Rate law and Rate constant

25. For the reaction $2N_2O_5 \rightarrow 4NO_2 + O_2$rate of reaction and rate constant are 1.02×10^{-4} and $3.4 \times 10^{-5}\, sec^{-1}$ respectively. The concentration of N_2O_5 at that time will be

(a) 1.732 (b) 3

(c) 1.02×10^{-4} (d) 3.4×10^{5}

26. The rate law of the reaction $2N_2O_5 \rightarrow 4NO_2 + O_2$ is

(a) $r = K[N_2O_5]$

(b) $r = K[N_2O_5]^2$

(c) $r = K[N_2O_5]^0$

(d) $r = K[NO_2]^4[O_2]$

27. If $R = K[NO]^2[O_2]$, rate constant may be increased by

(a) Increasing temperature

(b) Decreasing temperature

(c) Increasing concentration of O_2

(d) Increasing concentration of NO

28. The value of rate constant $A + B \rightarrow$products depends on

(a) Concentration of *A* and *B*

(b) Pressure

(c) Temperature

(d) All of these

29. The rate constant of a reaction depends upon

(a) Extent of reaction

(b) Time of reaction

(c) Temperature of the system

(d) Concentration of the system

30. The rate equation for the reaction $2A + B \rightarrow C$ is found to be: rate $= k[A][B]$. The correct statement in relation to this reaction is that the

(a) Rate of formation of *C* is twice the rate of disappearance of *A*

(b) $t_{1/2}$is a constant

(c) Unit of *k* must be s^{-1}

(d) Value of *k* is independent of the initial concentrations of *A* and *B*

31. The specific rate constant of a first order reaction depends on the

(a) Concentration of the reactants

(b) Concentration of the products

(c) Time of reaction

(d) Temperature of reaction

32. If the concentration is expressed in moles per litre, the unit of the rate constant for a first order reaction is

(a) *mole litre* $-1\, sec^{-1}$

(b) *mole litre*-1

(c) sec^{-1}

(d) mole-1 *litre*-1 *sec*-1

33. The dimension of rate constant of a second order reaction involves
(a) Neither time nor concentration
(b) Only time
(c) Time and concentration
(d) Time and square of concentration

34. The unit of rate constant of second order reaction is usually expressed as
(a) *mole litre* sec^{-1}
(b) $mole^{-1}litre^{-1}\,sec^{-1}$
(c) $molelitre^{-1}\,sec^{-1}$
(d) $mole^{-1}litre\,sec^{-1}$

35. A zero order reaction is one whose rate is independent of
(a) Temperature of the reaction
(b) The concentrations of the reactants
(c) The concentration of the products
(d) The material of the vessel in which the reaction is carried out

36. The unit of rate constant for a zero order reaction is
(a) *litre* sec^{-1}
(b) *litre* $mole^{-1}\,sec^{-1}$
(c) *mole* $litre^{-1}\,sec^{-1}$
(d) *mole* sec^{-1}

37. Which of the following rate laws has an overall order of 0.5 for reaction involving substances x, y and z
(a) Rate $= K(C_x)(C_y)(C_z)$
(b) Rate $= K(C_x)^{0.5}(C_y)^{0.5}(C_z)^{0.5}$
(c) Rate $= K(C_x)^{1.5}(C_y)^{-1}(C_z)^{0}$
(d) Rate $= K(C_x)(C_z)^n/(C_y)^2$

38. The rates of a certain reaction (*dc/dt*) at different times are as follows

Time	Rate (*mole litre*$^{-1}$ *sec*$^{-1}$)
0	2.8×10^{-2}
10	2.78×10^{-2}
20	2.81×10^{-2}
30	2.79×10^{-2}

The reaction is
(a) Zero order (b) First order
(c) Second order (d) Third order

39. For a chemical reaction $A \rightarrow B$ it is found that the rate of reaction doubles, when the concentration of A is increased four times. The order in A for this reaction is
(a) Two (b) One
(c) Half (d) Zero

40. The following data are for the decomposition of ammonium nitrate in aqueous solution

Volume of N_2 in cc	Time (minutes)
6.25	10
9.50	15
11.42	20
13.65	25
35.05	Finally

The order of the reaction is

(a) Zero (b) One

(c) Two (d) Three

41. The hydrolysis of ethyl acetate is a reaction of

$$CH_3COOEt + H_2O \xrightarrow{H^+} CH_3COOH + EtOH$$

(a) First order

(b) Second order

(c) Third order

(d) Zero order

42. The rate of reaction between A and B increases by a factor of 100, when the concentration of A is increased 10 folds. The order of reaction with respect to A is

(a) 10 (b) 1

(c) 4 (d) 2

43. Which of the following is a first order reaction

(a) $NH_4NO_2 \rightarrow N_2 + 2H_2O$

(b) $2HI \rightarrow H_2 + I_2$

(c) $2NO_2 \rightarrow 2NO + O_2$

(d) $2NO + O_2 \rightarrow 2NO_2$

44. The inversion of cane sugar is represented by

$C_{12}H_{22}O_{11} + H_2O \rightarrow C_6H_{12}O_6 + C_6H_{12}O_6$

It is a reaction of

(a) Second order

(b) Unimolecular

(c) Pseudo unimolecular

(d) None of the three

45. Which one of the following formula represents a first order reaction

(a) $K = \frac{x}{t}$

(b) $K = \frac{1}{2t}\left[\frac{1}{(a-x)^2} - \frac{1}{a^2}\right]$

(c) $K = \frac{2.303}{t} log_{10} \frac{a}{(a-x)}$

(d) $K = \frac{1}{t}\frac{x}{a(a-x)}$

46. The first order rate constant for the decomposition of N_2O_5 is $6.2 \times 10^{-4}\, sec^{-1}$. The half life period for this decomposition in seconds is

(a) 1117.7 (b) 111.7

(c) 223.4 (d) 160.9

47. A first order reaction which is 30% complete in 30 minutes has a half-life period of

(a) 24.2 *min* (b) 58.2 *min*

(c) 102.2 *min* (d) 120.2 *min*

48. The order of a reaction which has the rate expression $\frac{dc}{dt} = K[E]^{3/2}[D]^{3/2}$ is

(a) 3/2 (b) 3

(c) 2 (d) 0