DPP
DAILY PRACTICE PROBLEMS

Class : XIIth   Subject : CHEMISTRY
Date :   DPP No. : 7
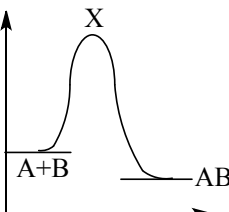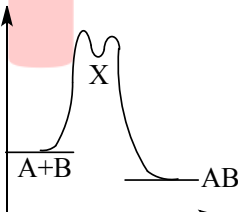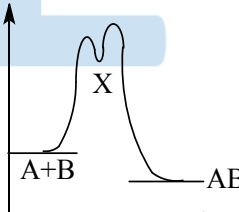
Topic :- Chemical Kinetics

1. The activation energy of a reaction is zero. The rate constant for the reaction
   a) Decreases with decrease of temp
   b) Increases with increase of temp
   c) Decreases with increase of temp
   d) Is nearly independent of temp

2. The burning of coal represented by the equation; $C(s) + O_2(g) \rightarrow CO_2(g)$. The rate of this reaction is increased by:
   a) Decrease in the concentration of oxygen
   b) Powdering the lumps of coal
   c) Decreasing the temperature
   d) Providing inert atmosphere for burning

3. At room temperature, the reaction between NO and O_2 to give NO_2 is fast, while that between CO and O_2 is slow. It is due to:
   a) CO is smaller in size than that of NO
   b) CO is poisonous
       The activation energy for the reaction,
   c) $2NO + O_2 \rightarrow 2NO_2$ is less than
       $2CO + O_2 \rightarrow 2CO_2$
   d) None of the above

4. The rate of first order reaction is $1.5 \times 10^{-2} mol\ L^{-1} min^{-1}$ at 0.5 M concentration of the reactant. The half-life of reaction is
   a) 0.383 min   b) 23.1 min   c) 8.73 min   d) 7.53 min

5. The rate constant of a first order reaction at 27°C is 10^{-3} min^{-1}. The temperature coefficient of this reaction is 2. What is the rate constant (in min^{-1}) at 17°C for this reaction?
   a) 10^{-3} b) 5×10^{-4} c) 2×10^{-3} d) 10^{-2}

6. The minimum energy required for the reacting molecules to undergo reaction is
   a) Potential energy
   b) Kinetic energy
   c) Thermal energy
   d) Activation energy

7. The decomposition of N_2O_5 occur as $2N_2O_5 \rightarrow 4NO_2 + O_2$, and follows Ist order kinetics, hance
   a) The reaction is unimolecular   b) The reaction is bimolecular
   c) $t_{1/2} \propto a^0$ d) None of the above

8. The rate of a chemical reaction doubles for every 10°C rise of temperature. If the temperature is raised by 50°C, the rate of the reaction increases by about
   a) 10 times   b) 24 times   c) 32 times   d) 64 times

9. Which of the following statement is incorrect about the molecularity of a reaction?
   a) Molecularity of a reaction is the number of molecules of the reactants presents in the balanced equation
   b) Molecularity of a reaction is the number of molecules in the slowest step
   c) Molecularity is always a whole number
   d) There is no difference between order and molecularity of a reaction

10. For a reaction $A + B \longrightarrow$ Products, the rate of the reaction was doubled when the concentration of A was doubled. When the concentration of A and B were doubled, the rate was again doubled, the order of the reaction with respect to A and B are:
    a) 1, 1   b) 2, 0   c) 1, 0   d) 0, 1

11. An exothermic chemical reaction occurs in two steps as follows
    (I) $A + B \rightarrow X$ (fast)
    (II) $X \rightarrow AB$ (slow)
    The progress of the reaction can be best represented by

        d) All are correct

12. According to the Arrhenius equation a straight line is to be obtained by plotting the logarithm of the rate constant of a chemical reaction (log k) against
    a) T b) $\log T$ c) $\dfrac{1}{T}$ d) $\log\dfrac{1}{T}$

13. The rate constant is numerically the same for three reactions of first, second and third order respectively. Which one is true for rate of three reaction?
    a) $r_1 = r_2 = r_3$ b) $r_1 > r_2 > r_3$ c) $r_1 < r_2 < r_3$ d) All of these

14. Mathematical expression for $t_{1/4}$ i.e., when (1/4)th reaction is over following first order kinetics can be given by

a) $t_{1/2} = \dfrac{2.303}{k} \log 4$ b) $t_{1/2} = \dfrac{2.303}{k} \log 2$ c) $t_{1/2} = \dfrac{2.303}{k} \log \dfrac{4}{3}$ d) $t_{1/2} = \dfrac{2.303}{k} \log \dfrac{3}{4}$

15. The rate of reaction:

    $2NO + Cl_2 \rightarrow 2NOCl$ is given by the rate, equation rate $= k[NO]^2[Cl_2]$. The value of the rate constant can be increased by:

    a) Increasing the temperature

    b) Increasing the concentration of NO

    c) Increasing the concentration of the Cl_2

    d) Doing all of these

16. A reaction was observed for 15 days and the percentage of the reactant remaining after the days indicated was recorded in the following table.
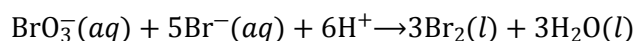
Time (days)	% Reactant remaining
0	100
2	50
4	39
6	25
8	21
10	18
12	15
14	12.5
15	10

    Which one of following best describes the order and the half-life of the reaction?

    Reaction order   Half-life (days)

    a) First   2   b) First   6

    c) Second   2   d) Zero   6

17. In the reaction

    $BrO_3^-(aq) + 5Br^-(aq) + 6H^+ \rightarrow 3Br_2(l) + 3H_2O(l)$

    The rate of appearance of bromine (Br_2) is related to rate of disappearance of bromide ions as following:

    a) $\dfrac{d(Br_2)}{dt} = \dfrac{3}{5}\dfrac{d(Br^-)}{dt}$ b) $\dfrac{d(Br_2)}{dt} = -\dfrac{3}{5}\dfrac{d(Br^-)}{dt}$ c) $\dfrac{d(Br_2)}{dt} = -\dfrac{5}{3}\dfrac{d(Br^-)}{dt}$ d) $\dfrac{d(Br_2)}{dt} = \dfrac{5}{3}\dfrac{d(Br^-)}{dt}$

18. Which one of the following is a second order reaction?

    a) $H_2 + Br_2 \rightarrow 2HBr$ b) $NH_4NO_3 \rightarrow N_2 + 3H_2O$

    c) $H_2 + Cl_2 \xrightarrow{\text{Sunlight}} 2HCl$ d) $CH_3COOCH_3 + NaOH \rightarrow CH_3COONa + H_2O$

19. The temperature coefficient of most of the reactions lies between

    a) 1 and 3   b) 2 and 3   c) 1 and 4   d) 2 and 4

20. In respect of the equation $k = Ae^{-E_a/RT}$ in chemical kinetics, which one of the statement is correct?

a) R is Rydberg constant

b) K is equilibrium constant

c) E_a is energy of activation

d) A is adsorption factor