Empirical and Molecular Formula

71. The empirical formula of an organic gaseous compound containing carbon and hydrogen is CH_2. The volume occupied by certain mass of this gas is exactly half of the volume occupied by the same mass of nitrogen gas under identical conditions. The molecular formula of the organic gas is

(a) C_2H_4 (b) CH_2

(c) C_6H_{12} (d) C_4H_8

72. A compound has carbon, hydrogen, and oxygen in 3:3:1 atomic ratio. If the number of moles in 1 g of the compound is 6.06×10^{-3}, the molecular formula of the compound will be

(a) C_3H_3O

(b) $C_6H_6O_2$

(c) $C_9H_9O_3$

(d) $C_{12}H_{12}O_4$

73. A compound having the empirical formula, C_3H_4O, has a molecular weight of 170 ± 5. The molecular formula of the compound is

(a) C_3H_4O

(b) $C_6H_8O_2$

(c) $C_6H_{12}O_3$

(d) $C_9H_{12}O_3$

74. It was found from the chemical analysis of a gas that it has two hydrogen atoms for each carbon atom. At 0°C and 1 atm, its density is 1.25 g per litre. The formula of the gas would be

(a) CH_2 (b) C_2H_4

(c) C_2H_6 (d) C_4H_8

75. A quantity of 1.4 g of a hydrocarbon gives 1.8 g water on complete combustion. The empirical formula of hydrocarbon is

(a) CH

(b) CH_2

(c) CH_3

(d) CH_4

76. An organic compound contains 40% carbon and 6.67% hydrogen by mass. Which of the following represents the empirical formula of the compound?

(a) CH_2

(b) CH_2O

(c) C_2H_4O

(d) CH_3O

77. A compound contains elements X and Y in 1:4 mass ratio. If the atomic masses of X and Y are in 1:2 ratio, the empirical formula of compound should be

(a) XY_2 (b) X_2Y

(c) XY_4 (d) X_4Y

78. A compound contains equal masses of the elements A, B and C. If the atomic masses of A, B and C are 20, 40 and 60, respectively, the empirical formula of the compound is

(a) A_3B_2C

(b) AB_2C_3

(c) ABC

(d) $A_6B_3C_2$

79. A gaseous oxide contains 30.4% of nitrogen, one molecule of which contains one nitrogen atom. The density of the oxide relative to oxygen, under identical conditions, is about

(a) 0.69   (b) 1.44

(c) 0.35   (d) 2.88

80. Iron form two oxides. If for the same mass of iron, mass of oxygen combined in the first oxide is two-third of the mass of oxygen combined in the second oxide, the ratio of valency of iron in first and second oxide is

(a) 1:1

(b) 2:3

(c) 3:2

(d) 2:5