



Time: 2 hours

Chemistry

Marks: 50

(Chemical kinetics)

NAME OF THE STUDENT:- _____

DATE:- _____

INSTRUCTION – ATTEMPT ALL QUESTIONS

Q.1. For the chemical reaction,

$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$ the correct options is

- (a) $3 \frac{d[H_2]}{dt} = 2 \frac{d[NH_3]}{dt}$
- (b) $-\frac{3}{1} \frac{d[N_2]}{dt} = -\frac{2}{1} \frac{d[NH_3]}{dt}$
- (c) $-\frac{d[N_2]}{dt} = 2 \frac{d[NH_3]}{dt}$
- (d) $-\frac{d[N_2]}{dt} = \frac{1}{2} \frac{d[NH_3]}{dt}$

Q.2. The rate of the reaction : $2N_2O_5 \rightarrow 4NO_2 + O_2$ can be written in three ways.

$$-\frac{d[N_2O_5]}{dt} = k[N_2O_5] \quad -\frac{d[NO_2]}{dt} = k'[N_2O_5]; \quad \frac{d[O_2]}{dt} = k''[N_2O_5]$$

The relationship between k and k' and between k and k'' are

- (a) $K' = 2k, K'' = k$ (b) $k' = 2k, k'' = k/2$
- (c) $k' = 2k, k'' = 2k$ (d) $k' = k, k'' = k$

Q.3. For the reaction $N_2O_{5(g)} \rightarrow 2NO_{2(g)} + 1/2O_{2(g)}$ the value of rate of disappearance of N_2O_5 is given as $6.25 \times 10^{-3} \text{ mol L}^{-1}\text{s}^{-1}$. The rate of formation of NO_2 and O_2 is given respectively as:

- (a) $6.25 \times 10^{-3} \text{ mol L}^{-1}\text{s}^{-1}$ and $6.25 \times 10^{-3} \text{ mol L}^{-1}\text{s}^{-1}$
- (b) $1.25 \times 10^{-2} \text{ mol L}^{-1}\text{s}^{-1}$ and $3.125 \times 10^{-3} \text{ mol L}^{-1}\text{s}^{-1}$
- (c) $6.25 \times 10^{-3} \text{ mol L}^{-1}\text{s}^{-1}$ and $3.125 \times 10^{-3} \text{ mol L}^{-1}\text{s}^{-1}$
- (d) $1.25 \times 10^{-2} \text{ mol L}^{-1}\text{s}^{-1}$ and $6.25 \times 10^{-3} \text{ mol L}^{-1}\text{s}^{-1}$

- Q.4. For the reaction, $N_2 + 3H_2 \rightarrow 2NH_3$, if $\frac{d[NH_3]}{dt} = 2 \times 10^{-4} \text{ mol L}^{-1}\text{s}^{-1}$, the value of $\frac{-d[H_2]}{dt}$ would be
- (a) $4 \times 10^{-4} \text{ mol L}^{-1}\text{s}^{-1}$ (b) $6 \times 10^{-4} \text{ mol L}^{-1}\text{s}^{-1}$
- (c) $1 \times 10^{-4} \text{ mol L}^{-1}\text{s}^{-1}$ (d) $3 \times 10^{-4} \text{ mol L}^{-1}\text{s}^{-1}$

- Q.5. In the reaction

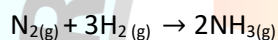


The rate of appearance of bromine (Br_2) is related to rate of disappearance of bromide ions as

(a) $\frac{d[\text{Br}_2]}{dt} = -\frac{5}{3} \frac{d[\text{Br}^-]}{dt}$ (b) $\frac{d[\text{Br}_2]}{dt} = \frac{5}{3} \frac{d[\text{Br}^-]}{dt}$

(c) $\frac{d[\text{Br}_2]}{dt} = \frac{3}{5} \frac{d[\text{Br}^-]}{dt}$ (d) $\frac{d[\text{Br}_2]}{dt} = -\frac{3}{5} \frac{d[\text{Br}^-]}{dt}$

- Q.6. Consider the reaction :



The equality relationship between

$\frac{d[NH_3]}{dt}$ and $-\frac{d[H_2]}{dt}$ is

(a) $\frac{d[NH_3]}{dt} = -\frac{d[H_2]}{dt}$

(b) $\frac{[NH_3]}{dt} = \frac{1}{3} \frac{d[H_2]}{dt}$

(c) $+\frac{d[NH_3]}{dt} = -\frac{2}{3} \frac{d[H_2]}{dt}$

(d) $+\frac{d[NH_3]}{dt} = -\frac{3}{2} \frac{d[H_2]}{dt}$

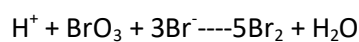
- Q.7. For the reaction, $2A + B \rightarrow 3C + D$, which of the following does not express the reaction rate?

(a) $-\frac{d[A]}{2dt}$ (b) $-\frac{d[C]}{3dt}$ (c) $-\frac{d[B]}{dt}$ (d) $\frac{d[D]}{dt}$

- Q.8. $3A \rightarrow 2B$, rate of reaction $\frac{+d[B]}{dt}$ is equal to

(a) $-\frac{3d[A]}{2dt}$ (b) $-\frac{2d[A]}{3dt}$ (c) $-\frac{1d[A]}{3dt}$ (d) $+2\frac{d[A]}{dt}$

Q.9. For the reaction



which of the following relations correctly represents the consumption and formation of products?

(a) $\frac{d[\text{Br}^-]}{dt} = -\frac{3d[\text{Br}_2]}{5dt}$

(b) $\frac{d[\text{Br}^-]}{dt} = -\frac{3d[\text{Br}_2]}{5dt}$

(c) $\frac{d[\text{Br}^-]}{dt} = -\frac{5d[\text{Br}_2]}{3dt}$

(d) $\frac{d[\text{Br}^-]}{dt} = -\frac{5d[\text{Br}_2]}{3dt}$

Q.10. For the reaction $\text{H}_{2(g)} + \text{I}_{2(g)} \rightarrow 2\text{HI}_{(g)}$, the rate of reaction is expressed as

(a) $\frac{\Delta[\text{H}_2]}{\Delta t} = \frac{1}{2} \frac{\Delta[\text{I}_2]}{\Delta t} = -\frac{\Delta[\text{HI}]}{\Delta t}$

(b) $-\frac{\Delta[\text{I}_2]}{\Delta t} = -\frac{\Delta[\text{H}_2]}{\Delta t} = \frac{1}{2} \frac{\Delta[\text{HI}]}{\Delta t}$

(c) $\frac{\Delta[\text{I}_2]}{\Delta t} = \frac{\Delta[\text{H}_2]}{\Delta t} = \frac{\Delta[\text{HI}]}{2\Delta t}$

(d) none of these.



