

## CHEMISTRY

### BOOKS - IIT-JEE PREVIOUS YEAR (CHEMISTRY)

#### CHEMICAL KINETICS

##### Jee Main And Advanced

1. Two reactions  $R_1$  and  $R_2$  have identical pre - exponential factors. Activations energy of  $R_1$  exceeds that of  $R_2$  by  $10 \text{ kJ mol}^{-1}$ . If  $k_1$  and  $k_2$  are rate constants for reactions  $R_1$  and  $R_2$  respectively at  $300\text{k}$ , then  $\ln \left( \frac{k_2}{k_1} \right)$  is equal to  $(R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1})$

A. 8

B. 12

C. 6

D. 4

Answer: d



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2. Decomposition of  $H_2O_2$  follows a first order reaction. In 50 min the concentration of  $H_2O_2$  decreases from 0.5 to 0.125 M in one such decomposition. When the concentration of  $H_2O_2$  reaches 0.05 M, the rate of formation of  $O_2$  will be

A.  $6.93 \times 10^{-4} \text{ mol min}^{-1}$

B.  $2.66 \text{ L min}^{-1} \text{ at STP}$

C.  $1.34 \times 10^{-2} \text{ mol min}^{-1}$

D.  $6.93 \times 10^{-2} \text{ mol min}^{-1}$

Answer: a



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3. Higher order (  $> 3$  ) reaction are rare due to :

- A. low probability id simultanceoues of all the reacting
- B. increase in entropy and activation energy as more molecules are involved
- C. shifting of equilibrium towards reactants due to elastic collisions
- D. loss of active species on cillision

**Answer: a**

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4. For the elementary reaction  $M \rightarrow N$ , the rate of disappearance of  $M$  increases by a factor of 8 upon doubling the concentration of  $M$ . The order of the reaction will respect to  $M$  is

- A. 4
- B. 3

C. 2

D. 1

**Answer: b**



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5. For the non-stoichiometric reaction  $2A + B \rightarrow C + D$

The following kinetic data were obtained in three separate experiments,

all at  $98K$

Initial concentration (A)	Initial concentration (B)	Initial rate of formation of C
$0.1M$	$0.1M$	$1.2 \times 10^{-3}$
$0.1M$	$0.2M$	$1.2 \times 10^{-3}$
$0.2M$	$0.1M$	$2.4 \times 10^{-3}$

The rate law for the formation of  $C$  is:

A.  $\frac{dC}{dt} = K[A][B]$

B.  $\frac{dC}{dt} = K[A]^2[B]$

C.  $\frac{dC}{dt} = K[A][B]^2$

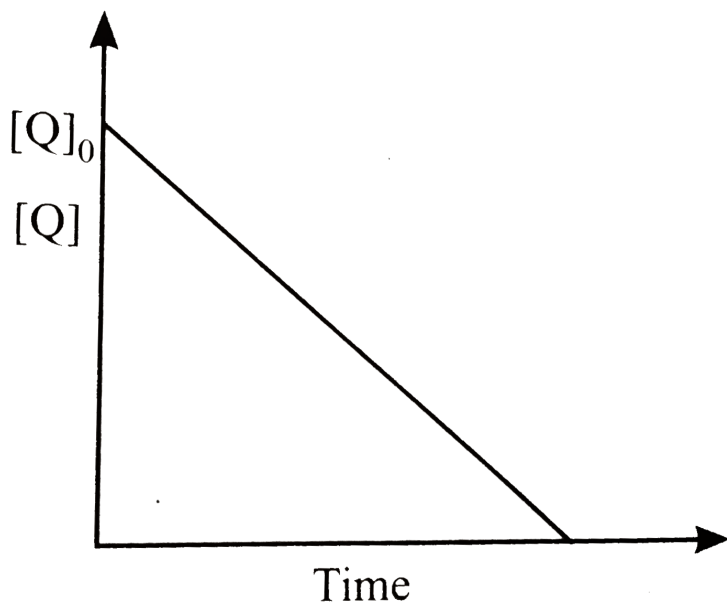
D.  $\frac{dC}{dt} = K[A]$

Answer: d

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6. In the reaction,  $P + Q \rightarrow R + S$

the time taken for 75 % reaction of  $P$  is twice the time taken for 50 % reaction of  $P$ . The concentration of  $Q$  varies with reaction time as shown in the figure. The overall order of the reaction is



A. 2

B. 3

C. 0

D. 1

**Answer: d**

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7. The rate of a reaction doubles when its temperature changes from  $300K$  to  $310K$ . Activation energy of such a reaction will be:

( $R = 8.314JK^{-1}mol^{-1}$  and  $\log 2 = 0.301$ )

A.  $53.6kJmol^{-1}$

B.  $48.6kJmol^{-1}$

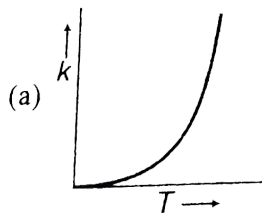
C.  $58.5kJmol^{-1}$

D.  $60.5kJmol^{-1}$

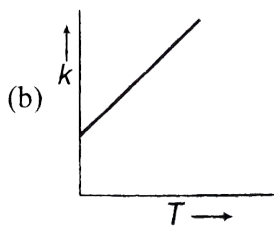
**Answer: a**

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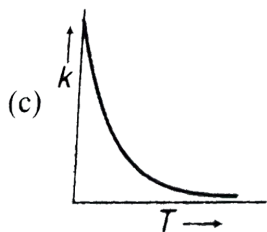
8. Plots showing the variation of the rate constant ( $k$ ) with temperature ( $T$ ) are given below. The plot that follows the Arrhenius equation is



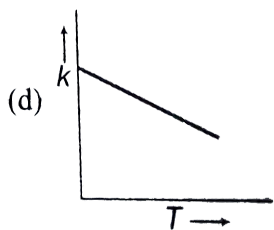
A.



B.



C.



D.

Answer: a



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9. For a first order reaction  $A \rightarrow P$ , the temperature ( $T$ ) dependent rate constant ( $k$ ) was found to follow the equation  $\log k = -2000(1/T) + 6.0$ . The pre-exponential factor  $A$  and the activation energy  $E_a$ , respective, are

- A.  $1.0 \times 10^6 s^{-1}$  and  $9.2 kJ mol^{-1}$
- B.  $6.0 s^{-1}$  and  $16.6 kJ mol^{-1}$
- C.  $1.0 \times 10^6 s^{-1}$  and  $16.6 kJ mol^{-1}$
- D.  $1.0 \times 10^6 s^{-1}$  and  $38.3 kJ mol^{-1}$

Answer: d



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10. Under the same reaction conditions, the initial concentration of  $1.386 mol dm^{-3}$  of a substance becomes half in 40s and 20s through first



order and zero order kinetics, respectively.

The ratio ( $k_1/k_0$ ) of the rate constants for first order ( $k_1$ ) and zero order ( $k_0$ ) of the reaction is

A.  $0.5 \text{ mol}^{-1} \text{ dm}^3$

B.  $1.0 \text{ mol} \text{ dm}^{-3}$

C.  $1.5 \text{ mol} \text{ dm}^{-3}$

D.  $1.5 \text{ mol}^{-1} \text{ dm}^3$

**Answer: a**



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**11.** Consider a reaction  $aG + bH \rightarrow$  Products. When concentration of both the reactants  $G$  and  $H$  is doubled, the rate increases eight times. However, when the concentration of  $G$  is doubled, keeping the concentration of  $H$  fixed, the rate is doubled. The overall order of reaction is

A. 0

B. 1

C. 2

D. 3

**Answer: d**



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**12.** which one of the following statements (s) is incorrect about order of reduction?

A. Order of reaction is determined experimentally

B. Order of reaction is equal to sum of the power of concentration terms in differential rate law

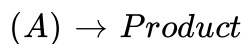
C. It is not affected with stoichiometric coefficient of the reactants

D. Order cannot be fractional

**Answer: d**

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**13.** A follows first order reaction.



The concentration of  $A$  changes from  $0.1M$  to  $0.025M$  in  $40 \text{ min}$ . Find the rate of reaction of  $A$  when the concentration of  $A$  is  $0.01M$ .

A.  $3.47 \times 10^{-4} M \text{ min}^{-1}$

B.  $3.47 \times 10^{-5} M \text{ min}^{-1}$

C.  $1.73 \times 10^{-4} M \text{ min}^{-1}$

D.  $1.73 \times 10^{-5} M \text{ min}^{-1}$

**Answer: a**

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14. In a first order reaction, the concentration of the reactant decreases from  $800\text{mol dm}^{-3}$  to  $50\text{mol dm}^{-3}$  in  $2 \times 10^4\text{s}$ . The rate constant of the reaction (in  $\text{s}^{-1}$ ) is

A.  $2 \times 10^4$

B.  $3.45 \times 10^{-5}$

C.  $1.386 \times 10^{-4}$

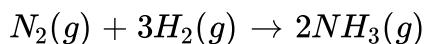
D.  $2 \times 10^{-4}$

**Answer: c**



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15. Consider the chemical reaction



The rate of this reaction can be expressed in terms of time derivatives of the concentration of  $\text{N}_2(g)$ ,  $\text{H}_2(g)$ , or  $\text{NH}_3(g)$ . Identify the correct relationship among the rate expressions.

$$\text{A. Rate} = -\frac{d[\text{N}_2]}{dt} = -\frac{1}{3}\frac{d[\text{H}_2]}{dt} = \frac{1}{2}\frac{d[\text{NH}_3]}{dt}$$

$$\text{B. Rate} = -\frac{d[\text{N}_2]}{dt} = -3\frac{d[\text{H}_2]}{dt} = 2\frac{d[\text{NH}_3]}{dt}$$

$$\text{C. Rate} = -\frac{d[\text{N}_2]}{dt} = \frac{1}{3}\frac{d[\text{H}_2]}{dt} = \frac{1}{2}\frac{d[\text{NH}_3]}{dt}$$

$$\text{D. Rate} = -\frac{d[\text{N}_2]}{dt} = -\frac{d[\text{H}_2]}{dt} = \frac{d[\text{NH}_3]}{dt}$$

Answer: a



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16. If  $I$  is the intensity of an absorbed light and  $c$  is the concentration of  $AB$  for the photochemical process.  $AB + h\nu \rightarrow AB^*$ , the rate of formation of  $AB^*$  is directly proportional to

A.  $C$

B.  $I$

C.  $I_2$

D.  $C \cdot I$

**Answer: d**

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17. The rate constant for the reaction,  $2N_2O_5 \rightarrow 4NO_2 + O_2$  is  $3.0 \times 10^{-5} s^{-1}$ . If the rate is  $2.40 \times 10^{-5} molL^{-1} s^{-1}$ , then the initial concentration of  $N_2O_5$  (in  $molL^{-1}$ ) is

A. 1.4

B. 1.2

C. 0.04

D. 0.8

**Answer: d**

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18. The half – life period of a radioactive element is 140 days. After 560 days, one gram of the element will reduce to

A.  $\frac{1}{2}(g)$

B.  $\frac{1}{4}(g)$

C.  $\frac{1}{8}(g)$

D.  $\frac{1}{16}(g)$

**Answer: d**



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19. A catalyst is a substance which

A. increases the equilibrium concentration of the product

B. changes the equilibrium constant of the reaction

C. shortens the time to reach equilibrium

D. supplies energy to the reaction

**Answer: c**



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**20.** The specific rate constant of a first order reaction depends on the

- A. concentration of the reactant
- B. concentration of the product
- C. time
- D. temperature

**Answer: d**



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**21.** The rate constant of a reaction depends on

- A. temperature



B. initial concentration of the reactants

C. time of reaction

D. extent of reaction

**Answer: a**



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**22. According to the Arrhenius equations**

A. a high activation energy usually implies a fast reaction

B. rate constant increases with increase in temperature. This is due to a greater number of collisions whose energy exceeds the activation energy

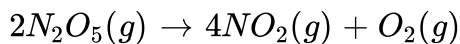
C. higher the magnitude of activation energy. Stronger is the temperature dependence of the rate constant

D. the pre- exponential factor is a measure of the rate at which collisions occur, irrespective of their energy collisions occur, irrespective of their energy

**Answer: b,c,d**

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**23.** For the first order reaction



- A. the concentration of the reactant decreases exponentially with time
- B. the half - life of the reaction decreases with increasing
- C. the half- life of the reaction decreases with increasing temperature
- D. the half - life of the reaction depends on the initial concentration of the reactant

**Answer: a,b,d**

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24. the following statement (s) is are correct

A. A plot of  $\log K_p$  vs  $\frac{1}{p}$  is linear

B. A plot of  $\log [X]$  vs time is linear for a first order reaction ,  $X \rightarrow P$

C. A plot of  $\log p$  vs  $\frac{1}{T}$  is linear at constant volume

D. A plot of  $p$  vs  $\frac{1}{V}$  is linear at constant temperature

Answer: a,b,d

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25. A catalyst

A. increases the average kinetic energy of reacting molecules

B. decreases the activation energy

C. alters the reaction mechanism

D. increases the frequency of collisions of reacting species

**Answer: b,c**



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**26.** What should be the age of fossil for meaningful determination of its age?

A. 6yr

B. 6000 yr

C. 60,000 yr

D. It can be used to calculate any age

**Answer: b**



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27. A nuclear explosion has taken place leading to increase in concentration of  $C^{14}$  in nearby areas.  $C^{14}$  concentration is  $C_1$  in nearby areas and  $C_2$  in areas far away. If the age of the fossil is determined to be  $T_1$  and  $T_2$  at the places respectively then

A. the age of fossil will increase at the place where explosion has

taken place and  $T_1 - T_2 = \frac{1}{\lambda} \ln \frac{C_1}{C_2}$

B. the age of fossil will decrease at the place where explosion has

taken place and  $T_1 - T_2 = \frac{1}{\lambda} \ln \frac{C_1}{C_2}$

C. the age of fossil will be determined to be the same

D.  $\frac{T_1}{T_2} = \frac{C_1}{C_2}$

**Answer: a**



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28. In the Arrhenius equation,  $k = A \exp^{-E_a/RT}$ , A may be termed as the rate constant at..... .

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29. For the reaction  $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$ , under certain conditions of temperature and partial pressure of the reactants, the rate of formation of  $NH_3$  is  $0.001\text{kg h}^{-1}$ . The same rate of conversion of hydrogen under the same condition is..... $\text{kg h}^{-1}$ .

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30. The hydrolysis of ethyl acetate in..... medium is a.....order reaction.

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31. The rate of chemical change is directly proportional to .....

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32. For a first order reaction, the rate of the reaction doubles as the concentration of the reaction (S) doubles.

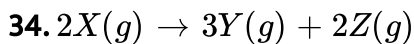
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33. An organic compound undergoes first decomposition. The time taken for its decomposition to  $1/8$  and  $1/10$  of its initial concentration are

$t_{1/8}$  and  $t_{1/10}$ , respectively. What is the value of  $\frac{[t_{1/8}]}{[t_{1/10}]} \times 10$ ?

( $\log_{10} 2 = 0.3$ )

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Time (in min)    0    100    200

Partial pressure of X (mm Hg)                      800    400    200

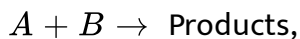
Assuming ideal gas condition, calculate

- (a) Order of reaction
- (b) Rate constant
- (c) Time taken for 75 % completion of reaction
- (d) Total pressure when  $p_x = 700\text{mm}$



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35. For the given reaction



the following data are given.



Initial concentration (mol L <sup>-1</sup> )		Initial rate (mol L <sup>-1</sup> s <sup>-1</sup> )
[A] <sub>0</sub>	[B] <sub>0</sub>	—
0.1	0.1	0.05
0.2	0.1	0.1
0.1	0.2	0.05

(a) Write the rate equation.

(b) Calculate the rate constant.

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36. The rate of first order reaction is  $0.04 \text{ mol L}^{-1} \text{ s}^{-1}$  at 10 min and  $0.03 \text{ mol L}^{-1} \text{ s}^{-1}$  at 20 min after initiation. Find the half life of the reaction.

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37. A hydrogenation reaction is carried out at  $500\text{K}$ . If the same reaction is carried out in the presence of a catalyst at the same rate, the

temperature required is  $400K$ . Calculate the activation energy of the reaction if the catalyst lowers the activation barrier by  $20kJmol^{-1}$ .

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**38.** The rate constant for an isomerization reaction,  $A \rightarrow B$  is  $4.5 \times 10^{-3} \text{ min}^{-1}$ . If the initial concentration of  $A$  is  $1M$ , calculate the rate of the reaction after  $1h$ .

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**39.** the rate constant of a reaction is  $1.5 \times 10^7 s^{-1}$  at  $50^\circ C$  and  $4.5 \times 10^7 s^{-1}$  at  $100^\circ C$ . Evaluate the Arrhenius parameters  $A$  and  $E^a$ .

(ii) for the reaction  $N_2O_5(g) \rightarrow 2NO_2(g) + \frac{1}{2}O_2(g)$

calculate the mole fractions  $N_2O_5(g)$  decomposed at a constant volume and temperature, if the initial pressure is  $600 \text{ mm Hg}$  and the pressure at any time is  $960 \text{ mm Hg}$ . Assume ideal gas behaviour.

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**40.** The rate constant for the first order decomposition of a certain reaction is described by the equation

$$\log k(s^{-1}) = 14.34 - \frac{1.25 \times 10^4 K}{T}$$

- (a) What is the energy of activation for the reaction?
- (b) At what temperature will its half-life period be 256 min ?

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**41.** One of the hazards of nuclear explosion is the generation of  $^{90}\text{Sr}$  and its subsequent incorporation in bones. This nuclide has a half-life of 28.1 year. Suppose one micro-gram was absorbed by a new-born child, how much  $\text{Sr}^{90}$  will remain in his bones after 20 year?

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42. At  $380^{\circ}\text{C}$ , the half-life period for the first order decomposition of  $\text{H}_2\text{O}_2$  is 360 min. The energy of activation of the reaction is  $200\text{kJmol}^{-1}$ . Calculate the time required for 75% decomposition at  $450^{\circ}\text{C}$ .

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43. form the following data for the reaction between  $A$  and  $B$ ,

[A] ( $\text{mol L}^{-1}$ )	[B] ( $\text{mol L}^{-1}$ )	Initial rate ( $\text{mol L}^{-1} \text{ s}^{-1}$ ) at	
		300 K	320 K
$2.5 \times 10^{-4}$	$3.0 \times 10^{-5}$	$5.0 \times 10^{-4}$	$2.0 \times 10^{-3}$
$5.0 \times 10^{-4}$	$6.0 \times 10^{-5}$	$4.0 \times 10^{-3}$	—
$1.0 \times 10^{-3}$	$6.0 \times 10^{-5}$	$1.6 \times 10^{-2}$	—

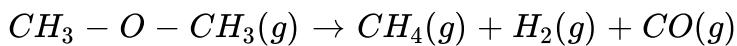
(a) Calculate the order of the reaction with respect to  $A$  and with respect to  $B$ .

(b) Calculate the rate constant at  $300\text{K}$ .

(c) Calculate the pre-exponential factor.

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44. The gas phase decomposition of dimethyl ether follows first order kinetics.



The reaction is carried out in a constant volume container at  $500^\circ C$  and has a half life of 14.5 min . Initially, only dimethyl ether is present at a pressure  $0.40 atm$ . What is the total pressure of the system after 12 min ? (Assume ideal gas behaviour)



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45. A first order reaction  $A \rightarrow B$  requires activation energy of  $70 kJ mol^{-1}$ . When a 20 % solution of  $A$  was kept at  $25^\circ C$  for 20 min , 25 % decomposition took place. What will be the percentage decomposition in the same time in a 30 % solution maintained at  $40^\circ C$  ? (Assume that activation energy remains constant in this range of temperature)



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46. Two reaction,  $(I)A \rightarrow \text{Products}$  and  $(II)B \rightarrow \text{Products}$ , follow first order kinetics. The rate of reaction  $(I)$  is doubled when the temperature is raised from  $300K$  to  $310K$ . The half life for this reaction at  $310K$  is  $30 \text{ min}$ . At the same temperature  $B$  decomposes twice as fast as  $A$ . If the energy of activation for reaction  $(II)$  is twice that of reaction  $(I)$ , (a) calculate the rate of constant of reaction  $(II)$  at  $300K$ .

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47. The nuclide ratio,  ${}^3_1H$  to  ${}^1_1H$  in a sample of water is  $8.0 \times 10^{-18} : 1$ . Tritium undergoes decay with a half-life period of  $12.3 \text{ yr}$ . How much tritium atoms would  $10.0 \text{ g}$  of such a sample contains  $40 \text{ year}$  after the original sample is collected?

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48. The decomposition of  $N_2O_5$  according to the equation

$$2N_2O_5(g) \rightarrow 4NO_2(g) + O_2(g)$$

is a first order reaction. After 30 min, from the start of the decomposition in a closed vessel, the total pressure developed is found to be  $284.5\text{mmHg}$ . On complete decomposition, the total pressure is  $584.5\text{mmHg}$ . Calculate the rate constant of the reaction.



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49. In an Arrhenius equation for a certain reaction, the values of  $A$  and  $E_a$  (energy of activation) are  $4 \times 10^{13}\text{s}^{-1}$  and  $98.6\text{KJmol}^{-1}$ , respectively. If the reaction is of first order, at what temperature will its half-life be 10 min.

- A.
- B.
- C.
- D.

**Answer: 311.34K**



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50. AN experiment requires minimum beta activity produced at the rate of 346 beta particles per minute. The half- life period of  $_{42}\text{Mo}^{99}$ , which is a beta emitter, is 66.6 h. Find the minimum amount of  $_{42}\text{Mo}^{99}$  required to carry out the experiment in 6.909 h.



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51. A first order gas reaction has  $k = 1.5 \times 10^{-6} \text{ s}^{-1}$  at  $200^\circ \text{C}$ . If the reaction is allowed to run for  $10h$ , what have changed in the Product? What is the half-life of this reaction?



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52. While studying the decomposition of gaseous  $\text{N}_2\text{O}_5$ , it is observed that a plot of logarithm of its partial pressure versus time is linear. What kinetic parameters can be obtained form this observation?





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**53.** Radioactive decay is a first – order process. Radioactive carbon in wood sample decays with a half – life of 5770 years. What is the rate constant ( in years ) for the decay ? What fraction would remains after 11540 years ?

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**54.** Calculating time required to complete a definite fraction of first order reaction : A first order reaction is 20 % complete in 10 minutes. Calculate the time taken for the reaction to go to 75 % completion.

Strategy : First calculate the rate constant (k) using first data and then calculate the required time to complete 75 % of the reaction by using the value of rate constant :

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55. Rate of a reaction  $A + B \rightarrow$  Product, is given as a function of different initial concentration of  $A$  and  $B$ .

$[A](molL^{-1})$	$(B)(molL^{-1})$	Initial rate $(molL^{-1} min^{-1})$
0.01	0.01	0.005
0.02	0.01	0.010
0.01	0.02	0.005

Determine the order of the reaction with respect to  $A$  and with respect to  $B$ . What is the half life of  $A$  in the reaction ?



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56. The activity of a radioactive isotope is 3000 count per minute at a certain time and 2736 count per minute after 48 h later. The half-life of this isotope is

A. 831 h

B. 521 h

C. 361 h

D. 1.44 h

**Answer:**

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57. For a reaction,  $A \rightarrow \text{Product}$ , half life measured for two different values of initial concentrations  $5 \times 10^{-3} M$  and  $25 \times 10^{-4} M$  are 1.0 and 8.0 h respectively. If the initial concentration is adjusted to  $1.25 \times 10^{-3} M$ , the new half-life would be

- A. 16 h
- B. 32 h
- C. 64 h
- D. 256 h

**Answer:**

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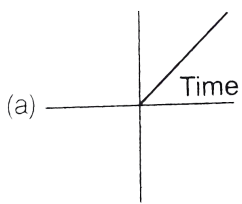
58. In a consecutive reaction :  $A \rightarrow B \rightarrow C$  starting with only A

- A. Concentration of B 1st increases and becomes constant after sometime
- B. Concentration of C increases in the beginning and then start decreasing
- C. Concentration of B attains a maxima and then start decreasing
- D. All of the species A, B and C are present at every stage of reaction

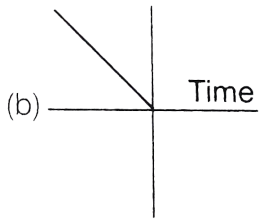
**Answer:**

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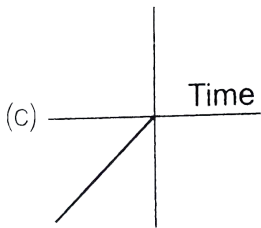
59. For a first order chemical reaction, which of the following describe the plot of logarithmic of friction of uncreated reactant vs time?



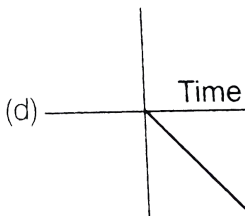
A.



B.



C.



D.

**Answer:**



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60. For a general  $n$ th order process,  $A \rightarrow P$  with initial concentration of reactant "a" and rate constant, the expression for time for 75 % completion of reaction is

A.  $\frac{1}{n-1} \left( \frac{2^{n-1} - 2}{a^{n-1}} \right)$

B.

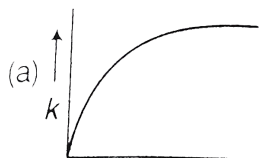
C.  $\frac{1}{n-2} \left( \frac{2^{2n-2} - 2}{a^{n-1}} \right)$

D.  $\frac{1}{n-2} \left( \frac{2^{2n-2} - 1}{a^{n-1}} \right)$

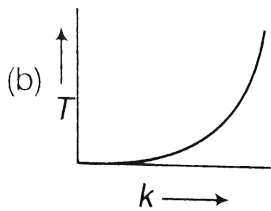
**Answer:**

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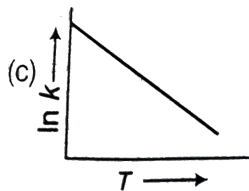
61. Which of the following is (are) correct for variation of rate constant with temperature?



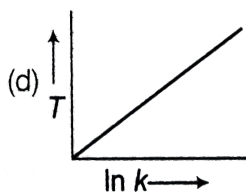
A.



B.



C.



D.

**Answer:**

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62. Which of the following is (are) true for the rate constant of a chemical reaction?

A. It depends only on temperature and catalyst

B. It always increase with temperature

C. It is linearly related to rate of a reaction

D. It is same for the both direction in a reversible reaction

**Answer:**

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**63.** Assertion : In a chemical reaction, rate of reaction always decreases with time.

Reason In a chemical reation, the amount of reactant remaining always decreases with time.

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**64.** Assertion: A catalyst increases the rate of a given reaction by greater factor if added at lower temperature than at higher temperature.

Reason Rate of reaction always increases on increasing temperature.



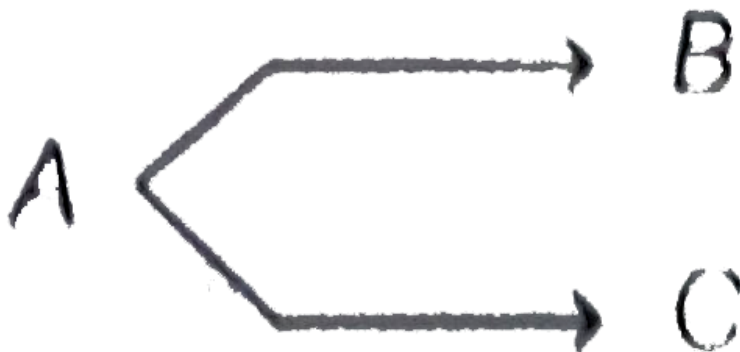
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65. Match the statements of Column I with values of Column II.

Column I		Column II	
A	Zero order reaction	p.	Rate of reaction increases with temperature
B	First order reaction	q.	Rate of reaction depends only on temperature and catalyst
C	Elementary reaction	r.	Half-life depends only on temperature and catalyst
D	Parallel reaction	s.	No reactive intermediates are involved
		t.	Products have a fixed molar ratio at a given temperature

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66. Consider the following parallel first order reactions:



Half-life of the overall decay of A is 2 yrs while half-life for the formation of B is 3yr. Half-life for the formation for C (in years) is :

Others

1. In a bimolecular reaction. The steric factor  $P$  was experimentally determined to be 4.5. the correct option(s) among the following is (are)

- A. The activation energy of the reaction is unaffected by the value of the steric factor.
- B. Experimentally determined value of frequency factor is higher than that predicated by Arrhenius equation
- C. The value of frequency factor predicated by Arrhenius equation is higher than that determined experimentally
- D. Since  $P = 4.5$ , the reaction will not proceed unless as effective catalyst is used

**Answer: a,c**



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2. For the first order reaction,

A. the degree of dissociations is equal to  $(1 - e^{-kt})$

B. a plot of reciprocal concentration of the reactant vs time gives a straight line

C. the time taken for the completion of 75% reaction is thrice the  $\frac{1}{2}$  of the reaction

D. the pre- exponential factor in the Arrhenius equation has the dimension of time,  $T^{-1}$

**Answer: a,d**



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3. which of the following option is correct?

- A. In living organisms, circulation of  $^{14}\text{C}$  from atmosphere is high so the carbon content is constant in organism
- B. Carbon dating can be used to find out the age of earth crust and rocks
- C. Radioactive absorption due to cosmic radiation is equal to the rate of radioactive decay, hence the carbon content remains constant in living organisms
- D. Carbon dating cannot be used to determine concentration of  $^{14}\text{C}$  in dead beings

**Answer: c**



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4. The concentration of R in the reaction  $R \rightarrow P$  was measured as a function of time and the following data is obtained:



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5.  $^{64}\text{Cu}$  (half - life = 12.8 h) decays by  $\beta$  emission (38%) ,  $\beta^+$  emission (19%) and electron capture (43%) Write the decay products and calculate partial half - lives for each of the decay processes.



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