CHEMISTRY

41. (4)
Among these Cl_2 has the highest molecular weight so it will posses lowest root mean square velocity

42. (3)
$$V_{rms} = \sqrt{\frac{3RT}{\text{Molecular weight}}}$$
i.e., $V_{rms} \propto \frac{1}{\sqrt{M}} \propto (M)^{-\frac{1}{2}}$

43. (1)
$$\text{K.E.} = \frac{3}{2}.RT = \frac{3}{2}.2.T \because R \approx 2\text{cal K}^{-1}\text{mol}^{-1}$$
$$\text{K.E.} = 3T$$

44. (1)
When pressure is low
$$\left[p + \frac{a}{V^2}\right](V - b) = RT$$
or $pV = RT + pb - \frac{a}{V} + \frac{ab}{V^2}$
or $\frac{pV}{RT} = 1 - \frac{a}{VRT}$
$$Z = -\frac{a}{VRT}\left(\because \frac{pV}{RT} = Z\right)$$

45. (2)
At high temperature and low pressure, Vander Waal's equation is reduced to ideal gas equation.
pV = nRT
pV = RT (For 1 mole of gas)

46. (2)
Greater are the concentrations of the reactants, faster is the reaction. Conversely, as the concentrations of the reactants decreases, the rate of reaction also decreases.

47. (3)
$$r = \frac{-\Delta C}{\Delta t}$$

48. (4)
'A' will disappear at twice the rate at which 'B' will decrease.

49. (2)
$$10 \xrightarrow{2} 20 \xrightarrow{2} 30 \xrightarrow{2} 40 \xrightarrow{2} 50 \xrightarrow{2}$$
$$60 \xrightarrow{2} 70 \xrightarrow{2} 80 \xrightarrow{2} 90 \xrightarrow{2} 100$$
Increase in rate, $r = 2^9$ or $r = 2^{\frac{\Delta t}{10}}$

50. (1)