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GENESIS TUTORIALS

Unit Test-Chemical Kinetics

1. For the reaction $2\ X_3 \rightarrow 3\ X_2$, the rate of formation of X_2 is:

   (a) $3(-d[X_3] / dt)$ (b) $\frac{1}{2}(-d[X_3] / dt)$

   (c) $\frac{1}{3}(-d[X_3] / dt)$ (d) $\frac{3}{2}(-d[X_3] / dt)$

2. For a reaction, $2A + B \rightarrow 3\ Z$, if the rate of consumption of A is 2×10^{-4} mole $dm^{-3}\ s^{-1}$, the rate of formation of Z (in mole $dm^{-3}\ s^{-1}$) will be-
   (a) 3×10^{-4} (b) 2×10^{-4} (c) $(4/3) \times 10^{-4}$ (d) 4×10^{-4}

3. If the rate laws are expressed in concentration unit mol dm^{-3}, the unit of the third order reaction rate constant is:

   (a) $dm^3\ mol^1\ sec^1$ (b) $dm^3\ mol^{-1}\ sec^{-1}$ (c) $dm^6\ mol^{-2}\ sec^{-1}$ (d) $dm^{-3}\ mol^1\ sec^{-1}$

4. For the reaction $2A+B \rightarrow C+2D$ which is first order in A and first order in B, the rate is given by

   (a) $k[A]^2\ [B]$ (b) $k[A][B]^2$ (c) $k[A]^2$ (d) $k[A][B]$

5. The value of the rate of constant for the gas phase reaction $2NO_2 + F_2 \rightarrow 2NO_2F$ is 38 $dm^3\ mol^{-1}\ sec^{-1}$ at 300K. The order of the reaction is:

   (a) 0 (b) 1 (c) 2 (d) 3

6. The rate expression for reaction A (g) +B (g) → C (g) is rate = k $[A]^{1/2}$ [B]. What changes in rate if initial concentration of A and B increase by factor 4 and 2 respectively?

   (a) 4 (b) 6 (c) 8 (d) 2

7. The unit of rate of reaction and rate constant are the same for a:

   (a) zero order reaction (b) first order reaction

   (c) second order reaction (d) third order reaction

8. For an elementary reaction $2A+B \rightarrow A_2B$ if the volume of vessel is quickly reduced to half of its original volume then rate of reaction will

   (a) Unchange (b) Increase four times

   (c) Increase eight times (d) Decrease eight times.

9. In the following reaction A→B+C, rate constant is 0.001 Ms^{-1}. If we start with 1 M of A then concenration of A and B after 10 minutes are respectively:

(a) 0.5M,0.5M (b) 0.6M,0.4M (c) 0.4M,0.6M (d) None of these

10. Half-life ($t_{1/2}$) and completion time (T) of the given reaction are:

3A→P, rate law = k

(a) 500min, 750min (b) 500sec, 750sec (c) 500sec, 1000sec (d) None of these

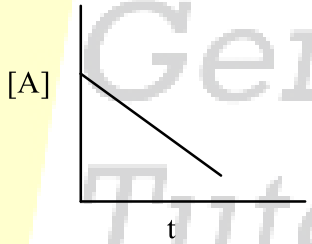
11. A first order reaction is 75% completed in 100 minutes. How long time will it take for its 87.5% completion?

(a) 125min (b) 150min (c) 175min (d) 200min

12. At 300K, the half-life of a sample of a gaseous compound initially at 1 atm is 100 sec. When the pressure is 0.5 atmp, the half-life is 50 sec. The order of reaction is:

(a) 0 (b) 1 (c) 2 (d) 3

13. The concentration of a reactant decreases linearly with time. What is the order of the reaction?



(a) 1st order (b) Fractional order (c) 2nd order (d) Zero order

14. The half life of any zero order reaction is

(a) Independent of concentration (b) Proportional to inverse of concentration

(c) Proportional to concentration (d) Proportional to square of the concentration.

15. The method of Initial rates is used to measure the rate law for the reaction given below:

$$2NO_{(g)} + 2H_{2(g)} \rightarrow N_{2(g)} + 2H_2O_{(g)}$$

The following initial rates are determined. P_A denotes the partial pressure of species A.

P_{NO} (Torr)	P_{H2} (Torr)	Initial rate (Torr/s)
200	400	0.46
400	200	0.92
400	400	1.85

These data imply which of the following rate laws

(a) Rate = K P_{NO} (b) Rate = K P_{NO}^2. P_{H2}

(c) Rate = K P_{NO} P_{H2}^2 (d) Rate = K P_{NO}^2 P_{H2}^2

16. The plot of ln k versus $\frac{1}{T}$ is linear with slope of

(a) $-\frac{E_a}{R}$ (b) $\frac{E_a}{R}$ (c) $\frac{E_a}{2.303R}$ (d) $-\frac{E_a}{2.303R}$

17. The temperature coefficient of a reaction is:

(a) The rate constant

(b) The rate constant at a fixed temperature.

(c) The ratio of rate constant at two temperature.

(d) The ratio of rate constant differing by 10°C preferably $\frac{k_{308K}}{k_{298K}}$

18. Which of the following statements is NOT correct for a catalyst?

(a) It increases the rate of a reaction.

(b) It is not consumed in the course of a reaction.

(c) It provides an alternative pathway for the reaction.

(d) It increases the activation energy of the reaction.

19. In the presence of a catalyst E_a is lowered by 2 kcal at 27°C. Hence, the rate will be increased by:

(a) 7 times (b) 14 times (c) 28 times (d) 56 times

20. The specific rate constant of decomposition of a compound is represented by-

$$\ln k = 5.0 - \frac{12000}{T}$$

The activation energy of decomposition for this compound at 300K is

(a) 24 Kcal/mole (b) 12 Kcal/mole (c) 24 cal/mole (d) 12 cal/mole