Calculation of Mole

36. Dopamine is a neurotransmitter, a molecule that serves to transmit message in the brain. The chemical formula of dopamine is $C_8H_{11}O_2N$. How many moles are there in 1 g of dopamine?
(a) 0.00654
(b) 153
(c) 0.0654
(d) None of these

37. Ethanol is the substance commonly called alcohol. The density of liquid alcohol is 0.8 g/ml at 293 K. If 1.2 moles of ethanol is needed for a particular experiment, what volume of ethanol should be measured out?
(a) 55.2 ml   (b) 57.5 ml
(c) 69 ml   (d) 47.9 ml

38. The volume of one mole of water at 277 K is 18 ml. One ml of water contains 20 drops. The number of molecules in one drop of water will be ($N_A = 6 \times 10^{23}$)
(a) 1.07×10^{21}
(b) 1.67×10^{21}
(c) 2.67×10^{21}
(d) 1.67×10^{20}

39. A given mixture consists only of pure substance X and pure substance Y. The total mass of the mixture is 3.72 g. The total number of moles is 0.06. If the mass of one mole of Y is 48 g and there is 0.02 mole of X in the mixture, what is the mass of one mole of X?
(a) 90 g   (b) 75 g
(c) 45 g   (d) 180 g

40. Number of gas molecules present in 1 ml of gas at 0°C and 1 atm is called Loschmidt number. Its value is about
(a) 2.7×10^{19} (b) 6×10^{23}
(c) 2.7×10^{22} (d) 1.3×10^{28}

41. A quantity of 0.25 g of a substance when vaporized displaced 50 cm^3 of air at 0°C and 1 atm. The gram molecular mass of the substance will be
(a) 50 g   (b) 100 g
(c) 112 g   (d) 127.5 g

42. An amount of 6 moles of Cl-atoms at STP occupies a volume of
(a) 134.4 l   (b) 67.2 l
(c) 68.1 l   (d) 136.2 l

43. While resting, the average 70 kg human male consumes 16.628 l of oxygen per hour at 27°C and 100 kPa. How many moles of oxygen are consumed by the 70 kg man while resting for 1hour?
(a) 0.67   (b) 66.7
(c) 666.7   (d) 67.5

44. One molecule of haemoglobin will combine with four molecules of oxygen. If 1.0 g of haemoglobin combines with 1.642 ml of oxygen at body temperature (27°C) and a pressure of 760 torr, what is the molar mass of haemoglobin?
(a) 6,00,000   (b) 1,50,000
(c) 15,000   (d) 60,000

45. A quantity of 2.0 g of a triatomic gaseous element was found to occupy a volume of 448 ml at 76 cm of Hg and 273 K. The mass of its each atom is
(a) 100 amu
(b) 5.53×10^{-23} g
(c) 33.3 g
(d) 5.53 amu

46. Most abundant element dissolved in sea water is chlorine at a concentration of 19 g/kg of sea water. The volume of earth's ocean is 1.4×10^{21} l. How many g-atoms of chlorine are potentially available from the oceans? Density of sea water is 1 g/ml. ($N_A = 6 \times 10^{23}$)
(a) 7.5×10^{20} (b) 27×10^{21}
(c) 27×10^{24} (d) 7.5×10^{19}