INDIAN SCHOOL NIZWA - WORKSHEET

CHEMISTRY

CHAPTER: 4 Chemical Kinetics

Name: _____ Date:_____ Class: XII Sec: ___

Choose the correct answer

1. For the reaction X + 2Y P, the differential form equation of the rate law is : (2024)
   (A) 2d[P] /dt = d[Y]/ dt (B) -d[P] /dt =-d[X]/dt (C) +d[X]/ dt = -d[p]/ dt (D) - 2d[Y]/dt= +dP/dt
2. In the Arrhenius equation, when log k is plotted against 1/T, a straight line is obtained whose :

A) slope is A/ R and intercept is Ea. B) slope is A and intercept is- E_a/ R
   C) slope is -E a/ RT and intercept is log A. D) slope is –Ea/2.303R and intercept is log A.

3. For a chemical reaction, A → B, it was observed that the rate of reaction doubles when the concentration of A is increased four times. The order of the reaction is :
   a) 1 b) 2 c) ½ d) 1/3
4. Given below is the decomposition of hydrogen peroxide in alkaline medium, which is catalysed by iodide ions :

$$2H_2O_2 \xrightarrow[\text{alkaline medium}]{I^-} 2H_2O + O_2$$

The above reaction takes place in two steps :

Step I : $H_2O_2 + I^- \longrightarrow H_2O + IO^-$ (slow)

Step II : $H_2O_2 + IO^- \longrightarrow H_2O + I^- + O_2$

Molecularity of Step I and Step II is :

(a) **Step I – 2, Step II – 2**

(b) **Step I – 1, Step II – 2**

(c) **Step I – 2, Step II – 1**

(d) **Step I – 3, Step II – 1**

5. For the reaction A+2B → C+D, the order of the reaction with respect to A &B are
   A) 1 with respect to A and 2 with respect to B
   B) 2 with respect to A and 1 with respect to B
   C) Order can't be predicted as it is an experimental quantity.
   D) 3

Answer the following

1.	For the reaction P → Q the rate of reaction becomes 2 times when the concentration of A is increased 8 times. What is the order of reaction?
2.	$X_2 + 3Y_2 \rightarrow 2XY_3$. Write the rate equation in terms of disappearance of Y_2
3.	The reaction; 2N2O5 ----> 4NO2 + O2, shows an increase in concentration of NO2 by 20 x 10^{-3}mol/l in 5 second. Calculate (a) rate of appearance of NO2, (b) rate of reaction and (c) rate of disappearance of N2O5.
4.	A first order reaction is 60% complete in 20 minutes. Calculate the time taken for the reaction to complete 84%.
5.	From the rate expression for the following reactions, determine their order of reaction and the dimensions of the rate constants. i) $3NO \rightarrow N_2O$ Rate $=K[NO]^2$ (ii) $H_2O_2(aq) + 3I^-(aq) + H^+ \rightarrow 2H_2O(l) + I_3^-$ Rate $= k[H_2O_2][I^-]$ (iii) $CH_3CHO(g) \rightarrow CH_4(g) + CO(g)$ Rate $= k[CH_3CHO]^{3/2}$ (iv) $C_2H_5Cl(g) \rightarrow C_2H_2(g) + HCl(g)$ Rate $= k[C_2H_5Cl]$
6.	A first order reaction takes 20 minutes for 25% decomposition. Calculate the time when 75% of the reaction will be completed. [Given : log 2 = 0.3010, log 3 = 0.4771, log 4 = 0.6021]
7.	The rate of a reaction triples when temperature changes from 27^0C to 37^0C. Calculate energy of activation for the reaction

8.

The following initial rate data were obtained for the reaction :

$2NO\,(g) + Br_2\,(g) \rightarrow 2NOBr\,(g)$

Expt. No.	[NO]/mol L^{-1}	[Br_2]/mol L^{-1}	Initial Rate (mol L^{-1} s^{-1})
1	0·05	0·05	$1{\cdot}0 \times 10^{-3}$
2	0·05	0·15	$3{\cdot}0 \times 10^{-3}$
3	0·15	0·05	$9{\cdot}0 \times 10^{-3}$

(a) What is the order with respect to NO and Br_2 in the reaction ?

(b) Calculate the rate constant (k).

(c) Determine the rate of reaction when concentration of NO and Br_2 are 0·4 M and 0·2 M, respectively. *1+1+1=3*

(2023)

8 Assertion Reason questions

a) Assertion &Reason are correct and reason is the correct explanation for assertion

b) Assertion &Reason are correct and reason is not the correct explanation for assertion

c) Assertion is true but reason is false

d) Assertion is false and reason is true

1. Assertion: The fastest elementary step in a complex reaction decides the rate of the reaction.

   Reason: The order can be zero

2. Assertion: Unit of rate constant is independent of order of reaction.

   Reason: The power of concentration terms in the rate equation keep changing with change in order.

3. Assertion: Reactions of higher order are rare

   Reason: The chances of multimolecular collision are extremely small.

4. Assertion (A) : The molecularity of the reaction H2 + Br2 2HBr appears to be 2. (2024)
   Reason (R) : Two molecules of the reactants are involved in the given elementary reaction.

5. Assertion (A) : Rate constant increases with increase in temperature.
   Reason (R) : Increasing the temperature of the substance increases the fraction of molecules, which collide with energies greater than activation energy. (2024)