

## CHEMISTRY

### BOOKS - DISHA PUBLICATION CHEMISTRY (HINGLISH)

#### SOME BASIC CONCEPTS OF CHEMISTRY

##### Exercise

1. An unknown chlorohydrocarbon has 3.55% of chlorine. If each molecule of the hydrocarbon has one chlorine atom only, chlorine atoms present in 1 g of chlorohydrocarbon are :

(Atomic wt. of Cl = 35.5 u,

Avogadro constant =  $6.023 \times 10^{23} \text{ mol}^{-1}$ )

A.  $6.023 \times 10^9$

B.  $6.023 \times 10^{23}$

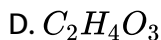
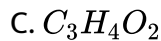
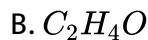
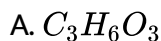
C.  $6.023 \times 10^{21}$

D.  $6.023 \times 10^{20}$

**Answer: D**

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2. The ration of mass per cent of C and H of an organic compound ( $C_xH_yO_z$ ) is 6:1. If one molecule of the above compound ( $C_xH_yO_z$ ) contains half as much oxygen as required to burn one molecule of compound  $C_xH_y$  completely to  $CO_2$  and  $H_2O$ . The empirical formula of compound  $C_xH_yO_z$  is:



**Answer: D**

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3. Excess of NaOH (aq) was added to 100 mL of  $FeCl_3$  (aq) resulting into 2.14 g of  $Fe(OH)_3$ . The molarity of  $FeCl_3$  (aq) is:

(Given molar mass of Fe =  $56\text{g mol}^{-1}$  and molar mass of Cl =  $35.5\text{g mol}^{-1}$

)

A. 0.2 M

B. 0.3 M

C. 0.6 M

D. 1.8 M

**Answer: A**



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4. The most abundant elements by mass in the body of a healthy human adult are: Oxygen (61.4%), Carbon (22.9%), Hydrogen (10.0%), and

Nitrogen (2.6%). The weight which a 75 kg person would gain if all  $^1H$  atoms are replaced by  $^2H$  atoms is:

- A. 15 kg
- B. 37.5 kg
- C. 7.5 kg
- D. 10 kg

**Answer: C**



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5. 1g of a carbonate ( $M_2CO_3$ ) on treatment with excess  $HCl$  produces 0.01186 mole of  $CO_2$ . The molar mass of  $M_2CO_3$  in  $gmol^{-1}$  is

- A. 1186
- B. 84.3
- C. 118.6

D. 11.86

**Answer: B**

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6.  $5L$  of an alkane requires  $25L$  of oxygen for its complete combustion. If all volumes are measured at constant temperature and pressure, the alkane is :

A. Isobutane

B. Ethane

C. Butane

D. Propane

**Answer: D**

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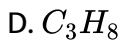
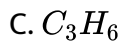
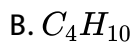
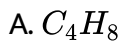
7. The amount of arsenic pentasulphide that can be obtained when 35.5g arsenic acid is treated with excess  $H_2S$  in the presence of conc.  $HCl$  (assuming 100% conversion) is :

- A. 0.25 mol
- B. 0.50 mol
- C. 0.333 mol
- D. 0.125 mol

**Answer: D**

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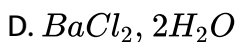
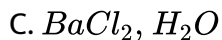
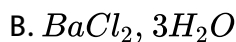
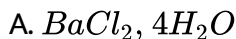
8. At 300K and 1atm, 15mL of a gaseous hydrocarbon requires 375mL air containing 20%  $O_2$  by volume for complete combustion. After combustion, the gases occupy 330mL. Assuming that the water formed is in liquid form and the volumes were measured at the same temperature and pressure, the formula of the hydrocarbon is



**Answer: D**

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9. A sample of a hydrate of barium chloride weighing 61 g was heated until all the water of hydration is removed. The dried sample weighed 52 g. The formula of the hydrated salt is : (atomic mass, Ba = 137 amu, Cl = 35.5 amu)



**Answer: D**



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10. The molecular formula of a commercial resin used for exchanging ions in water softening is  $C_8H_7SO_3Na$  (*mol. Wt.* 206) . What would be the maximum uptake of  $Ca^{2+}$  ions by the resin when expressed in mole per gram resin?

A.  $\frac{2}{309}$

B.  $\frac{1}{412}$

C.  $\frac{1}{103}$

D.  $\frac{1}{206}$

**Answer: B**



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11. In Carcuc method for the estimation of halogens. 250 mg of organic compound gave 141 mg of  $AgBr$ . The percentage of bromine in the compound is :

A. 48

B. 60

C. 24

D. 36

**Answer: C**



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12. 3g of activated charcoal was added to 50mL of acetic acid solution (0.06N) in a flask. After an hour it was filtered and the strength of the filtrate was found to be 0.042N . The amount of acetic adsorbed (per gram of charcoal) is:

A. 42 mg

B. 54 mg

C. 18 mg

D. 36 mg

**Answer: C**



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**13.** Dissolving 120 g of a compound of (mol. wt. 60) in 1000 g of water gave a solution of density  $1.12\text{g}/\text{mL}$ . The molarity of the solution is:

A. 1.00 M

B. 2.00 M

C. 2.50 M

D. 4.00 M

**Answer: B**

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14. The amount of oxygen in 3.6 moles of water is:

A. 115.2 g

B. 57.6 g

C. 28.8 g

D. 18.4 g

**Answer: B**

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15. Two students performed the same experiment separately and each one of them recovered two readings of mass which are given below. Correct reading of mass is 3.0 g. On the basis of given data, mark the

correct option out of the following statements.

Student	Readings	
	(I)	(II)
<b>A</b>	<b>3.01</b>	<b>2.99</b>
<b>B</b>	<b>3.05</b>	<b>2.95</b>

- A. Results of both the students are neither accurate nor precise.
- B. Results of student A are both precise and accurate.
- C. Results of student B are precise but not accurate.
- D. Results of student B are both precise and accurate.

**Answer: B**

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16. If the density of a solution is  $3.12\text{g mL}^{-1}$ , the mass of 1.5 mL solution in significant figures is

A. 4.7 g

B.  $4680 \times 10^{-3} \text{ g}$

C. 4.680 g

D. 46.80 g

**Answer: A**

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17. In which of the following numbers all zeros are significant ?

A. 0.0005

B. 0.0500

C. 50

D. 0.0050

**Answer: C**

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18. Irrespective of the source, pure sample of water always yields 88.89 % mass of oxygen and 11.11 % mass of hydrogen. This is explained by the law of

- A. conservation of mass
- B. multiple proportions
- C. constant composition
- D. constant volume

**Answer: C**



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19. Two samples of lead oxide were separately reduced to metallic lead by heating in a current of hydrogen. The weight of lead from one oxide was half the weight of lead obtained from the other oxide. The data illustrates

- A. law of reciprocal proportions.

B. law of constant proportions.

C. law of multiple proportions.

D. law of equivalent proportions.

**Answer: C**

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20. Which one the following combinations illustrate law of reciprocal proportions ?

A.  $N_2O_3$ ,  $N_2O_4$ ,  $N_2O_5$

B.  $NaCl$ ,  $NaBr$ ,  $NaI$

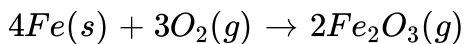
C.  $CS_2$ ,  $CO_2$ ,  $SO_2$

D.  $PH_3$ ,  $P_2O_3$ ,  $P_2O_5$

**Answer: C**

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21. Which of the following statements is correct about the reaction given below:-



- A. Total mass of iron and oxygen in reactants = total mass of iron and oxygen in product therefore, it follows law of conservation of mass.
- B. Total mass of reactants = total mass of product, therefore, law of multiple proportions is followed.
- C. Amount of  $Fe_2O_3$  can be increased by reducing the amount of any one of the reactants (iron or oxygen).
- D. Amount of  $Fe_2O_3$  produced will decrease if the amount of any one of the reactants (iron or oxygen) is taken in excess.

**Answer: A**



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22. A sample of pure carbon dioxide, irrespective of its source contains 27.27 % carbon and 72.73 % oxygen. The data support

- A. law of constant composition
- B. law of conservation of mass
- C. law of reciprocal proportions
- D. law of multiple proportions

**Answer: A**



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23. What is the mass of 1 molecule of CO?

- A.  $2.325 \times 10^{-23}$
- B.  $4.65 \times 10^{-23}$
- C.  $3.732 \times 10^{-23}$
- D.  $2.895 \times 10^{-23}$

**Answer: B**



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**24.** How many atoms are contained in one mole of sucrose ( $C_{12}H_{22}O_{11}$ )?

A.  $20 \times 6.02 \times 10^{23}$  atoms / mol

B.  $45 \times 6.02 \times 10^{23}$  atoms / mol

C.  $5 \times 6.02 \times 10^{23}$  atoms / mol

D. None of these

**Answer: B**



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**25.** 1 cc  $N_2O$  at NTP contains

A.  $\frac{1.8}{224} \times 10^{22}$  atoms

B.  $\frac{6.02}{22400} \times 10^{23}$  molecules

C.  $\frac{1.32}{224} \times 10^{23}$  electrons

D. All of the above

**Answer: D**



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26. Two containers P and Q of equal volume (1 litre each) contain 6 g of  $O_2$  and 6g  $SO_2$  respectively at 300 K and 1 atmosphere, then

A. number of molecules in P is less than that in Q.

B. number of molecules in P and Q is same.

C. number of molecules in Q is less than that in P.

D. either (a) or (b).

**Answer: C**



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27. A sample of  $AlF_3$  contains  $3.0 \times 10^{24}$   $F^-$  ions. The number of formula units of the sample are

A.  $9 \times 10^{24}$

B.  $3 \times 10^{24}$

C.  $0.75 \times 10^{24}$

D.  $1.0 \times 10^{24}$

**Answer: D**



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28. Which one of the following is the lightest?

A. 0.2 mole of hydrogen gas

B.  $6.023 \times 10^{22}$  molecules of nitrogen

C. 0.1 g of silver

D. 0.1 mole of oxygen gas

**Answer: C**

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**29.** Arrange the following in the order of increasing mass (atomic mass:

O=16, Cu-63, N-14)

I. one atom of oxygen

II. one atom of nitrogen

III  $1 \times 10^{-10}$  mole of oxygen

IV.  $1 \times 10^{-10}$  mole of copper

A.  $II < I < III < IV$

B.  $I < II < III < IV$

C.  $III < II < IV < I$

D.  $IV < II < III < I$

**Answer: A**



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30. The ratio of number of oxygen atoms ( $O$ ) in 16.0g ozone ( $O_3$ ), 28.0g carbon monoxide ( $CO$ ) and 32.0g oxygen ( $O_2$ ) is :-

(Atomic mass:  $C = 12$ ,  $O = 16$  and Avogadro's constant  $N_A = 6.0 \times 10^{23} \text{ mol}^{-1}$ )

A. 3 : 1 : 2

B. 1 : 1 : 2

C. 3 : 1 : 1

D. 1 : 1 : 1

**Answer: B**



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31. A mixture of  $CH_4$ ,  $N_2$  and  $O_2$  is enclosed in a container of 1 litre capacity at  $0^\circ C$ . Total pressure of gaseous mixture is 2660 mm Hg. If the

ratio of partial pressures of the gases is 1 : 4 : 2 respectively, the number of moles of oxygen present in the vessel is:

A.  $\frac{1}{22.4}$

B. 1

C. 0.1

D. none of these

**Answer: A**



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**32.** The number of gram molecules of oxygen in  $6.02 \times 10^{24} CO$  molecules is

A. 10 g molecules

B. 5 g molecules

C. 1 g molecules

D. 0.5 g molecules

**Answer: B**



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**33.** The number of molecules in 16 g of methane is

A.  $3.0 \times 10^{23}$

B.  $\frac{16}{6.02} \times 10^{23}$

C.  $6.023 \times 10^{23}$

D.  $\frac{16}{3.0} \times 10^{23}$

**Answer: C**



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34. 25.4 gm of iodine and 14.2 gm of chlorine are made to react completely to yield mixture of ICl and  $ICl_3$ . Ratio of moles of ICl &  $ICl_3$  formed is (Atomic mass I: 127, Cl=35.5)

- A. 0.1, 0.1
- B. 0.2, 0.2
- C. 0.1, 0.2
- D. 0.2, 0.1

**Answer: A**



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35. The Statue of Liberty is made of  $2.0 \times 10^5$  lbs of copper sheets bolted to a framework (1 lb = 454 g) How many atoms of copper are on the statue?

(Atomic weight: Cu = 63.5).

A.  $2.1 \times 10^{27}$

B.  $8.6 \times 10^{29}$

C.  $4.3 \times 10^{26}$

D.  $8.6 \times 10^{26}$

**Answer: B**

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**36.** Number of moles of  $MnO_4^-$  required to oxidise one mole of ferrous oxalate completely in acidic medium will be

A. 0.6 moles

B. 0.4 moles

C. 7.5 moles

D. 0.2 moles

**Answer: B**

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37. The number of moles of oxygen in 1 L of air containing 21 % oxygen by volume , under standard conditions , is

A. 0.0093 mole

B. 0.21 mole

C. 2.10 mole

D. 0.186 mole

**Answer: A**

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38. Haemoglobin contains 0.33% of iron by weight. The molecular weight of haemoglobin is approximately 67200. The number of iron atoms (At. Wt. of Fe=56) present in one molecule of haemoglobin is

A. 1

B. 6

C. 4

D. 2

**Answer: C**



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**39.** How many moles of  $P_4O_6$  and  $P_4O_{10}$  will be produced by the combustion of 12.4 g of phosphorous (atomic mass 31) in 12.8 g of oxygen, leaving no  $P_4$  or  $O_2$  ?

A. 0.1 and 0.3 mol

B. 0.15 mol and 0.25 mol

C. 0.05 mol each

D. 0.1 mol each

**Answer: C**

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**40.** Boron has two stable isotopes,  $^{10}\text{B}$ (19%) and  $^{11}\text{B}$ (81%). The atomic mass that should appear for boron in the periodic table is

A. 10.8

B. 10.2

C. 11.2

D. 10

**Answer: A**

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**41.** The percentage weight of Zn in which vitriol [ $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$ ] is approximately equal to (at. Mass of Zn =65, S= 32, O=16 and H=1)

A. 33.65 %

B. 32.56 %

C. 23.65 %

D. 22.65 %

**Answer: D**



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**42.** The vapour density of a mixture containing  $NO_2$  and  $N_2O_4$  is 27.6.

The mole fraction of  $N_2O_4$  in the mixture is :

A. 0.2

B. 0.4

C. 0.6

D. 0.8

**Answer: D**

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43. A metal oxide has the formula  $Z_2O_3$ . It can be reduced by hydrogen to give free metal and water. 0.1596 g of the metal oxide requires 6 mg of hydrogen for complete reduction. The atomic weight of the metal is

- A. 27.9
- B. 159.6
- C. 79.8
- D. 55.8

**Answer: D**

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44. Suppose elements  $X$  and  $Y$  combine to form two compounds  $XY_2$  and  $X_3Y_2$  when 0.1 mole of former weigh 10g while 0.05 mole of the latter weigh 9g. What are the atomic weights of  $X$  and  $Y$ .

A. 60 & 40

B. 30 & 40

C. 40 & 30

D. 40 & 60

**Answer: C**



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45. 4 g of a hydrated crystal of formula  $A \cdot xH_2O$  has 0.8 g of water. If the molar mass of the anhydrous crystal (A) is  $144\text{g mol}^{-1}$  The value of x is

A. 4

B. 1

C. 2

D. 3

**Answer: C**



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46.  $6.02 \times 10^{20}$  molecules of urea are present in 100 ml of its solution.

The concentration of solution is :

- A. 0.01 M
- B. 0.001 M
- C. 0.1 M
- D. 0.02 M

**Answer: A**

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47. A metallic chloride contain 47.22% metal. Calculate the equivalent weight of metal.

- A. 39.68

B. 31.76

C. 36.35

D. 33.46

**Answer: B**



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**48.** Sulphur forms the chlorides  $S_2Cl_2$  and  $SCl_2$ . The equivalent mass of sulphur in  $SCl_2$  is

A.  $8g/mol$

B.  $16g/mol$

C.  $64.8g/mol$

D.  $32g/mol$

**Answer: B**



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49. If 0.20 g chloride of a certain metal, when dissolved in water and treated with excess of  $AgNO_3$  yields 0.50 g of  $AgCl$ , the equivalent mass of the metal is ( $Ag=108$ ,  $Cl = 35.5$ )

- A. 21.9
- B. 20.04
- C. 40.08
- D. 43.80

**Answer: A**



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50. Equivalent mass of a metal M is 2.5 times that of oxygen. The minimum molecular mass of its oxide is

- A. 28

B. 42

C. 56

D. 112

**Answer: C**

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51. The same amount of a metal combines with 0.20 g of oxygen and with 3.17 g of a halogen. Hence equivalent mass of halogen is

A. 9

B. 35.5

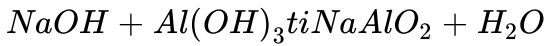
C. 80

D. 127

**Answer: C**

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52. In the reaction



The equivalent mass of  $Al(OH)_3$  is

- A. 78
- B. 26
- C. 52
- D. unpredictable

**Answer: B**



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53. On reduction 1.644 g of hot iron oxide give 1.15g of iron. Evaluate the equivalent weight of iron.

- A. 18.62

B. 19.13

C. 18.95

D. 12.95

**Answer: A**



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54. If a pure compound is composed of  $X_2Y_3$  molecules and consists of 60% X by weight what is the atomic weight of Y in term of atomic weight of X (Atomic mass of  $X = M_x$ )?

A. 2.25 times atomic weight of X

B. 44% of atomic weight of X

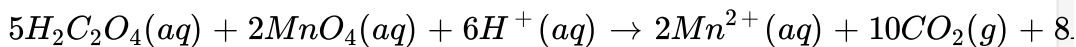
C. 4.0 times the atomic weight of X

D. 25% of the atomic weight of X

**Answer: B**

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55.



Oxalic acid,  $H_2C_2O_4$ , reacts with permanganate ion according to the balanced equation above. How many mL of 0.0154 M  $KMnO_4$  solution are required to react with 25.0 mL of 0.0208 M  $H_2C_2O_4$  solution?

- A. 13.5 mL
- B. 18.5 ml
- C. 33.8 ml
- D. 84.4 mL

**Answer: A**

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56. Percentage of Se in peroxidase anhydrase enzyme is 0.5 % by weight (at. Wt. = 78.4), then minimum molecular weight of peroxidase anhydrase enzyme is:

A.  $1.568 \times 10^3$

B. 15.68

C.  $2.136 \times 10^4$

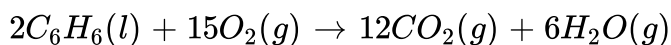
D.  $1.568 \times 10^4$

**Answer: D**



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57. Liquid benzene  $C_6H_6$  burns in oxygen according to the equation,



How many litres of  $O_2$  at STP are needed to complete the combustion of

39 g of liquid benzene ? (Mol . Weight if  $O_2 = 32$ ,  $C_6H_6 = 78$ )



A. 74 L

B. 11.2 L

C. 22.4 L

D. 84 L

**Answer: D**



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**58.** Calculate the mass of  $BaCO_3$  produced when excess  $CO_2$  is bubbled through a solution containing 0.205 moles of  $Ba(OH)_2$ .

A. 81 g

B. 40.5 g

C. 20.25 g

D. 162 g

**Answer: B**

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59. 12 litre of  $H_2$  and 11.2 litre of  $Cl_2$  are mixed and exploded. The composition by volume of mixture is-

A. 11.2, 11.2, 22.4

B. 0.8, 0, 22.4

C. 0.8, 0.8, 22.1

D. 0.8, 11.2, 22.4

**Answer: B**

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60. 10 moles  $SO_2$  and 15 moles  $O_2$  were allowed to react over a suitable catalyst. 8 moles of  $SO_3$  were formed. The remaining moles of  $SO_2$  and  $O_2$  respectively are -

A. 2 moles, 11 moles

B. 2 moles, 8 moles

C. 4 moles, 5 moles

D. 8 moles, 2 moles

**Answer: A**

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61. How many moles of KI are required to produce 0.4 moles of  $K_2HgI_4$  ?

A. 0.4

B. 0.8

C. 3.2

D. 1.6

**Answer: B**

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62. Under similar conditions of pressure and temperature, 40 ml of slightly moist hydrogen chloride gas is mixed with 20 ml of ammonia gas, the final volume of gas at the same temperature and pressure will be

A. 100 mL

B. 20 mL

C. 40 mL

D. 60 mL

**Answer: B**



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63. What is the volume of  $CO_2$  liberated in litres at 1 atmosphere and  $0^\circ C$  when 10% of 100 pure calcium carbonate is treated with excess dilute sulphuric acid? (at mass of Ca=40, C=12, O=16)

A. 0.224

B. 2.24

C. 22.4

D. 224

**Answer: B**



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**64.** The volume of  $0.1N$  dibasic acid sufficient to neutralize  $1g$  of a base that furnishes  $0.04$  mole of  $OH^-$  in aqueous solution is :

A. 400 mL

B. 600 mL

C. 200 ml

D. 800 ml

**Answer: A**

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65. The density of 3M solution of  $NaCl$  is  $1.25\text{gmL}^{-1}$ . The molality of the solution is

- A. 260 m
- B. 2.18 m
- C. 2.79 m
- D. 3.00 m

**Answer: C**

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66. The amount of  $BaSO_4$  formed upon mixing 100mL of 20.8%  $BaCl_2$  solution with 50mL of 9.8%  $H_2SO_4$  solution will be :

(Ba = 137, Cl = 35.5, S = 32, H = 1 and O = 16)

A. 23.3 g

B. 11.65 g

C. 30.6 g

D. 33.2 g

**Answer: A**



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67. The formula of an acid is  $HXO_2$ . The mass of 0.0242 g of the acid is 1.657g. What is the atomic mass of X ?

A. 35.5

B. 28.1

C. 128

D. 19.0

**Answer: A**

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68. A portable hydrogen generator utilizes the reaction between calcium hydride and water to produce hydrogen. What mass of hydrogen can be produced by 70 g cartridge of calcium hydride?

A. 6.7 g

B. 3.5 g

C. 4.5 g

D. 5.5 g

**Answer: A**

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69. If  $1\frac{1}{2}$  moles of oxygen combine with Al to form  $Al_2O_3$  the weight of Al used in the reaction is (Al=27)



A. 27 g

B. 54 g

C. 49.5 g

D. 31 g

**Answer: B**



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**70.** For the reaction  $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$ , the volume of carbon monoxide required to reduce one mole of ferric oxide is

A.  $67.2dm^3$

B.  $11.2dm^3$

C.  $22.4dm^3$

D.  $44.8dm^3$

**Answer: A**

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71. 6.8 g  $H_2O_2$  present in 100 mL of its solution. What is the molarity of solution?

- A. 1 M
- B. 2 M
- C. 3 M
- D. 0.5 M

**Answer: B**

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72. 5 g sample contain only  $Na_2CO_3$  and  $Na_2SO_4$  . This sample is dissolved and the volume made up to 250 mL. 25 mL of this solution neutralizes 20 mL of 0.1 M  $H_2SO_4$ .

Calcalute the % of  $Na_2SO_4$  in the sample .

A. 42.4

B. 57.6

C. 36.2

D. 0.576

**Answer: B**



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**73.** A silver coin weighing 11.34 g was dissolved in nitric acid. When sodium chloride was added to the solution, all the silver (present as  $AgNO_3$ ) precipitated as silver chloride. The mass of the precipitated silver chloride was 14.35 g. Calculate the percentage of silver in the coin.

A. 4.8 %

B. 95.2 %

C. 90 %

D. 80 %

**Answer: B**



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74. 25 mL of a solution of barium hydroxide on titration with a 0.1 molar solution of hydrochloric acid gave a titre value of 35 mL. The molarity of barium hydroxide solutions was

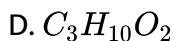
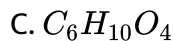
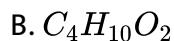
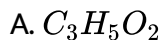
- A. 0.14
- B. 0.28
- C. 0.35
- D. 0.07

**Answer: D**



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75. An organic compound contains 49.3 % carbon, 6.84 % hydrogen and its vapour density is 73. Molecular formula of the compound is

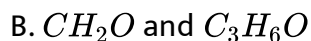
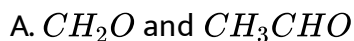


**Answer: C**



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76. The masses of carbon, hydrogen and oxygen in an organic compound are in the ratio 6 : 1 : 8 respectively. Which of the following pairs of formulae correspond to above information?



C.  $C_2H_6O$  and  $C_2H_6O_2$

D.  $C_3H_6O_3$  and HCHO

**Answer: D**

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77. A gaseous hydrocarbon gives upon combustion, 0.72 g of water and 3.08 g of  $CO_2$ . The empirical formula of the hydrocarbon is

A.  $C_2H_4$

B.  $C_3H_4$

C.  $C_6H_5$

D.  $C_7H_8$

**Answer: D**

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78. The chloride of a metal (M) contains 65.5% of chlorine. 100 ml of the vapour of the chloride of the metal at STP weighs 0.72 g. The molecular formula of the metal chloride is:

A.  $MCl$

B.  $MCl_2$

C.  $MCl_3$

D.  $MCl_4$

Answer: C



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79. In the reaction,  $4NH_3(g) + 5O_2(g) \rightarrow 4NO(g) + 6H_2O(g)$ , when 1 mole of ammonia and 1 mole of  $O_2$  are made to react to completion

A. 1.0 mole of  $H_2O$  is produced

B. 1.0 mole of NO will be produced

C. all the oxygen will be consumed

D. all the ammonia will be consumed

**Answer: C**

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**80.** If potassium chlorate is 80% pure, then 48 g of oxygen would be produced from (atomic mass of K = 39)

A. 153.12 g of  $KClO_3$

B. 122.5 g of  $KClO_3$

C. 245 g of  $KClO_3$

D. 98 g of  $KClO_3$

**Answer: A**

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81. When burnt in air, 14.0 g mixture of carbon and sulphur gives a mixture of  $CO_2$  and  $SO_2$  in the volume ratio of 2 : 1, volumes being measured at the same conditions of temperature and pressure. Moles of carbon in the mixture is

A. 0.25

B. 0.4

C. 0.5

D. 0.75

**Answer: C**



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82. Consider the reaction  $2A + B + 3C \rightarrow P + 2Q$ . Starting with 3 mol of A, 2 mol of B and 6 mol of C, number of moles of the products P and Q would respectively be

A. 2 and 4

B. 4 and 2

C. 3 and 1.5

D. 1.5 and 3

**Answer: D**



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**83.** A mixture of CO and  $CO_2$  having a volume of 20 mL is mixed with X mL of oxygen and electrically sparked. The volume after explosion is  $16 + X$  mL under the same conditions. What would be the residual volume if 30 mL of the original mixture is treated with aqueous NaOH?

A. 12 mL

B. 10 mL

C. 9 mL

D. 8 ml

**Answer: A**



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**84.** Consider a titration of potassium dichromate solution with acidified Mohr's salt solution using diphenylamine as indicator. The number of moles of Mohr's salt required per mole of dichromate is:

A. 3

B. 4

C. 5

D. 6

**Answer: D**



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85. On dividing  $0.25$  by  $22.1176$ , the actual answer is  $0.011303$ . The correctly reported answer will be

- A. 0.011
- B. 0.01
- C. 0.0113
- D. 0.013

**Answer: A**



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86. The number of significant figures for the three numbers 161 cm, 0.161 cm, 0.0161 cm are

- A. 3, 4 and 5 respectively
- B. 3, 4 and 4 respectively
- C. 3, 3 and 4 respectively

D. 3, 3 and 3 respectively

**Answer: D**

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87. In compound A,  $1.00g$  nitrogen units with  $0.57g$  oxygen. In compound B,  $2.00g$  nitrogen combines with  $2.24g$  oxygen. In compound C,  $3.00g$  nitrogen combines with  $5.11g$  oxygen. These results obey the following law

- A. law of constant proportion
- B. law of multiple proportion
- C. law of reciprocal proportion
- D. Dalton's law of partial pressure

**Answer: B**

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88. In the final answer of the expression  $\frac{(29.2 - 20.2)(1.79 \times 10^5)}{1.37}$ . The number of significant figures is

A. 1

B. 2

C. 3

D. 4

Answer: C



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89. Specific volume of cylindrical virus particle is  $6.02 \times 10^{-2} \text{ cc/g}$  whose radius and length  $7\text{\AA}$  and  $10\text{\AA}$  respectively. If  $N_A = 6.02 \times 10^{23}$ , find molecular weight of virus:

A.  $3.08 \times 10^3 \text{ kg/mol}$

B.  $3.08 \times 10^4 \text{ kg/mol}$

C.  $1.54 \times 10^4 \text{ kg/mol}$

D.  $1.54 \text{ kg/mol}$

**Answer: D**

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**90.** The maximum number of molecules is present in

A. 15 L of  $H_2$  gas at STP

B. 5 L of  $N_2$  gas at STP

C. 0.5 g of  $H_2$  gas

D. 10 g of  $O_2$  gas

**Answer: A**

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91. If  $N_A$  is Avogadro's number then number of valence electrons in 4.2 g of nitride ions ( $N^{3-}$ )

A.  $2.4N_A$

B.  $4.2N_A$

C.  $1.6N_A$

D.  $3.2N_A$

**Answer: A**



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92. 10 g of a metal gives 14 g of its oxide. The equivalent mass of its oxide and hydroxide will be respectively

A. 20 and 37

B. 28 and 37

C. 56 and 74



D. None of these

**Answer: B**

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93.  $MnO_2$  on ignition converts into  $Mn_3O_4$ . A sample of pyrolusite having 75%  $MnO_2$ , 20% inert impurities and rest water is ignited in air to constant mass. What is the percentage of Mn in the ignited sample ?

A. 24.6 %

B. 37 %

C. 55.24 %

D. 74.05 %

**Answer: C**

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94. A 3 L gas mixture of propane ( $C_3H_8$ ) and butane ( $C_4H_{10}$ ) on complete combustion at 25 C produced 10 L  $CO_2$ . Assuming constant P and T conditions what was volume of butane present in initial mixture?

A. 2 : 1

B. 1 : 2

C. 1.5 : 1.5

D. 0.5 : 2.5

**Answer: A**



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95. Glauberite is a mineral containing sodium sulphate ( $M= 142.0$ ) and calcium-sulphate ( $M=136$ ) only. It is the chief source of sodium sulphate, which is used in making glass. If a 20.00 g sample of glauberite contains 2.88 g of calcium ( $M = 40$ ), what mass of sodium sulphate can be extracted from 1 ton (1000 kg) of glauberite?

A. 102 kg

B. 510 kg

C. 719 kg

D. 855 kg

**Answer: B**



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**96.** A mixture of methane and ethane in the molar ratio of  $x:y$  has a mean molar mass of 20. what would be the mean molar mass, if the gases are mixed in the molar ratio of  $y:x$ ?

A. 20

B. 22

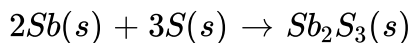
C. 24

D. none of these

**Answer: C**

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**97.** Antimony reacts with sulphur according to the equation



The molar mass of  $\text{Sb}_2\text{S}_3$  is  $340\text{g mol}^{-1}$

What is the percentage yield for a reaction in which 1.40 g of  $\text{Sb}_2\text{S}_3$  is obtained from 1.73 g of antimony and a slight excess of sulphur?

- A. 80.9
- B. 58
- C. 40.5
- D. 29.0%

**Answer: B**

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98. 10 g  $CaCO_3$  were dissolved in 250 ml of 1 M HCl or the solution was boiled. What volume of 2 M KOH would be required to equivalence point after boiling? Assume no change in volume during boiling.

- A. 50 mL
- B. 25 mL
- C. 75 ml
- D. 60 mL

**Answer: B**

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99. The concentrated sulphuric acid that is peddled commercially is 95%  $H_2SO_4$  by weight. If the density of this commerical acid is  $1.834gcm^{-3}$ , the molarity of this solution is

- A. 17.8 M

B. 12.0 M

C. 10.5 M

D. 15.7 M

**Answer: A**



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**100.** Aniline is diazotized and the diazonium salt hydrolysed to yield phenol which is brominated to produce  $C_6H_2(Br_3)OH$ . Calculate the mass of the final product obtained from 9.3 g of aniline if the yield in the two steps is 45% and 70% (Atomic mass of Br=80)

A. 1.04 g

B. 10.43 g

C. 14.89 g

D. 23.17 g

**Answer: B**



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**101.** 2 gm of a mixture of  $CO$  and  $CO_2$  on reaction with excess of  $I_2O_5$  produced 2.54 gm of  $I_2$ . What will be the mass % of  $CO_2$  in the original mixture ?

A. 60

B. 30

C. 70

D. 35

**Answer: B**



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**102.** Consider aqueous solutions containing 6 g each of (I)  $CH_3COOH$ , (II)  $C_3H_7OH$  and (III) urea in 100 mL of solution. Which of them has the maximum molarity of all the particles (molecules and ions)?

- A. I
- B. II
- C. III
- D. All equal

**Answer: A**



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**103.** Calculate the molarity of each ion in solution after 2.0 litre of 3.0 M  $AgNO_3$  is mixed with 3.0 litre of 1.0 M  $BaCl_2$ .

A.  $[Ba^{2+}] = 0.6M, [NO_3^-] = 1.2M$

B.  $[Ag^+] = [Cl^-] = 1.2M$



C.  $[Ba^{2+}] = 1.0M$ ,  $[NO_3^-] = 3.0M$

D. None of these

**Answer: A**



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**104.** Calculate the number of millilitre of  $NH_3(aq)$  solution ( $d=0.986g/ml$ ) contain 2.5% by mass  $NH_3$ , which will be required to precipitate iron as  $Fe(OH)_3$  in a 0.8 g sample that contains 50%  $Fe_2O_3$ .

A. 0.344 mL

B. 3.44 mL

C. 17.24 mL

D. 10.34 mL

**Answer: D**



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105. A mineral consists of an equimolar mixture of the carbonates of two bivalent metals. One metal is present to the extent of 12.5% by mass. 2.8 g of the mineral on heating lost 1.32 g of  $CO_2$ . What is the % by mass of the other metal ?

- A. 87.5
- B. 35.71
- C. 65.11
- D. 23.21

**Answer: D**



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106. A sample containing  $HAsO_2$  (mol. Mass=108) and weighing 3.78 g is dissolved and diluted to 250 mL in a volumetric flask. A 50 mL sample

(aliquot) is withdrawn with a pipet and titrated with 25 mL of 0.05 M solution of  $I_2$ . Calculate the percentage  $HAsO_2$  in the sample :

A. 25 %

B. 20 %

C. 10 %

D. 15 %

**Answer: A**



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**107.** 1.94 g of a mixture of KOH (56) and  $K_2CO_3$  (138) is dissolved in water and separated into two equal parts by volume. One part required 50 mL 0.1 M  $H_2SO_4$  to reach the phenolphthalein end point while the other part required 75 mL of the same acid to reach the methyl orange end point. The mass percentage of  $K_2CO_3$  in the mixture is

A. 35.5 %

B. 71 %

C. 29 %

D. 64.5 %

**Answer: B**



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**108.** A mixture of ethane and ethene occupies 41 L at atm and 500 K. The mixture reacts completely with  $10/3$  mole of oxygen to produce  $CO_2$  and water. The mole fraction of ethane and ethene in the mixture are (R=0.0821L atm  $K^{-1}mol^{-1}$  respectively

A. 0.50, 0.50

B. 0.75, 0.25

C. 0.67, 0.33

D. 0.25, 0.75

**Answer: C**

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**109.** On subjecting 10ml mixture of  $N_2$  and CO to repeated electric spark to form  $CO_2$  and NO, 7 ml of  $O_2$  was required for combustion. What was the mole percent of CO in the mixture ? (All volumes were measured under identical conditions)

- A. 60
- B. 40
- C. 6
- D. 4

**Answer: A**

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110. A mixture containing 28 g of CaO and 20 g of NaOH is treated with aqueous HCl till the reactions are complete. The resulting solution is evaporated to dryness. What is the mass of the solid obtained?

A. 169.50 g

B. 84.75 g

C. 42.37 g

D. 100.0 g

**Answer: B**



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111. The weight of one molecule of a compound  $C_{60}H_{122}$  is

A.  $1.2 \times 10^{-20} g$

B.  $1.4 \times 10^{-21} g$

C.  $5.025 \times 10^{23} g$

D.  $6.023 \times 10^{23} g$

**Answer: B**



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112. A mixture of  $O_2$  and gas Y (*mol. wt.* 80) in the mole ratio  $a : b$  has a mean molecular weight 40. What would be mean molecular weight, if the gases are mixed in the ratio  $b : a$  under identical conditions ? ( gases are )

A. 40

B. 48

C. 62

D. 72

**Answer: D**



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113. What quantity (in mL) of a 45% acid solution of a mono-protic strong acid must be mixed with a 20% solution of the same acid to produce 800 mL of a 29.875% acid solution?

A. 320

B. 325

C. 316

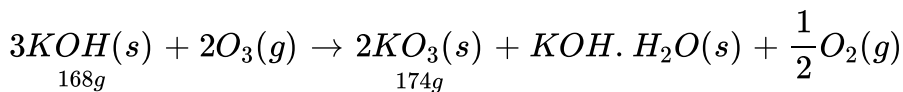
D. 330

**Answer: C**



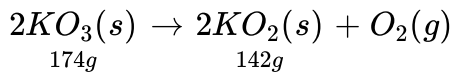
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114. The interaction of  $O_3$  with potassium hydroxide gives ozonide according to the following equation.



The ozonide  $KO_3$  slowly decomposes to  $KO_2$  and oxygen





The mass of  $KO_2$  produced by the reaction of 75.0g of KOH is

- A. 6.34 g
- B. 63.4 g
- C. 634 g
- D. 0.634 g

**Answer: B**



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