THE MOLE CONCEPT

1. Which one of the following pairs of gases contains the same number of molecules

(a) 16 *g* of $O_2$and 14 *g* of N_2

(b) 8 *g* of $O_2$and 22 *g* of CO_2

(c) 28 *g* of $N_2$and 22 *g* of CO_2

(d) 32 *g* of $O_2$and 32 *g* of N_2

2. Number of *gm* of oxygen in 32.2 *g* $Na_2SO_4.10H_2O$is

(a) 20.8 (b) 22.4

(c) 2.24 (d) 2.08

3. 250 *ml* of a sodium carbonate solution contains 2.65 grams of Na_2CO_3. If 10 *ml* of this solution is diluted to one litre, what is the concentration of the resultant solution (mol. wt. of Na_2CO_3=106)

(a) 0.1 *M* (b) 0.001 *M*

(c) 0.01 *M* (d) $10^{-4}M$

4. A molar solution is one that contains one mole of a solute in

(a) 1000 *g* of the solvent

(b) One litre of the solvent

(c) One litre of the solution

(d) 22.4 litres of the solution

5. The number of oxygen atoms in 4.4 *g* of $CO_2$is approx.

(a) 1.2×10^{23} (b) 6×10^{22}

(c) 6×10^{23} (d) 12×10^{23}

6. The volume occupied by 4.4 *g* of CO_2at STP is

(a) 22.4 *L* (b) 2.24 *L*

(c) 0.224 *L* (d) 0.1 *L*

7. The number of water molecules present in a drop of water (volume 0.0018 *ml*) at room temperature is

(a) 6.023×10^{19}

(b) 1.084×10^{18}

(c) 4.84×10^{17}

(d) 6.023×10^{23}

8. One mole of calcium phosphide on reaction with excess of water gives

(a) One mole of phosphine

(b) Two moles of phosphoric acid

(c) Two moles of phosphine

(d) One mole of phosphorus pentoxide

9. 19.7 *kg* of gold was recovered from a smuggler. How many atoms of gold were recovered (*Au* =197)

(a) 100 (b) 6.02×10^{23}

(c) 6.02×10^{24} (d) 6.02×10^{25}

10. The total number of protons in 10 *g* of calcium carbonate is ($N_0 = 6.023 \times 10^{23}$)
(a) 1.5057×10^{24}
(b) 2.0478×10^{24}
(c) 3.0115×10^{24}
(d) 4.0956×10^{24}

11. The number of molecules in 16 *g* of methane is
(a) 3.0×10^{23} (b) 6.02×10^{23}
(c) $\frac{16}{6.02} \times 10^{23}$ (d) $\frac{16}{3.0} \times 10^{23}$

12. Number of molecules in 100 *ml* of each of O_2, NH_3 andCO_2at STP are
(a) In the order $CO_2 < O_2 < NH_3$
(b) In the order $NH_3 < O_2 < CO_2$
(c) The same
(d) $NH_3 = CO_2 < O_2$

13. The molecular weight of hydrogen peroxide is 34. What is the unit of molecular weight
(a) g (b) mol
(c) $gmol^{-1}$ (d) $molg^{-1}$

14. The number of water molecules in 1 litre of water is
(a) 18 (b) 18×1000
(c) N_A (d) $55.55N_A$

15. The number of electrons in a mole of hydrogen molecule is
(a) 6.02×10^{23}
(b) 12.046×10^{23}
(c) 3.0115×10^{23}
(d) Indefinite

16. The numbers of moles of $BaCO_3$ which contain 1.5 moles of oxygen atoms is
(a) 0.5 (b) 1
(c) 3 (d) 6.02×10^{23}

17. Which of the following is Loschmidt number
(a) 6×10^{23}
(b) 2.69×10^{19}
(c) 3×10^{23}
(d) None of these

18. How many molecules are present in one gram of hydrogen
(a) 6.02×10^{23} (b) 3.01×10^{23}
(c) 2.5×10^{23} (d) 1.5×10^{23}

19. The total number of gm-molecules of SO_2Cl_2 in $13.5g$ of sulphuryl chloride is
(a) 0.1 (b) 0.2

(c) 0.3 (d) 0.4

20. The largest number of molecules is in
(a) $34g$ of water
(b) $28g$ of CO_2
(c) $46g$ of CH_3OH
(d) $54g$ of N_2O_5

21. The number of moles of sodium oxide in $620g$ of it is
(a) 1 mol (b) 10 moles
(c) 18 moles (d) 100 moles

22. $2g$ of oxygen contains number of atoms equal to that in
(a) $0.5g$ of hydrogen
(b) $4g$ of sulphur
(c) $7g$ of nitrogen
(d) $2.3g$ of sodium

23. Molarity of liquid HCl with density equal to $1.17g/cc$ is
(a) 36.5 (b) 18.25
(c) 32.05 (d) 4.65

24. How many atoms are contained in one mole of sucrose $(C_{12}H_{22}O_{11})$
(a) $45 \times 6.02 \times 10^{23}$ atoms/mole
(b) $5 \times 6.62 \times 10^{23}$ atoms/mole
(c) $5 \times 6.02 \times 10^{23}$ atoms/mole
(d) None of these

25. The number of molecules of CO_2 present in $44g$ of CO_2 is
(a) 6.0×10^{23} (b) 3×10^{23}
(c) 12×10^{23} (d) 3×10^{10}

26. A sample of phosphorus trichloride (PCl_3) contains 1.4 moles of the substance. How many atoms are there in the sample
(a) 4
(b) 5.6
(c) 8.431×10^{23}
(d) 3.372×10^{24}
(e) 2.409×10^{24}

27. The number of sodium atoms in 2 moles of sodium ferrocyanide is
(a) 12×10^{23} (b) 26×10^{23}
(c) 34×10^{23} (d) 48×10^{23}