Rate law and Rate constant

49. (c) Two molecules are taking part in elementary step.

50. (b) Because two molecules are taking part in elementary step.

51. (b) The overall order of a reaction is sum of powers T raised on concentration terms in order to write rate expression.

52. (a) It is a first order reaction as is clear from rate law expression, $r = k(H_2O_2)$

53. (a) For Ist order reaction half life is independent of concentration.

54. (d) $K = \frac{1}{t} log\, e\left(\frac{a}{a-x}\right) = \frac{1}{15} log\, e\left(\frac{35}{35-9}\right) = \frac{1}{15} log\, e\left(\frac{35}{26}\right)$

56. (c) $k = \frac{0.693}{30} = 0.0231$; $t = \frac{2.303}{k} log\left(\frac{100}{100-75}\right)$

$t = \frac{2.303}{0.0231} log\, 4 = 60$minutes

57. (d) $Rate = K(sugar)(H_2O)^o$

58. (b) Derive $t_{\frac{1}{2}}$from $K_t = 2.303\, log \frac{a}{a-x}$, putting $t = \frac{1}{2}$ and $x = \frac{a}{2}$. Therefore it is $\frac{0.693}{K}$.

59. (b) $r \propto [X]^2$ or $r = k[X]^2$

60. (b) $t_{\frac{1}{2}} = \frac{0.693}{k}, \frac{0.693}{1.1\times10^{-9}} = 6.3 \times 10^8 sec.$

61. (c) $t_{\frac{1}{2}} \propto \frac{1}{(a)}$for II order reaction.

62. (d) Order of reaction is an experimental value, while molecularity is a theoretical value.

63. (c) K for 1st order reaction = per unit time *i.e.* $Time^{-1}$.

64. (b) $R = K[A][B]^0$ so molecularity is two and order is two.

65. (c) Rate of zero order reaction is independent of the concentration of the reactant and remains constant throughout the reaction.

66. (d) $t_{\frac{1}{2}} \propto \frac{1}{(a)^{n-1}}$

67. (b) $t_{\frac{1}{2}} \propto \frac{1}{(C_o)^{n-1}} \therefore$ reaction is of first order.

68. (c) For Ist order reaction half life is independent of concentration.

69. (c) $K = \frac{0.693}{t_{\frac{1}{2}}}, K = \frac{0.693}{138.6 min\, min^{-1}}$

70. (b) $CH_3COOCH_3 + H_2O \xrightarrow{H^+} CH_3COOH + CH_3OH$

It is a pseudo-unimolecular reaction.

71. (d) $t_{\frac{1}{2}} \propto \frac{1}{K}$ and $K \propto t$

73. (b) For zero order reactions $\frac{dx}{dt} = K(A)^o$