CHEMISTRY

41. Among the following gases which one has the lowest root mean square velocity at $25^\circ C$
(1) SO_2 (2) N_2
(3) O_2 (4) Cl_2

42. Root mean square velocity of a gas molecule is proportional to
(1) $M^{\frac{1}{2}}$ (2) M^0
(3) $M^{-\frac{1}{2}}$ (4) M

43. The K.E. of an ideal gas in calories per mole is approximately equal to
(1) Three times the absolute temperature
(2) Absolute temperature
(3) Two times the absolute temperature
(4) 1.5 times the absolute temperature

44. At low pressure, the van der Waal's equation is reduced to
(1) $Z = \frac{pV_m}{RT} = 1 - \frac{a}{VRT}$
(2) $Z = \frac{pV_m}{RT} = 1 + \frac{b}{RT}p$
(3) $pV_m = RT$
(4) $Z = \frac{pV_m}{RT} = 1 - \frac{a}{RT}$

45. At high temperature and low pressure, the van der Waal's equation is reduced to
(1) $\left(p + \frac{a}{V_m^2}\right)(V_m) = RT$
(2) $pV_m = RT$
(3) $p(V_m - b) = RT$
(4) $\left(p + \frac{a}{V_m^2}\right)(V_m - b) = RT$

46. The rate law for the reaction,
$RCl + NaOH(aq) \rightarrow ROH + NaCl$ is given by rate = $k_1[RCl]$. The rate of the reaction will be
(1) doubled on doubling the concentration of sodium hydroxide
(2) halved on reducing the concentration of alkyl halide to one half
(3) decreased on increasing the temperature of the reaction
(4) unaffected by increasing the temperature of the reaction.

47. The concentration of a reactant decreases from 0.2 M to 0.1 M in 10 minutes. The rate of the reaction is
(1) 0.01 M (2) 10^{-2}
(3) 0.01 mol dm^{-3} min^{-1}
(4) 1 mol dm^{-3} min^{-1}

48. In the reaction $2A + B \rightarrow A_2B$, if the concentration of A is doubled and of B is halved, then the rate of the reaction will
(1) Increase by four times
(2) Decrease by two times
(3) Increase by two times
(4) Remain the same

49. The rate of a reaction is doubled for every 10 °C rise in temperature. The increase in reaction rate as a result of temperature rise from 10 °C to 100 °C is
(1) 112 (2) 512
(3) 400 (4) 614

50. The experimental data for the reaction
$2A + B_2 \rightarrow 2AB$ is

Exp.	$[A]_0$	$[B]_0$	Rate (mole s^{-1})
(1)	0.50	0.50	1.6×10^{-4}
(2)	0.50	1.00	3.2×10^{-4}
(3)	1.00	1.00	3.2×10^{-4}

The rate equation for the above data is
(1) Rate = $k[B_2]$
(2) Rate = $k[B_2]^2$
(3) Rate = $k[A]^2[B]^2$
(4) Rate = $k[A]^2[B]$

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