INDIAN SCHOOL NIZWA - WORKSHEET

CHEMISTRY

CH: 4 KINETICS CLASS: XII

1. Define the following for a chemical reaction. a) order b) half life c) pseudo first order reaction d) effective collision f) threshold energy.
2. A first order reaction has a specific reaction rate of 10 -3/s. How long will it take for 10 g of the reactant to be reduced to 2.5 g?
3. For the reaction A $\longrightarrow$ B the rate of reaction becomes 3 times when the concentration of A is increased 27 times. What is the order of reaction?
4. For the reaction 2 H_2 + 2NO $\longrightarrow$ N_2 + 2H_2O, the rate law is expressed as rate k = [H_2] [NO_2] ^{2}. Write the overall order of reaction.
5. For a reaction X_2 + 2Y_2 $\longrightarrow$ 2XY_2 , write the rate equation in terms of rate of disappearance of Y_2.
6. The decomposition reaction 4PH_3 P_4 +6H_2 has the rate law R= k[PH_3]. Rate constant is 6x 10 $^{-4}$/s at 27 ^{0} C. Ea = 3.05 x 10 ^{5} J/mole. Find the rate constant at 37^{0}C ?
7. The following data were obtained at 300K for the reaction,2A + B C + D.

Expt. No.	[A]	[B]	Rate of formation of D
1	0.1	0.1	5.0 x10-3
2.	0.3	0.2	6 x 10-2
3.	0.3	0.4	2.4 x 10-1
4.	0.4	0.1	2.0 x 10-2

Calculate the rate of formation of D when [A] = 0.5 mol/lit and [B] = 0.2 mol/lit.

8. The half life of a reaction N_2O_5 → 2 NO2 + ½ O_2 is 2.4 hrs.
   a) Starting with 100 g of N_2O_5 , how much would remain after a period of 9.6 hrs?
   b) What time would be required to reduce 10 ^{5} molecules of N_2O_5 to 10 ^{3} molecules?
9. List the factors that influence the rate of a reaction.
10. According to Arrhenius, rate of a reaction increases with increase in temperature.Explain.
11. The half life a reaction is 50 minutes. What will be order of reaction if the reaction goes to completeion in 100 minutes?

12. The reaction C_2H_5I C_2H_4 + HI is of first order and has rate constants are 3.2 x 10-4 /s at 600K and 1.6 x 10 -2 /s at 1200K. Calculate the energy of activation of the reaction.
13. The decomposition of hydrocarbons follows k = 4.5 x 10^{11}/s e- $^{28000k/T}$, calculate Ea.
14. Distinguish between order and molecularity.
15. What is the effect of temperature on activation energy?
16. In some cases it is found that a large number of colliding molecules have energy more than threshold value, yet the reaction is slow. Why?
17. Is there any reaction for which reaction rate does not decrease with time?
18. Why is it that the rate of an instantaneous reaction does not change when a part of reaction mixture is taken out from it?
19. State any one condition under which a bimolecular reaction may be kinetically first order.
20. What is the effect of catalyst on reaction rate and activation energy?
21. A first order reaction is 20 % complete in 20 minutes. Calculate the time taken for the reaction to complete 80%.
22. The activation energy of a reaction is 94.14 kj/mol and the value of rate constant at 313 K is 1.8 x 10^{-5} s^{-1}.Calculate the frequency factor.
23. For a reaction energy of activation is zero. What is the value of Arrhenius constant at 300 K if k =1.6 x 10^{6} s^{-1}?