Chemical Kinetics

1.The term – dx/dt in a rate equation refers to :
(a) the conc. of a reactant
(b) the decrease in conc. of the reactant with time
(c) the velocity constant of reaction
(d) None of these
Answer: (b) the decrease in conc. of the reactant with time

2.For a reaction P + Q → 2 R + S , the incorrect statement is
(a) Rate of disappearance of P = Rate of appearance of S
(b) Rate of disappearance of Q = 2 x Rate of appearance of R
(c) Rate of disappearance of Q = Rate of disappearance of P
(d) Rate of disappearance of Q = 1⁄2 x Rate of appearance of R
Answer: (b) Rate of disappearance of Q = 2 x Rate of appearance of R

3.In a reaction, 2X → Y, the concentration of X decreases from 0.50 M to 0.38 M in 10 min. Whatis the rate of reaction in Ms^{-1} during this interval ?
(a) 2×10^{-4}
(b) 4×10^{-2}
(c) 2×10^{-2}
(d) 1×10^{-2}
Answer: (a) 2×10^{-4}

4.Instantaneous rate of a chemical reaction is
(a) rate of reaction in the beginning
(b) rate of reaction at the end
(c) rate of reaction at a given instant
(d) rate of reaction between two specific time intervals
Answer: (c) rate of reaction at a given instant

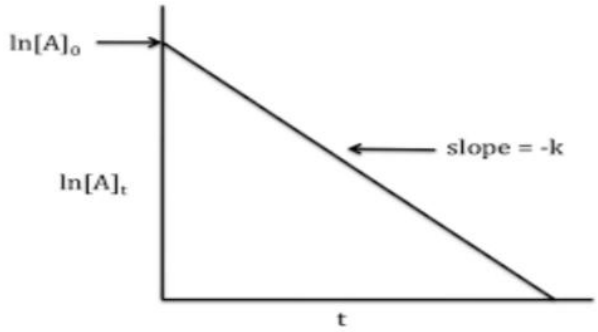
5.A first order reaction has a rate constant $1.15 \times 10^{-3}s^{-1}$. Time taken for 5 g of this reactant to reduce to 3 g is
(a) 444 s
(b) 400 s
(c) 528 s
(d) 669 s
Answer: (a) 444 s

6.For the reaction A + 2B → C, rate is given by $R = [A] [B]^2$ then the order of the reaction is
(a) 3
(b) 6
(c) 5
(d) 7

Answer: (a) 3

7.Order of reaction is decided by
(a) temperature
(b) mechanism of reaction as well as relative concentration of reactants
(c) molecularity
(d) pressure
Answer: (b) mechanism of reaction as well as relative concentration of reactants

8.A plot is shown below between concentration and time t. Which of the given orders is indicated by the graph

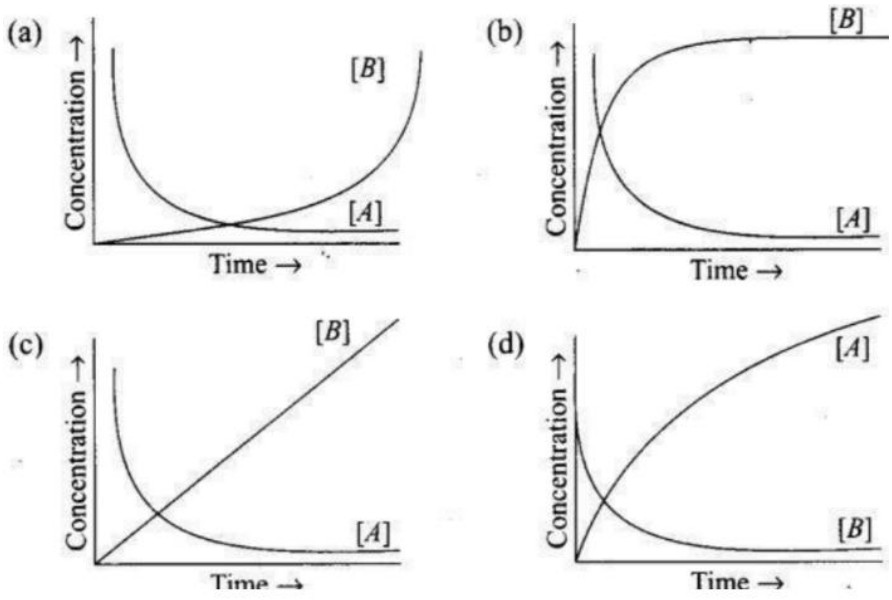


(a) Zero Order
(b) Second Order
(c) First Order
(d) Fractional Order
Answer: (c) First Order

9.A zero order reaction is one whose rate is independent of
(a) the concentration of the reactants
(b) the temperature of reaction
(c) the concentration of the product
(d) the material of the vessel in which reaction is carried out
Answer: (a) the concentration of the reactants

10.A catalyst increases the reaction rate by:
(a) decreasing enthalpy
(b) increasing internal energy
(c) decreasing activation enthalpy
(d) increasing activation enthalpy
Answer: (c) decreasing activation enthalpy

11.Consider the reaction A —> B. The concentration of both the reactants and the products varies exponentially with time. Which of the following figures correctly describes the change in concentration of reactants and products with time?



Answer: (b)

12.A first order reaction takes 40 min for 30% decomposition. $t_{1/2}$ will be
(a) 77.7 min
(b) 52.5 min
(c) 46.2 min
(d) 22.7 min
Answer: (a) 77.7 min

13.In a reaction, the threshold energy is equal to
(a) activation energy + normal energy of reactants
(b) activation energy - normal energy of reactants
(c) normal energy of reactants - activation energy
(d) average kinetic energy of molecules of reactants
Answer: (a) activation energy + normal energy of reactants

14.Which of the following influences the reaction rate performed in a solution?
(a) Temperature
(b) Activation energy
(c) Catalyst
(d) All of the above
Answer: (d) All of the above

15.Compounds A and B react according to the following chemical equation. $A(g)+2B(g)\rightarrow 2C(g)$ Concentration of either 'A' or 'B ' were changed keeping the concentrations of one of the reactantsconstant and rates were measured as a function of initial concentration. Following results were obtained. Choose the correct option for the rate equations for this reaction.

Expt	[A]	[B]	Initial Rate (mol $L^{-1}s^{-1}$)

I	0.01	0.01	0.005
II	0.02	0.01	0.020
III	0.02	0.03	0.060

(a) Rate= k[A] [B]

(b) Rate= $k[A]^1[B]^2$

(c) Rate= $k[A]^2[B]^2$

(d) Rate= $k[A]^2[B]$

Answer: (d) Rate= $k[A]^2[B]$