MOLE CONCEPT

Units, Atoms, Molecules, Atomic mass, Molecular mass, Gram atomic mass, Gram molecular mass, RAM, Average atomic

1._ Molecular weight of SO_2 is

(1) 64 gm (2) 64 amu (3) 32 gm (4) 32 amu

2. 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

3. The modern atomic weight scale is based on :

(1) ^{12}C (2) ^{16}O (3) ^{1}H (4) ^{18o}

4. 1 amu is equal to

(1) $\frac{1}{12}$of $C-12$ (2) $\frac{1}{14}$of $O-16$ (3) 1 g of H_2 (4) 1.66×10^{-23} kg

5. Avogadro number is :

(1) Number of atoms in one gram of the element

(2) Number of mililitre which one mole of a gaseous substance occupies at NTP (1 atm & 0ºC)

(3) Number of molecules present in one gram molecular mass of a substance.

(4) All are correct

6. At what temperature, both Celsius and Fahrenheit scale read the same value :

(1) 100º (2) 130º (3) 60º (4) –40º

7. The weight of one atom of Uranium is 238 amu. Its actual weight is ..... g.

(1*) 3.95×10^{-22} (2) 3.96×10^{-22} (3) 2.95×10^{-22} (4) 3.98×10^{-20}

Relation between Mole, Mass and Gaseous volume.

8. 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

9. How many atoms are there in 100 amu of He ?

(1) 25 (2) 50 (3) 75 (4) 100

10. The largest number of molecules is present in 1 g of

(1) CO_2 (2) H_2O (3) C_2H_5OH (4) N_2O_5.

11. The number of sodium atoms in 2 moles of sodium ferrocyanide ($Na_4[Fe(CN)_6]$) is :

(1) 12 × 23 (2) 26×10^{23} (3) 34×10^{23} (4) 48×10^{23}

12. The total number of g-molecules of SO_2Cl_2 in 13.5 g of sulphuryl chloride is

(1*) 0.1 (2) 0.2 (3) 0.3 (4) 0.4

13. Total number of atoms in 196 amu H_2SO_4 are :

(1) 14 N_A (2) 14 (3) 7 N_A (4) 7

14. The number of molecules of CO_2 present in 44 g of CO_2 is :

(1) 6.0×10^{23} (2) 3×10^{23} (3) 12×10^{23} (4) 3×10^{10}

15. One mole of P_4 molecules contain :

(1) 1 molecule (2) 4 molecules

(3) $\frac{1}{4} \times 6.022 \times 10^{23}$ atoms (4) 24.088×10^{23} atoms

.

16. 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)

17. 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.

18. The number of atoms in 558.5 g of Fe (at wt.= 55.85) is :

(1) Twice that in 60 g carbon (2) 6.022×10^{22}

(3) Half in 8 g He (4) $558.5 \times 6.023 \times 10^{23}$

19. The total number of electrons present in 8.0 g of methane is

(1) 4.8×10^{24} (2) 3.01×10^{24} (3) 4.8×10^{25} (4) 3.01×10^{23}.

20. 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 dm^3 each (4) have an equal number of atoms

21. If V ml of the vapours of substance at NTP weight W g. Then molecular weight of substance is :

(1) (W/V) × 22400 (2) $\frac{V}{W} \times 22.4$ (3) (W–V) × 22400 (4) $\frac{W \times 1}{V \times 22400}$

22. 16 g of an ideal gas 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

23. 4.4 g of an unknown gas occupies 2.24 litres of volume at STP, the gas may be :
(1) N_2O (2) CO (3) CO_2 (4) 1 & 3 Both

Density and Vapour density

24. Vapour density of a gas if its density is 0.178 g/L at NTP is :
(1) 0.178 (2) 2 (3) 4 (4) 0.089

25. A gas is found to have the formula $(CO)_x$. It's VD is 70 the value of x must be :

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

26. Number of electrons in 1.8 mL of $H_2O(\ell)$ is about :

[Book_RCMukerjee_2004_1.103]

(1) 6.02×10^{23} (2) 3.011×10^{23} (3) 0.6022×10^{21} (4) 60.22×10^{20}

27. The density of liquid mercury is 13.6 g/cm^3. How many moles of mercury are there in 1 litre of the metal ? (Atomic mass of Hg = 200.)

(1)68 mole (2)69 mole (3)70 mole (4)71 mole

28. 22.4 litre of water vapour at NTP, when condensed to water occupies an approximate volume of :
(Given : density of water = 1 g/ml)
(1) 18 litre (2) 1 litre (3) 1 ml (4) 18 ml

Percentage composition and Molecular formula

29. A hydrocarbon contains 75% of carbon. Then its molecular formula is :

(1) CH_4 (2) C_2H_4 (3) C_2H_6 (4) C_2H_2

30. The percentage value of nitrogen in urea is about

(1) 46 (2) 85 (3) 18 (4) 28

31. The empirical formula of a compound of molecular mass 120 is CH_2O. The molecular formula of the compound is :
(1) $C_2H_4O_2$ (2) $C_4H_8O_4$ (3) $C_3H_6O_3$ (4) all of these

32. 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) CH_2N (2) CH_4N (3) CH_5N (4) $C_3H_9N_3$.

33. 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) A_2B (3) A_2B_2 (4) A_2B_3

34. Insulin constans 3.4% sulphur. The minimum mol. wt. of insulin is –
(1) 941.176 (2) 944 (3) 945.27 (4) None

35. 64 g of an organic compound has 24 g carbon and 8 g hydrogen and the rest is oxygen. The empirical formula of the compound is :
(1) CH_4O (2) CH_2O (3) C_2H_4O (4) None

36. Percentage of Se in peroxidase anhydrous enzyme is 0.5% by weight (at. wt. = 78.4) then min. mol. wt. of peroxidase anhydrous enzymes is :
(1) 1.568×10^4 (2) 1.568×10^3 (3) 15.68 (4) 2.136×10^4

Balanced chemical equation analysis

37. 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

38. For the reaction $2P + Q \rightarrow R$, 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

39. 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

40. What volume of 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

41. The volume of oxygen necessary for the complete combusion of 20 litre of propane is :
(1) 40 litre (2) 60 litre (3) 80 litre (4*) 100 litre

42. The number of moles of oxygen obtained by the electrolytic decomposition of 90 g water is :
$2H_2O \longrightarrow 2H_2+O_2$

(1) 2.5 (2) 5 (3) 7.5 (4) 10

43. 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

44. The moles of O_2 required for reacting with 6.8 g of ammonia
(.....NH_3 + ... $O_2 \longrightarrow$ ..... NO + ... H_2O) is

(1) 5 (2) 2.5 (3) 1 (4) 0.5

45. The weight of lime (Cao) obtained by heating 200 kg of 95% pure lime stone ($CaCO_3$) is :
[AFMC 1999]

(1) 98.4 kg (2) 106.4 kg (3) 112.8 kg (4) 122.6 kg

46. The volume of gas at NTP produced by 100g of CaC_2 with water
$CaC_2 + H_2O \longrightarrow Ca(OH)_2 + C_2H_2$
(1) 70 litre (2) 35 litre (3) 17.5 litre (4) 22.4 litre

47. 20 gm. $CaCO_3$ on decomposition gives CO_2 at STP if yield of reaction is 75% only
[RPMT 2003]
(1) 3.36 litre (2) 22.4 litre (3) 2.24 litre (4) None of these

Principle of atomic conversation

48. X g of Ag was dissolved in HNO_3 and the solution was treated with excess of NaCl. When 2.87 g of AgCl was precipeted the value of X is

(1) 1.08 g (2) 2.16 g (3) 2.70 g (4) 1.62 g

49. 500 ml of a gaseous hydrocarbon when burnt in excess of O_2 gave 2.5 litre of CO_2 and 3.0 litre of water vapours under same conditions. Molecular formula of the hydrocarbon is :

(1) C_4H_8 (2) C_4H_{10} (3) C_5H_{10} (4) C_5H_{12}

50. 21.6 g of silver coin is dissolved in HNO_3. When NaCl is added to this solution, all silver is precipitated as AgCl. The weight of AgCl is found to be 14.35 g then % of silver in coin is :

(1) 50% (2) 75% (3) 100% (4) 15%

51. 25.4 g of iodine and 14.2g of chlorine are made to react completely to yield a mixture of ICl and ICl_3. Calculate the number of moles of ICl and ICl_3 formed.

(1) 0.1 mole, 0.1 mole (2) 0.1 mole, 0.2 mole (3) 0.5 mole, 0.5 mole (4) 0.2 mole, 0.2 mole

Limitting reagent

52. 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

53. 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

54. 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

55. 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

56. A mixture of 1.0 mole of Al and 3.0 mole of Cl_2 are allowed to react as :

$$2Al\,(s) + 3Cl_2\,(g) \longrightarrow 2AlCl_3\,(s)$$

(1) Which is limiting reagent ?

(2) How many moles of $AlCl_3$ are formed

(3) Moles of excess reagent left unreacted is

(1) (1) Al, (2) 1.0 (3) 1.5 (2) (1) Cl_2, (2) 2.0 (3) 2.0

(3) (1) Al, (2) 0.5 (3) 1.5 (4) (1) Cl_2, (2) 1.0 (3) 1.5

57. Zinc and hydrochloric acid react according to the reaction.

$$Zn(s) + 2HCl(aq.) \longrightarrow ZnCl_2(aq.) + H_2(g)$$

If 0.30 mole of Zn are added to hydrochloric acid containing 0.52 mole HCl, how many moles of H_2 are produced ?

(1) 0.26 (2) 1.04 (3) 0.52 (4) 0.13

58. When a mixture of 10 mole of SO_2 , 15 mole of O_2 was passed over catalyst , 8 mole of SO_3 was formed. How many mole of $SO_2$and O_2 did not enter into combination ?

(1) 2 moles of SO_2, 11 moles of O_2 (2) 3 moles of SO_2, 11.5 moles of O_2

(3) 2 moles of SO_2, 4 moles of O_2 (4) 8 moles of SO_2, 4 moles of O_2

Concentration terms

59. 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

60. The amount of salt required to prepare 10 dm^3 of decimolar solution is :

(1) 0.05 mole (2) 0.02 mole (3) 0.01 mole (4) 1.00 mole

61. 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) $\frac{M}{5}$

62. 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

63. 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

64. 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

65. Which of the following concentration factor is affected by change in temperature ?

(1) Molarity (2) Molality (3) Mole fraction (4) Weight fraction

66. The molar concentration of pure water at 4°C and 1 atm pressure is

(1) 1 (2) 5.5 (3) 18 (4) 55.5

67. Equal moles of H_2O and NaCl are present in a solution. Hence, molality of NaCl solution is :

(1) 0.55 (2) 55.5 (3) 1.00 (4) 0.18

Dilution, Mixting of solutions, Interconversion of concentration terms and Acid base reactions

68. 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) 6.02×10^{23} (2) 7.5×10^{22} (3) 1×10^{24} (4) 3.76×10^{23}

69. 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

70. 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

71. The molarity of 20% w/w sulphuric acid of density 1.14 g cm^{-3} is

(1) 2.32 (2) 2.02 (3) 2.12 (4) 2.22

72. An aqueous solution of ethanol has density 1.025 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.

73. Silver metal reacts with nitric acid according to the equation

$$3Ag\ (s) + 4HNO_3\ (aq) \longrightarrow 3AgNO_3\ (aq) + NO\ (g) + 2H_2O\ (l)$$

The volume of 1.15 M HNO_3 (aq) required to react with 0.784 g of silver is –

(1) 4.74 mL (2) 6.32 mL (3) 8.43 mL (4) 25.3 mL

74. The average oxidation state of Fe in Fe_3O_4 is :

(1) – 8/3 (2*) 8/3 (3) 2 (4) 3

Oxidation number

75. The oxidation number of Phosphorus in $Mg_2P_2O_7$ is :

(1) + 3 (2) + 2 (3) + 5 (4) – 3

76. The oxidation states of Sulphur in the anions SO_3^{2-} , $S_2O_4^{2-}$ and $S_2O_6^{2-}$ follow the order :

(1) $S_2O_6^{2-} < S_2O_4^{2} < SO_3^{2-}$ (2) $S_2O_4^{2-} < SO_3^{2-} < S_2O_6^{2-}$

(3) $SO_3^{2-} < S_2O_4^{2-} < S_2O_6^{2-}$ (4) $S_2O_4^{2} < S_2O_6^{2-} < SO_3^{2-}$

77. Match List-I (Compounds) with List-II (Oxidation states of Nitrogen) and select answer using the codes given below the lists :

(1)	NaN_3	(1)	+5
(2)	N_2H_2	(2)	+2
(3)	NO	(3)	–1/3
(4)	N_2O_5	(4)	–1

(Code)

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

Balancing of redox reaction

78. In the reaction $xHI + yHNO_3 \longrightarrow NO + I_2 + H_2O$, upon balancing with whole number coefficients :

(1) x = 3, y = 2 (2) x= 2, y = 3 (3) x = 6, y = 2 (4) x = 6, y = 1

79. For the redox reaction $xP_4 + yHNO_3 \longrightarrow H_3PO_4 + NO_2 + H_2O$, upon balancing with whole number coefficients:

(1) x = 1, y = 5 (2) x = 2, y = 10 (3) x = 1, y = 20 (4) x = 1, y = 15

80. In the reaction $X^- + XO_3^- + H^+ \longrightarrow X_2 + H_2O$, the molar ratio in which X^- and XO_3^- react is :

(1) 1 : 5 (2) 5 : 1 (3) 2 : 3 (4) 3 : 2

Solutions

Units, Atoms, Molecules, Atomic mass, Molecular mass, Gram atomic mass, Gram molecular mass, RAM, Average atomic

1.

sol(b)

2.

Sol. This is the required relation in Centigrade and Fahrenheit scales.

3.

sol(a)

4.

sol(a)

5.

sol(c)

6.

Sol. (4) ; $\frac{F-32}{9}=\frac{C}{5}$

Let temperature be t, same on two scale

$\therefore \quad t-32=\frac{9t}{5}$ or $t=-40$

7.

Sol. 1 amu = 1.66×10^{-24} gm

Relation between Mole, Mass and Gaseous volume.

8.

Sol. $\text{mole}=\frac{\text{mass}}{\text{at. wt.}}=\frac{46}{23}$ = 2 mole.

9.

Sol. We know that, 1 amu = $\frac{1}{12}$ × weight of one ^{12}C atom

or weight of one ^{12}C atom = 12 amu (at. wt. of C = 12 amu).
Similarly, as the atomic weight of He is 4 amu,
weight of one He atom = 4 amu.

Thus, the number of atoms in 100 amu of He = $\frac{100}{4}$ = 25.

10.

Sol. mole = $\frac{w}{m} = \frac{1}{m}$

for largest no. of molecule m should be lowest.

11. sol(d)

12. sol(a)

13.

Sol. molecule of H_2SO_4 = $\frac{196}{98}$ = 2.

Hence : H = 4 atoms, S = 2 atoms, O = 8 atoms.

H_2SO_4 = $\frac{196}{98}$ = 2.

: H = 4 , S = 2 , O = 8

14. sol(a)

15.

Sol. 1 mole P_4 = N molecules of P_4 = 4 N atoms of P_4.

16.

Sol. (1) moles of C = 24/12 = 2, So no. of atoms = $2N_A$

(2) moles of Fe = 56/56 = 1, So no. of atoms = N_A

(3) moles of Al = 27/27 = 1, So no. of atoms = N_A

(4) moles of Fe = 108/108 = 1, So no. of atoms = N_A

17. sol(c)

18.

Sol. 558.5 g Fe = $\frac{558.5}{55.85}$ mole Fe = 10 mole Fe

= 2×5 mole C = 2× $\frac{60}{12}$ mole C

19.

Sol. $\frac{1}{2} \times 6.023 \times 10^{23}$ = 3.0125 × 10^{23}

20.

Sol. Statement of avogadro's hypothesis.

21. sol(a)

22.

Sol. Mol. wt. of gas is $= \frac{16 \times 22.4}{5.6} = 64$ g

$32 + 16x = 64$

$x = 2$

23. sol(d)

Density and Vapour density

24. sol(b)

25. sol(c)

26. sol(c)

Sol. Number of electrons $= \frac{1.8 \times 10}{18} \times N_A$

27.

Sol. 1 litre Hg metal

volume = 1000

$d = \frac{m}{v}$ mass = d × V = 13.6 × 1000

No of mole of Hg metal $= \frac{13.6 \times 1000}{200} = 68$ mole

28. sol(d)

Percentage composition and Molecular formula

29. sol(a)

30. sol(a)

31. sol(db)

32. sol(b)

33. sol(b)

34. sol(a)

35. sol(a)

Sol.

	C	H	O
mass	24	8	32
moles	$\frac{24}{12}$	$\frac{8}{1}$	$\frac{32}{16}$
ratio	2	8	2
Simple integer ratio	1	4	1

Hence empirical formula is CH_4O

36. sol(a)

Balanced chemical equation analysis

37. sol(b)

Sol. $KClO_3 \rightarrow KCl + \frac{3}{2} O_2$

$\frac{3}{2}$ mole or 33.6 litre O_2 from 1 mole $KClO_3$

11.2 litre of O_2 formed by $\frac{1}{3}$ mole $KClO_3$

38. sol(c)

39. sol(a)

40. sol(b)

41. sol(d)

42. sol(a)

43. sol(b)

44. sol(d)

45. sol(b)

46. sol(b)

47. sol(a)

Principle of atomic conversation

48. sol(b)

49. sol(d)

50.sol(a)

51.

Sol.

	I_2 +	$2Cl_2$ ⟶	ICl +	ICl_3
Given mass	25.4 gram	14.2 gram	0	0
initial mole	0.1 mole	0.2 mole	0	0
final mole	0	0	0.1	0.1

Limitting reagent

52. For the reaction 2P + Q → 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

53. sol(b)

54. sol(d)

55.

Sol.

	Zn +	Fe +	2S ⟶	Zn (FeS_2)
initial mole	2	3	5	0
final mole	0	3–2 = 1	5 –4 =1	2

56. sol(a)

57. sol(a)

58.

Sol.

	$2SO_2$ +	O_2 ⟶	$2SO_3$
Initial mole	10	15	0
Final mole	(10 – 2x)	(15 – x)	2x

∵ Given $2x = 8$

$\therefore \quad x = 4$

$\therefore$ Mole of SO_2 left = $10 - 2 \times 4 = 2$

Mole of O_2 left = $15 - 4 = 11$

Concentration terms

59.

Sol. Molarity = $\frac{6.02\times10^{22}}{6.02\times10^{23}} \times \frac{1}{1/2}$ = 0.2

60. sol(d)

61.sol(c)

62. sol(a)

63.sol(c)

64. sol(c)

65. sol(a)

66. sol(d)

67. sol(b)

Dilution, Mixting of solutions, Interconversion of concentration terms and Acid base reactions

68. sol(b)

69. sol(b)

70.

Sol. Weight of NaOH = 20 gram

Weight of solvent = 80 g

$$M = \frac{20 \times 1000}{40 \times 80} = 6.25 \text{ m}$$

71.

Sol. $M = \frac{10\times1.14\times20}{98}$

M = 2.32

72. sol(b)

Sol. 1000 mL solution contain 2 mole of ethanol or 1000 × 1.025 g

solution contain 2 mole of ethanol

wt. of solvent = 1000 × 1.025 – 2 × 46

$m = \frac{2}{1000\times1.025-2\times46} \times 1000$

$m = \frac{2}{933} \times 1000 = 2.143$

73.

Sol. Moles of HNO_3 required = $\frac{0.784}{108}$ = 0.0072 × $\frac{4}{3}$ = 0.00968.

Vol. of HNO_3 = $\frac{0.00963}{1.15}$ × 1000 = 8.41 ml.

74.

Sol. Fe_3O_4 can be written as $FeO.Fe_2O_3$.

In FeO , Fe has oxidation state + 2 , in Fe_2O_3 has oxidation state + 3.

resultant oxidation number = $\frac{1\times 2+2\times 3}{3}$ = $\frac{8}{3}$.

Oxidation number

75.

Sol. 2(+2) + 2x + 7 (–2) = 0

$\therefore$ x = +5

76.

Sol. $SO_3^{2-} \Rightarrow 1(x) + 3(-2) = -2 \therefore x = +4$

$S_2O_4^{2-} \Rightarrow 2(x) + 4(-2) = -2 \therefore x = +3$

$S_2O_6^{2-} \Rightarrow 2(x) + 6(-2) = -2 \therefore x = +5$

77.

Sol. $NaN_3 \Rightarrow 1(+1) + 3(x) = 0 \therefore x = -1/3$

$N_2H_2 \Rightarrow 2(x) + 2(+1) = 0 \therefore x = -1$

$NO \Rightarrow 1(x) + 1(-2) = 0 \therefore x = +2$

$N_2O_5 \Rightarrow 2(x) + 5(-2) = 0 \therefore x = +5$

Balancing of redox reaction

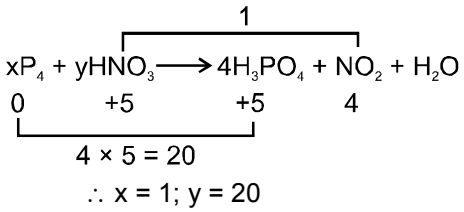
78.

Sol. Valency factor ratio is inversely related to molar ratio.

(V.f.)HI : (V.f.)HNO_3 = 1 : 3 = 2 : 6 $\therefore$ Molar ratio = 6 : 2

79.

Sol.



$\therefore$ (V.f.)P_4 : (V.f.) HNO_3 = 20 : 1

$\therefore$ x = 1; y = 20

80.

Sol. $X^- + XO_3^- + H^+ \longrightarrow X_2 + H_2O$

V.f. = 1 V.f. = 5

$\therefore$ Molar ratio = 5 : 1