0.236 (4) 0.2125
11. One mole of  $\text{P}_4$  molecules contain :  
 (1) 1 molecule (2) 4 molecules  
 (3)  $\frac{1}{4} \times 6.022 \times 10^{23}$  atoms (4)  $24.088 \times 10^{23}$  atoms
12. Number of atoms in 560 g of Fe (atomic mass 56  $\text{gmol}^{-1}$ ) is :  
 (1) Twice that in 70 g N (2) Half that in 20 g H (3) Both (1) and (2) (4) None of these
13. Which has maximum number of atoms :  
 (1) 24 g of C (12) (2) 56 g of Fe (56) (3) 27 g of Al (27) (4) 108 g Ag (108)
14. The total number of protons, electrons and neutrons in 12 g of  $^{12}_6\text{C}$  is :  
 (1)  $1.084 \times 10^{25}$  (2)  $6.022 \times 10^{23}$  (3)  $6.022 \times 10^{22}$  (4) 18
15. 1.0 g of hydrogen contains  $6 \times 10^{23}$  atoms. The atomic weight of helium is 4. It follows that the number of atoms in 1 g of He is :  
 (1)  $\frac{1}{4} \times 6 \times 10^{23}$  (2)  $4 \times 6 \times 10^{23}$  (3)  $6 \times 10^{23}$  (4)  $12 \times 10^{23}$
16. A sample of aluminium has a mass of 54.0 g. What is the mass of the same number of magnesium atoms? (At. wt. Al = 27, Mg = 24)  
 (1) 12 g (2) 24 g (3) 48 g (4) 96 g.
17. The number of atoms in 558.5 g of Fe (at wt. = 55.85) is :  
 (1) Twice that in 60 g carbon (2)  $6.022 \times 10^{22}$   
 (3) Half in 8 g He (4)  $558.5 \times 6.023 \times 10^{23}$

18. The total number of electrons present in 8.0 g of methane is  
 (1)  $4.8 \times 10^{24}$  (2)  $3.01 \times 10^{24}$  (3)  $4.8 \times 10^{25}$  (4)  $3.01 \times 10^{23}$ .
19. The weight of  $1 \times 10^{22}$  molecules of  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  is :  
 (1) 41.59 g (2) 415.9 g (3) 4.159 g (4) None of these
20. How many moles of electron weigh one kilogram :  
 (1)  $6.023 \times 10^{23}$  (2)  $\frac{1}{9.108} \times 10^{31}$  (3)  $\frac{6.023}{9.108} \times 10^{54}$  (4)  $\frac{1}{9.108 \times 6.023} \times 10^8$
21. Under the same conditions, two gases have the same number of molecules. They must  
 (1) be noble gases (2) have equal volumes  
 (3) have a volume of  $22.4 \text{ dm}^3$  each (4) have an equal number of atoms
22. 5.6 litre of oxygen at STP contains :  
 (1)  $6.02 \times 10^{23}$  atoms (2)  $3.01 \times 10^{23}$  atoms (3)  $1.505 \times 10^{23}$  atoms (4)  $0.7525 \times 10^{23}$  atoms
23. If V ml of the vapours of substance at NTP weight W g. Then molecular weight of substance is :  
 (1)  $(W/V) \times 22400$  (2)  $\frac{V}{W} \times 22.4$  (3)  $(W-V) \times 22400$  (4)  $\frac{W \times 1}{V \times 22400}$
24. If  $1 \text{ dm}^3$  of a gas weights 2.5 g at STP, its gram-molecular weight is :  
 (1) 56 g (2) 11.2 g (3) 22.4 g (4) 224 g
25. 16 g of an ideal gas  $\text{SO}_x$  occupies 5.6 L. at STP. The value of x is  
 (1)  $x = 3$  (2)  $x = 2$  (3)  $x = 4$  (4) none of these

### DPP-03 : Density and Vapour density

1. A gas is found to have the formula  $(\text{CO})_x$ . It's VD is 70 the value of x must be :  
 (1) 7 (2) 4 (3) 5 (4) 6
2. Number of electrons in 1.8 mL of  $\text{H}_2\text{O}(\ell)$  is about :  
 (1)  $6.02 \times 10^{23}$  (2)  $3.011 \times 10^{23}$  (3)  $0.6022 \times 10^{21}$  (4)  $60.22 \times 10^{20}$

### DPP-04 : Percentage composition and Molecular formula

1. The percentage value of nitrogen in urea is about  
 (1) 46 (2) 85 (3) 18 (4) 28
2. A hydrocarbon contains 75% of carbon. Then its molecular formula is :  
 (1)  $\text{CH}_4$  (2)  $\text{C}_2\text{H}_4$  (3)  $\text{C}_2\text{H}_6$  (4)  $\text{C}_2\text{H}_2$
3. The empirical formula of a compound of molecular mass 120 is  $\text{CH}_2\text{O}$ . The molecular formula of the compound is :  
 (1)  $\text{C}_2\text{H}_4\text{O}_2$  (2)  $\text{C}_4\text{H}_8\text{O}_4$  (3)  $\text{C}_3\text{H}_6\text{O}_3$  (4) all of these

4. The number of atoms of Cr and O in a compound are  $4.8 \times 10^{10}$  &  $9.6 \times 10^{10}$  respectively. Its empirical formula is—  
 (1)  $\text{Cr}_2\text{O}_3$                       (2)  $\text{CrO}_2$                       (3)  $\text{Cr}_2\text{O}_4$                       (4) None
5. The percentages of C, H and N in an organic compound are 40%, 13.3% and 46.7%. The empirical formula of this compound is  
 (1)  $\text{CH}_2\text{N}$                       (2)  $\text{CH}_4\text{N}$                       (3)  $\text{CH}_5\text{N}$                       (4)  $\text{C}_3\text{H}_9\text{N}_3$ .
6. The simplest formula of a compound containing 50% of element 'A' (Atomic weight = 10) and 50% of element 'B' (Atomic weight = 20) is  
 (1) AB                      (2)  $\text{A}_2\text{B}$                       (3)  $\text{A}_2\text{B}_2$                       (4)  $\text{A}_2\text{B}_3$
7. Insulin contains 3.4% sulphur. The minimum mol. wt. of insulin is —  
 (1) 941.176                      (2) 944                      (3) 945.27                      (4) None

### DPP-05 : Balanced chemical equation analysis

1. For the reaction  $2\text{P} + \text{Q} \rightarrow \text{R}$ , 8 mol of P and excess of Q will produce :  
 (1) 8 mol of R                      (2) 5 mol of R                      (3) 4 mol of R                      (4) 13 mol of R
2. If 1.5 moles of oxygen combine with Al to form  $\text{Al}_2\text{O}_3$ , the weight of Al used in the reaction is :  
 (1) 27 g                      (2) 40.5 g                      (3) 54g                      (4) 81 g
3. How many moles of potassium chlorate need to be heated to produce 11.2 litre oxygen at N.T.P.  
 (1)  $\frac{1}{2}$  mol                      (2)  $\frac{1}{3}$  mol                      (3)  $\frac{1}{4}$  mol                      (4)  $\frac{2}{3}$  mol
4. What volume of  $\text{CO}_2$  will be liberated at NTP if 12 g of carbon is burnt in excess of oxygen ?  
 (1) 11.2 L                      (2) 22.4 L                      (3) 2.24 L                      (4) 1.12 L
5. For the complete combustion of 4 litre ethane, how much oxygen is required ?  
 (1) 14 litre                      (2) 4 litre                      (3) 8 litre                      (4) 12 litre
6. The volume of oxygen necessary for the complete combustion of 20 litre of propane is :  
 (1) 40 litre                      (2) 60 litre                      (3) 80 litre                      (4) 100 litre
7. The equation :  

$$2\text{Al}(\text{S}) + \frac{3}{2} \text{O}_2(\text{g}) \longrightarrow \text{Al}_2\text{O}_3(\text{S})$$
 show that  
 (1) 2 mole of Al reacts with  $\frac{3}{2}$  mole of  $\text{O}_2$  to produce  $\frac{7}{2}$  mole of  $\text{Al}_2\text{O}_3$   
 (2) 2g of Al reacts with  $\frac{3}{2}$  g of  $\text{O}_2$  to produce one mole of  $\text{Al}_2\text{O}_3$   
 (3) 2g mole of Al reacts with  $\frac{3}{2}$  litre of  $\text{O}_2$  to produce 1 mole of  $\text{Al}_2\text{O}_3$   
 (4) 2 mole of Al reacts with  $\frac{3}{2}$  mole of  $\text{O}_2$  to produce 1 mole of  $\text{Al}_2\text{O}_3$

8. The number of moles of oxygen obtained by the electrolytic decomposition of 90 g water is :  
 $2\text{H}_2\text{O} \longrightarrow 2\text{H}_2 + \text{O}_2$   
 (1) 2.5 (2) 5 (3) 7.5 (4) 10
9. Volume of  $\text{CO}_2$  obtained at STP by the complete decomposition of 9.85 g.  $\text{BaCO}_3$  is –  
 (At. wt. of Ba = 137)  
 (1) 2.24 lit (2) 1.12 lit (3) 0.84 lit (4) 0.56 lit
10. The moles of  $\text{O}_2$  required for reacting with 6.8 g of ammonia  
 ( $\dots\dots\text{NH}_3 + \dots\dots\text{O}_2 \longrightarrow \dots\dots\text{NO} + \dots\dots\text{H}_2\text{O}$ ) is  
 (1) 5 (2) 2.5 (3) 1 (4) 0.5
11. At same temperature and pressure the volume of oxygen required for complete combustion of 20 ml of ethene is  
 (1) 30 ml (2) 60 ml (3) 40 ml (4) 50 ml
12. The volume of gas at NTP produced by 100g of  $\text{CaC}_2$  with water  
 $\text{CaC}_2 + \text{H}_2\text{O} \longrightarrow \text{Ca(OH)}_2 + \text{C}_2\text{H}_2$   
 (1) 70 litre (2) 35 litre (3) 17.5 litre (4) 22.4 litre
13. The weight of lime obtained by heating 200 kg of 95% pure lime stone is :  
 (1) 98.4 kg (2) 106.4 kg (3) 112.8 kg (4) 122.6 kg
14. 20 gm.  $\text{CaCO}_3$  on decomposition gives  $\text{CO}_2$  at STP if yield of reaction is 75% only  
 (1) 3.36 litre (2) 22.4 litre (3) 2.24 litre (4) None of these

### DPP-06 : Principle of atomic conservation

1. X g of Ag was dissolved in  $\text{HNO}_3$  and the solution was treated with excess of NaCl. When 2.87 g of AgCl was precipitated the value of X is  
 (1) 1.08 g (2) 2.16 g (3) 2.70 g (4) 1.62 g
2. 10 g of a sample of a mixture of  $\text{CaCl}_2$  and NaCl is treated to precipitate all the calcium as  $\text{CaCO}_3$ . This  $\text{CaCO}_3$  is heated to convert all the Ca to CaO and the final mass of CaO is 1.62 g . The percent by mass of  $\text{CaCl}_2$  in the original mixture is.  
 (1) 32.1 % (2) 16.2 % (3) 21.8 % (4) 11.0 %
3. 500 ml of a gaseous hydrocarbon when burnt in excess of  $\text{O}_2$  gave 2.5 litre of  $\text{CO}_2$  and 3.0 litre of water vapours under same conditions. Molecular formula of the hydrocarbon is :  
 (1)  $\text{C}_4\text{H}_8$  (2)  $\text{C}_4\text{H}_{10}$  (3)  $\text{C}_5\text{H}_{10}$  (4)  $\text{C}_5\text{H}_{12}$

### DPP-07 : Limiting reagent

- For the reaction  $2P + Q \rightarrow R$ , 8 mol of P and 5 mol of Q will produce  
(1) 8 mol of R                      (2) 5 mol of R                      (3) 4 mol of R                      (4) 13 mol of R
- For the reaction :  $A + 2B \rightarrow C$   
5 mole of A and 8 mole of B will produce :  
(1) 5 mole of C                      (2) 4 mole of C                      (3) 8 mole of C                      (4) 12 mole of C
- 4 g of hydrogen is ignited with 4 g of oxygen, the amount of water formed is ?  
(1) 2.5 g                              (2) 0.5 g                              (3) 4.5 g                              (4) 8 g
- Calculate the amount of  $H_2$  which is left unreacted in the given reaction :  
$$2H_2 + O_2 \longrightarrow 2H_2O$$
  
If 8 g of  $H_2$  is mixed with 16 g  $O_2$  ?  
(1) 3 g                              (2) 6 g                              (3) 1 g                              (4) 4 g
- If 30 ml of  $H_2$  and 20 ml of  $O_2$  react to form water, what is left at the end of the reaction?  
(1) 10 ml of  $H_2$                       (2) 5 ml of  $H_2$                       (3) 10 ml of  $O_2$                       (4) 5 ml of  $O_2$
- How many mole of  $Zn(FeS_2)$  can be made from 2 mole zinc, 3 mole iron and 5 mole sulphur.  
(1) 2 mole                              (2) 3 mole                              (3) 4 mole                              (4) 5 mole

### DPP-08 : Concentration terms

- 500 mL of a glucose solution contains 90 g of glucose. The concentration of the solution is  
(1) 0.1 M                              (2) 1.0 M                              (3) 0.2 M                              (4) 2.0 M
- 500 mL of a glucose solution contains  $6.02 \times 10^{22}$  molecules. The concentration of the solution is  
(1) 0.1 M                              (2) 1.0 M                              (3) 0.2 M                              (4) 2.0 M
- What volume of a 0.8 M solution contains 100 milli moles of the solute?  
(1) 100 mL                              (2) 125 mL                              (3) 500 mL                              (4) 62.5 mL
- Which of the following solutions are unimolar solutions ?  
(1) 4.6 g of  $C_2H_5OH$  in 10 mL of solution                      (2) 110.98 g of  $CaCl_2$  in 1000 mL of solution  
(3) 0.23 g of  $CH_3OH$  in 100 mL of solution                      (4) 5.88 g of  $NaCl$  in 1000 mL of solution.
- The amount of salt required to prepare 10 dm<sup>3</sup> of decimolar solution is :  
(1) 0.05 mole                              (2) 0.02 mole                              (3) 0.01 mole                              (4) 1.00 mole
- A solution of  $FeCl_3$  is  $\frac{M}{30}$  its molarity for  $Cl^-$  ion will be :  
(1)  $\frac{M}{90}$                               (2)  $\frac{M}{30}$                               (3)  $\frac{M}{10}$                               (4)  $\frac{M}{5}$
- 11.1 g  $CaCl_2$  is used to prepare a 500 mL solution then molarity of  $Cl^-$  in solution will be :  
(1) 0.4 M                              (2)  $\frac{M}{30}$                               (3) 0.1 M                              (4) 0.2 M

8. 0.01 mole of a non-electrolyte is dissolved in 10 g of water. The molality of the solution is :  
 (1) 0.1 m (2) 0.5 m (3) 1.0 m (4) 0.18 m
9. The molality of a sulphuric acid solution is 0.2. Calculate the total weight of the solution having 1000 gm of solvent.  
 (1) 1000 g (2) 1098.6 g (3) 980.4 g (4) 1019.6g
10. The mole fraction of water in a solution containing 117 g sodium chloride and 900 g of water is ?  
 (1) 0.0632 (2) 0.038 (3) 0.9615 (4) 1.000
11. Which of the following concentration factor is affected by change in temperature ?  
 (1) Molarity (2) Molality (3) Mole fraction (4) Weight fraction

**DPP-09 : Dilution, Mixing of solutions, Interconversion of concentration terms and Acid base reactions**

1. If 500 ml of 1 M solution of glucose is mixed with 500 ml of 3 M solution of glucose final molarity of solution will be :  
 (1) 1 M (2) 0.5 M (3) 2 M (4) 1.5 M
2. 250 ml of 0.5 M KCl is diluted with water to 500 ml of solution, the number of chloride ions in the resulting solution are  
 (1)  $6.02 \times 10^{23}$  (2)  $7.5 \times 10^{22}$  (3)  $1 \times 10^{24}$  (4)  $3.76 \times 10^{23}$
3. 300 ml of 3.0 M NaCl is added to 200 ml of 4.0 M  $\text{BaCl}_2$  solution. The concentration of  $\text{Cl}^-$  ions in the resulting solution is  
 (1) 7 M (2) 1.6 M (3) 1.8 M (4) 5 M
4. The molarity of the solution containing 2.8% w/v solution of KOH is  
 (1) M/10 (2) M/2 (3) M/5 (4) 1 M
5. The molality of the solution containing 20% w/w solution of NaOH is :  
 (1) 4.5 m (2) 6.25 m (3) 0.3 m (4) 1 m
6. Mole fraction of A in  $\text{H}_2\text{O}$  is 0.2. The molality of A in  $\text{H}_2\text{O}$  is :  
 (1) 13.9 (2) 15.5 (3) 14.5 (4) 16.8
7. The molarity of 20% w/w sulphuric acid of density  $1.14 \text{ g cm}^{-3}$  is  
 (1) 2.32 (2) 2.02 (3) 2.12 (4) 2.22
8. 36.5 % w/w HCl has density equal to  $1.20 \text{ g mL}^{-1}$ . The molarity (M) and molality (m), respectively, are  
 (1) 15.7, 15.7 (2) 12, 12 (3) 15.7, 12 (4) 12, 15.7
9. An aqueous solution of ethanol has density  $1.025 \text{ g/mL}$  and it is 2M. What is the molality of this solution ?  
 (1) 1.79 (2) 2.143 (3) 1.951 (4) None of these.
10. 3.0 litre of water are added to 2.0 litre of 5 M HCl. What is the molarity of HCl (in M) the resultant solution ?  
 (1) 2 (2) 3 (3) 4 (4) 5

# Answers

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## DPP-01

1. (2) 2. (1) 3. (4) 4. (1) 5. (1) 6. (3)

## DPP-02

1. (2) 2. (4) 3. (1) 4. (1) 5. (2) 6. (1) 7. (4)  
8. (2) 9. (1) 10. (2) 11. (4) 12. (3) 13. (1) 14. (1)  
15. (1) 16. (3) 17. (1) 18. (2) 19. (3) 20. (4) 21. (2)  
22. (2) 23. (1) 24. (1) 25. (2)

## DPP-03

1. (3) 2. (1)

## DPP-04

1. (1) 2. (1) 3. (2) 4. (2) 5. (2) 6. (2) 7. (1)

## DPP-05

1. (3) 2. (3) 3. (2) 4. (2) 5. (1) 6. (4) 7. (4)  
8. (1) 9. (2) 10. (4) 11. (2) 12. (2) 13. (2) 14. (1)

## DPP-06

1. (2) 2. (1) 3. (4)

## DPP-07

1. (3) 2. (2) 3. (3) 4. (2) 5. (4) 6. (1)

## DPP-08

1. (2) 2. (3) 3. (2) 4. (2) 5. (4) 6. (3) 7. (1)  
8. (3) 9. (4) 10. (3) 11. (1)

## DPP-09

1. (3) 2. (2) 3. (4) 4. (2) 5. (2) 6. (1) 7. (1)  
8. (4) 9. (2) 10. (1)

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