

# ETERNAL CAREER CLASSES

SUBJECT : CHEMISTRY

CLASS : XII

FULL MARKS : 20

NAME : .....

BOARD TEST : 09

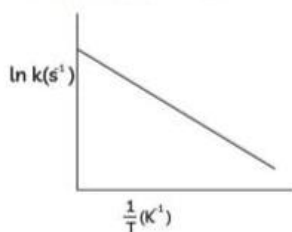
DATE : 13.12.2024

## SECTION - A

Single answer type question. Attempt any seven question :-

Marks :  $1 \times 7 = 7$

1. If the initial concentration of substance  $A$  is  $1.5M$  and after 120 seconds the concentration of substance  $A$  is  $0.75M$ , the rate constant for the reaction if it follows zero - order kinetics is:  
(a)  $0.00625 \text{ mol L}^{-1} \text{ s}^{-1}$       (b)  $0.00625 \text{ s}^{-1}$   
(c)  $0.00578 \text{ mol L}^{-1} \text{ s}^{-1}$       (d)  $0.00578 \text{ s}^{-1}$
2. Which of the following statement is true?  
(a) Molecularity of reaction can be zero or a fraction.  
(b) Molecularity has no meaning for complex reactions.  
(c) Molecularity of a reaction is an experimental quantity.  
(d) Reactions with the molecularity three are very rare but are fast.
3. For the reaction,  $A + 2B \rightarrow AB_2$ , the order w.r.t. reactant  $A$  is 2 and w.r.t. reactant  $B$ . What will be change in rate of reaction if the concentration of  $A$  is doubled and  $B$  is halved?  
(a) increases four times    (b) decreases four times  
(c) increases two times    (d) no change
4. The slope in the plot of  $[R]$  vs. time for a zero order reaction is:  
(A)  $+k$     (B)  $-k$   
(C)  $-k$     (D)  $+k$
5. Which radioactive isotope would have the longer half-life 15O or 19O ?  
(Given rate constants for 15O and 19O are  $5.63 \times 10^{-3} \text{ s}^{-1}$  and  $k = 2.38 \times 10^{-2} \text{ s}^{-1}$  respectively.)  
(a) 15O      (b) 19O  
(c) Both will have the same half-life  
(d) None of the above, information given is insufficient.
6. Assertion (A): Molecularity of the reaction  $H_2 + Br_2 \rightarrow 2HBr$  appears to be 2  
Reason (R): Two molecules of the reactants are involved in the given elementary reaction.  
In the following question, a statement of assertion (A) followed by a statement of reason (R) is given.  
Choose the correct answer out of the following choices.  
(a) Both (A) and (R) are true and (R) is the correct explanation of (A).  
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).  
(c) (A) is true, but (R) is false.  
(d) (A) is false, but (R) is true
7. For a reaction  $2A \rightarrow 3B$ , rate of reaction  $-d[A]$   
 $dt$  is equal to:  
(A)  $+3 \frac{d[B]}{dt}$       (B)  $+\frac{2}{3} \frac{d[B]}{dt}$   
(C)  $+\frac{1}{3} \frac{d[B]}{dt}$     (D)  $+\frac{2}{3} \frac{d[B]}{dt}$
8. Arrhenius equation can be represented graphically as follows :



The (i) intercept and (ii) slope of the graph are :

(a)	(i) $\ln A$	(i) $E_a/R$
(b)	(i) $A$	(ii) $E_a$
(c)	(i) $\ln A$	(iii) $-E_a/R$
(d)	(i) $A$	(iv) $-E_a$

9. If the concentration of material X is doubled and that of Y is halved, how many times will the rate of the elementary reaction  $3X + Y = X_2Y$  change?  
 a)  $r_2 = 4.5r_1$       b)  $r_2 = 5r_1$   
 c)  $r_2 = 2r_1$       d)  $r_2 = 4r_1$
10. The chemical reaction,  $2O_3 \rightarrow 3O_2$  Proceeds as  
 $O_3 \rightleftharpoons O_2 + |O|$  (fast)  
 $|O| + O_3 \rightarrow 2O_2$  (slow)  
 The rate law expression will be  
 (a) Rate =  $k [O] [O_3]$   
 (b) Rate =  $k [O_3]^2 [O_2]^{-1}$   
 (c) Rate =  $k [O_3]^2$   
 (d) Rate =  $k [O_2] [O]$

### SECTION - B

**Short answer type question. Attempt any one question :-**

**Marks :  $1 \times 3 = 3$**

11. How will the rate of reaction be affected when:  
 (A) surface area of the reactant is reduced,  
 (B) temperature of the reaction is increased, and  
 (C) catalyst is added in a reversible reaction?
12. A first order reaction is 50% complete in 30 minutes at 300 K and in 100 minutes at 320K. Calculate activation energy ( $E_a$ ) for the reaction. [ $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$ ] [Given:  $\log 2 = 0.3010$ ,  $\log 3 = 0.4771$ ,  $\log 4 = 0.6021$ ]

**Long answer type question. Attempt any two question :-**

**Marks :  $2 \times 5 = 10$**

13. A. The rate of a reaction becomes four times when the temperature changes from 293 K to 313 K. Calculate the energy of activation ( $E_a$ ) of the reaction assuming that it does not change with temperature.  
 [ $R = 8.134 \text{ J K}^{-1} \text{ mol}^{-1}$ ,  $\log 4 = 0.6021$ ]  
 B. Write the slope value obtained in the plot of  $\ln [R]$  vs time for a first order reaction.
14. 1. Define half-life of a reaction. Write the expression of half-life for:  
 (A) zero order reaction and  
 (B) first order reaction.  
 2. Draw the plot of  $\ln k$  vs  $1/T$  for a chemical reaction. What does the intercept represent? What is the relation between slope and  $E$ ?
15. 1. Explain how and why will the rate of reaction for a given reaction be affected when:  
 (A) a catalyst is added  
 (B) the temperature at which the reaction was taking place is decreased.  
 2. Define the type of a reaction in which a bimolecular reaction becomes first order reaction, by stating the condition.  
 3. Define "half-life" period of a reaction.

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