2

IIT-JAM BIOTECHNOLOGY

CHEMICAL KINETICS & PHOTOCHEMISTRY

PART A: IIT-JAM PREVIOUS YEARS QUESTION

1. For a reaction $2A + B \rightarrow P$, by doubling the initial concentration of both the reactants the rate increases by a factor of 8, whereas by doubling the concentration of B alone the rate increases two times. The rate law for the reaction is **[JAM 2005]**

(a) $\frac{d[P]}{dt} = k[A][B]^2$ (b) $\frac{d[P]}{dt} = k[A][B]$

(c) $\frac{d[P]}{dt} = k[A]^2[B]$ (d) $\frac{d[P]}{dt} = k[A]^2[B]^0$

2. The hydrolysis of ethyl acetate by acetic acid produced in the reaction also catalyzes the reaction. If the initial concentration of ethyl acetate is 'a' and that of acetic acid is 'b' and 'x' is the amount of ethyl acetate hydrolyzed at time 't'. The rate of reaction will be **[JAM 2006]**

(a) $k(a+x)(b+x)$ (b) $k(a-x)(b+x)$

(c) $k(a-x)(b-x)$ (d) $k(a+x)(b-x)$

3. The rate equation for the reaction $2X + 3Y \rightarrow Z$ is $rate = k[X][Y]$. Consider the following statements

P: The unit of k is mol $L^{-1}s^{-1}$

Q: The value of k is independent of the initial concentrations of X and Y **[JAM 2007]**

R: By doubling the concentrations of both X and Y, the rate is doubled

Then, which one of the following is CORRECT?

(a) **P** is true, **Q** is false, **R** is false (b) **P** is true, **Q** is true, **R** is false

(c) **P** is false, **Q** is true, **R** is true (d) **P** is false, **Q** is true, **R** is false

4. A zero order reaction is 50% complete in 30 minutes. The time (in minutes) from the start of the reaction required for 80% completion is **[JAM 2007]**

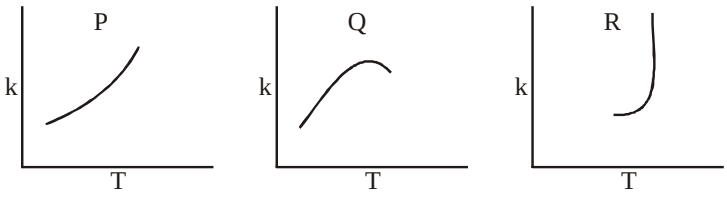
(a) 42 (b) 48 (c) 52 (d) 60

5. The rate of reaction (r) is expressed as, $r = k[A]^m[B]^n$. The rate constant (k) for this reaction is $2L^2\,mol^{-2}\,s^{-1}$. The possible values of m and n are **[JAM 2008]**

(a) 1 and 1 (b) 1 and 2

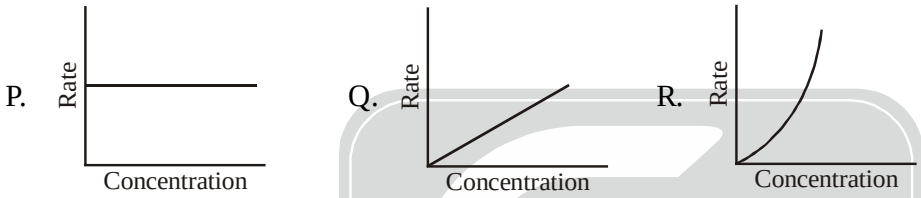
(c) 1 and 3 (d) 1 and 4

6. The graphs P, Q and R show the variation of rate constant (k) with temperature. The reactions represented by P, Q and R, respectively, are **[JAM 2009]**



(a) P-Arrhenius type, Q - an enzyme catalysed and R - a chain reaction
(b) P-an enzyme catalysed, Q-Arrhenius type and R- a chain reaction
(c) P-Arrhenius type, Q - a chain reaction and R - an enzyme catalysed reaction
(d) P-a chain reaction, Q - an enzyme catalysed and R - Arrhenius type reaction

7. The *correct* orders of the reactions deduced from the graphs given below, are **[JAM 2011]**



(a) P-First order, Q-Zero order, R-Half order
(b) P-Zero order, Q-First order, R-Second order
(c) P-Pseudo-first order, Q-Second order, R-Third order
(d) P-Second order, Q-First order, R-Zero order

8. For the reaction, $N_2O_4(g) \Leftrightarrow 2NO_2(g)$, taking place in a closed container at a constant temperature, the rate constant k in terms of P_0(pressure at time $t = 0$) and P_t (pressure at time t) is given by **[JAM 2012]**

(a) $\frac{1}{t}\ln\frac{P_0}{2P_0 - P_t}$ (b) $\frac{1}{t}\ln\frac{P_0}{P_t}$ (c) $\frac{1}{t}\ln\frac{P_0}{P_0 - P_t}$ (d) $\frac{1}{t}\ln\frac{P_0}{P_0 - 2P_t}$

9. For the reaction, $A \rightarrow product$, match the order of the reaction in Group I with their corresponding linear plots in Group II **[JAM 2012]**

Group I	**Group II**
P. Zero	**1.** ln[A] versus time
Q. First	**2.** 1/[A] versus time
R. Second	**3.** [A] versus time

(a) **P-1, Q-2, R-3** (b) **P-2, Q-1, R-3**
(c) **P-3, Q-1, R-2** (d) **P-1, Q-3, R-2**

10. For a single-enzyme-substrate reaction, the half-life of the enzyme can be calculated using the following expression, wherein k is the first order rate constant or deactivation constant **[JAM 2013]**

(a) $\frac{693}{k}$ (b) $\frac{2.3\log 2}{k}$ (c) $\frac{69.3}{k}$ (d) $\frac{2.3\ln 2}{k}$

11. For a reaction $aA + bB \rightarrow cC + dD$, the relation that holds is **[JAM 2014]**

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

(c) $\frac{1}{a}\frac{d[A]}{dt} = \frac{1}{b}\frac{d[B]}{dt} = \frac{1}{c}\frac{d[C]}{dt} = \frac{1}{d}\frac{d[D]}{dt}$ (d) $\frac{1}{a}\frac{d[A]}{dt} = \frac{1}{b}\frac{d[B]}{dt} = -\frac{1}{c}\frac{d[C]}{dt} = -\frac{1}{d}\frac{d[D]}{dt}$

12. The rate constant for the reaction $O(g) + O_3(g) \rightarrow 2O_2(g)$ is 8.0×10^{-15} cm^3 molecule^{-1} s^{-1}. The rate constant in dm^3 mol^{-1} s^{-1}, would be **[JAM 2015]**

(a) 4.8×10^{-6} (b) 4.8×10^{6} (c) 4.8×10^{-9} (d) 8.0×10^{6}

13. Match the equations in the left column with their names in the right column **[JAM 2016]**

(i) $\ln k = \ln A - \frac{E_a}{RT}$ (p) Kirchhoff's law

(ii) $\ln K = -\frac{\Delta_r H^0}{RT} + \frac{\Delta_r S^0}{R}$ (q) van't Hoff equation

(iii) $\Delta_r H_2 - \Delta_r H_1 = \Delta C_p (T_2 - T_1)$ (r) Clausius-Clapeyron equation

(iv) $\ln P = -\frac{\Delta \bar{H}}{RT} +$ constant (s) Arrhenius equation

(a) (i)-(s), (ii)-(r), (iii)-(p), (iv)-(q) (b) (i)-(p), (ii)-(q), (iii)-(r), (iv)-(s)

(c) (i)-(p), (ii)-(q), (iii)-(s), (iv)-(r) (d) (i)-(s), (ii)-(q), (iii)-(p), (iv)-(r)

14. For an autocatalytic second order reaction R → P, the rate law is **[JAM 2017]**
[where v is rate of the reaction and k is the rate constant]

(a) $v = k[R]$ (b) $v = k[R][P]$ (c) $v = k[R]^2$ (d) $v = k[P]^2$

15. The deactivation rate constant of an enzyme is 0.346h^{-1}. Assuming that the deactivation process follows first order kinetics, the half life of the enzyme in minutes is _____ **[JAM 2015]**

16. If a fossil that has been discovered recently contains 0.2% of the ^{14}C ($t_{1/2}$ = 5.730 years) that was present when the fossil was formed, then the age of the fossil in years is likely to fall in the range of

(a) 25,000-35,000 (b) 35,000-45,000 **[JAM 2019]**

(c) 45,000-55,000 (d) 55,000-65,000

17. The velocity of an enzyme-catalysed reaction following Michaelis-Menten kinetics, at the substrate concentration equal to $0.3 \times K_m$ is equal to _____ $\times V_{max}$ (round off to 2 decimal places). **[JAM 2019]**

18. In the second-order reaction $2A \rightarrow B$, the initial concentration of A is 1.0 M and after 30 minutes, the concentration A is 0.5 M. The rate constant of the reaction is _____ L/mol/h (round off to 2 decimal places) **[JAM 2019]**

19. In this system of two reaction $A \rightarrow 2B$ and $B \rightarrow 2C$, which of the following statements is/are TRUE at steady-state?

(a) The rate of consumption of A is four times the rate of production of C **[JAM 2019]**

(b) The rate of consumption of B is twice the rate of production of C

(c) The rate of production of B is the same as the rate of consumption B

(d) The rate of production of C is four times the rate of consumption of A

20. Which one of the following parameters changes upon doubling the enzyme concentration?

(a) K_M (b) V_{max} (c) K_{cat} (d) K_{eq} **[JAM 2019]**

21. In an enzyme catalyzed first-order reaction, the substrate conversion follows an exponential pattern such that 80% of the substrate is converted in 10 minutes. The first-order rate constant (in min^{-1}) of the reaction, rounded off to THREE decimal places, is _____ **[JAM 2020]**

22. For an enzyme following Michaelis-Menten kinetics, when [S] = K_M then, the velocity v is
([S] is substrate concentration, K_M is Michaelis constant, V_{max} is maximal velocity)
(a) [S] × V_{max} (b) 0.75 × V_{max} (c) 0.5 × V_{max} (d) K_M × V_{max} **[JAM 2022]**

PART B: JNU PREVIOUS YEARS QUESTION

1. The rate of the reaction $2A \rightarrow B + D$ is doubled when concentration of A is increased 4 fold. If half time of the reaction with 0·2 M concentration of A is 25 minutes, how much it will be when concentration of A is 0·8 M?
(a) 12·5 minutes (b) 50 minutes (c) 5 minutes (d) 625 minutes **[JNU-2003]**

2. If 10% of a radioactive material decays in 5 days, then the amount of the original material left after 20 days is approximately **[JNU-2003]**
(a) 60% (b) 65% (c) 70% (d) 75%

3. The half-life period of a radioactive element is 19 hours. At the end of 57 hours the fraction of the radioactive element remaining is **[JNU-2004]**
(a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) $\frac{1}{16}$ (d) $\frac{1}{8}$

4. If concentrations are measured in moles per liter and time in seconds what are the units of the rate constant for a first-order reaction? **[JNU-2004]**
(a) Liter (b) Mole liter^{-1} sec^{-1} (c) Sec^{-1} (d) Mole^{-1} liter

5. The value of activation energy for a chemical reaction is primarily determined by **[JNU-2004]**
(a) temperature (b) collision frequency (c) concentration (d) nature of reactants

6. The K_m of an enzyme-catalysed reaction **[JNU-2004]**
(a) is equal to the catalytic rate when all substrate sites are full
(b) describes the affinity of an enzyme for its substrate
(c) is independent of the enzyme concentration
(d) is higher when the enzyme binds its substrate more tightly

7. For second-order reaction, if the concentration of the reactants is doubled, the rate will **[JNU-2005]**
(a) be tripled (b) stay the same (c) be doubled (d) be quadrupled

8. The radioactive decay is the example of **[JNU-2005]**
(a) first-order reaction (b) zeroth order reaction
(c) second-order reaction (d) third-order reaction

9. Higher K_m value of an enzyme often denotes **[JNU-2005]**
(a) higher affinity of the enzyme to the substrate
(b) lower affinity of the enzyme to the substrate
(c) affinity constant of the enzyme to the substrate analogue
(d) None of these

10. The rate constant of a reaction is $5.4\times10^{-14}\,s^{-1}$, Which of the following is its $t_{1/2}$? **[JNU-2006]**

(a) $1.26\times10^{10}\,s$ (b) $2.0\times10^{11}\,s$ (c) $1.26\times10^{13}\,s$ (d) $1.26\times10^{16}\,s$

11. The half-life for the reaction **[JNU-2007]**

$$N_2O_5 \rightleftharpoons 2NO_2 + \frac{1}{2}O_2$$

is 24 hours at 30 °C. Starting with 10 g of N_2O_5, how many grams of N_2O_5 will remain after a period of 96 hours?

(a) 1.25 g (b) 0.63 g (c) 1.77 g (d) 0.5 g

12. k_1 and k_2 are velocity constants of forward and backward reactions. For this reaction equilibrium constant K is given by **[JNU-2008]**

(a) k_1/k_2 (b) $k_1 \cdot k_2$ (c) $k_1 + k_2$ (d) $k_1 - k_2$

13. Initial concentraion of reactants is 4.0 g. The half-life period of the reaction is 100 minutes. In 400 minutes the amount remaining will be **[JNU-2008]**

(a) 0.0 g (b) 1.0 g (c) 0.25 g (d) 0.5 g

14. The unit of zero-order rate constant is **[JNU-2009]**

(a) $mol.lit^{-1}.sec^{-1}$ (b) sec^{-1} (c) $mol^{-1}lit.sec^{-1}$ (d) sec

15. For the second-order reaction, $t_{1/2}$ is proportional to **[JNU-2009]**

(a) $1/a$ (b) $1/a^2$ (c) constant (d) a

16. A reaction of two different reactants can never be a **[JNU-2009]**

(a) first-order reaction (b) second-order reaction
(c) unimolecular reaction (d) bi-molecular reaction

17. The first-order reaction requires 30 minutes for 50% completion. The time required to complete the 75% reaction will be **[JNU-2009]**

(a) 45 minutes (b) 15 minutes (c) 60 minutes (d) None of these

18. Radioactive decay follows — kinetics. **[JNU-2010]**

(a) zero-order (b) first-order (c) second-order (d) third-order

19. Half-life period of a radioactive isotope is 36 days. How much time would it take for 75% of its decomposition? **[JNU-2011]**

(a) 18 days (b) 72 days (c) 54 days (d) 108 days

20. In Lineweaver-Burk plot, the y intercept represents **[JNU-2012]**

(a) K_m/V_{max} (b) $1/K_m$ (c) $1/V_{max}$ (d) V_{max}/K_m

21. Match the following : **[JNU-2013]**

(A) Zero-order reaction	(i) $litre^2\ mole^{-2}\ sec^{-1}$
(B) First-order reaction	(ii) $litre\ mole^{-1}\ sec^{-1}$
(C) Second-order reaction	(iii) sec^{-1}

(D) Third-order reaction (iv) mole litre^{-1} sec^{-1}

(a) A-i, B-ii, C-iii, D-iv (b) A-iv, B-iii, C-ii, D-i

(c) A-ii, B-iii, C-iv, D-i (d) A-iv, B-ii, C-iii, D-i

22. The half-life of ^{64}Cu is 12.83 hours. How much time would it take to reach the disintegration rate of 100 min^{-1} from 500 min^{-1}? **[JNU-2013]**

(a) 0.054 hour (b) 0.13 hour (c) 28.5 hours (d) 29.7 hours

23. In two different zero-order reactions $A \rightarrow P_1$ and $B \rightarrow P_2$, the rate of conversion of A into product is twice that of B converted into product. if 30% of B is converted into P_2 in 30 minutes, then what will be the amount of A reacted at the same time? **[JNU-2013]**

(a) 15% (b) 30% (c) 45% (d) 60%

24. The unit of rate constant for zero-order reaction is **[JNU-2014]**

(a) lit sec^{-1} (b) lit mole^{-1} sec^{-1} (c) mole lit^{-1} sec^{-1} (d) mole sec^{-1}

25. A sample of radioactive substance has 10^6 nuclei. Its half-life is 20 second. The number of nuclei that will be left after 10 second is approximately **[JNU-2016]**

(a) 1×10^5 (b) 2×10^5 (c) $7 \times l0^5$ (d) 9×10^5

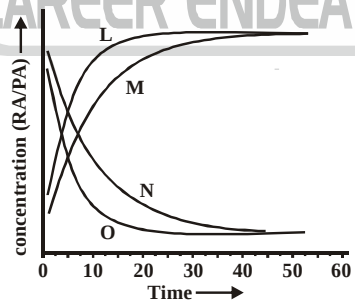
26. When the substrate concentration is much lower than K_m in an enzyme assay, the rate **[JNU-2017]**

(a) approaches V_{max} (b) shows zero-order kinetics

(c) is proportional to substrate concentration (d) is constant

PART C: TIFR PREVIOUS YEARS QUESTION

1. In a reaction RA converts to PA in the presence of a catalyst. Two experiments were carried out and the concentration of RA and PA were followed in time. In one experiment, the catalyst was 100 μM and in another it was doubled. The data is shown in the graph below. Which of the following is not true? **[TIFR-2010]**



(a) Curves M and N represent expriment one and curves L and O represent experiment two.

(b) L and M represent product concentration and N and O represent reactant concentration.

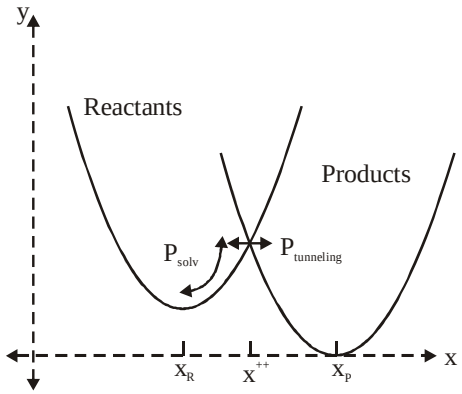
(c) Steady state concentration in both experiments is the same.

(d) Curves L and N result from experiment one and curves M and O result from experiment two.

2. The half life of radioactive P32 is 14.3 days. In how many weeks will the radioactivity fall to $1/16^{th}$ of the original value **[TIFR-2011]**

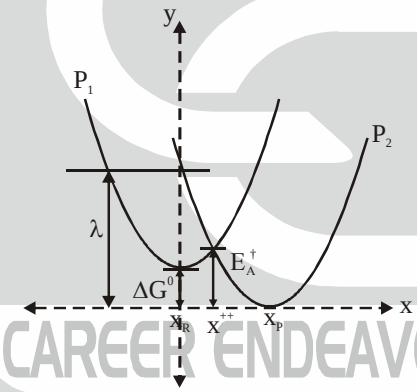
(a) 8.2 weeks (b) 9.7 weeks (c) 7.6 weeks (d) None of these

3. An electron transfer reaction proceeds by diffusion along a solvent coordinate, followed by an electron tunneling event (see figure). If P_{solv} is the probability of the system diffusing from x^R to x^{++} and $P_{tunneling}$ is the probability of the electron tunneling then the rate constant for electron transfer is proportional to: **[TIFR-2011]**



(a) $P_{solv} + P_{tunneling}$ (b) $P_{solv} \times P_{tunneling}$ (c) $P_{solv} - P_{tunneling}$ (d) $P_{solv} / P_{tunneling}$

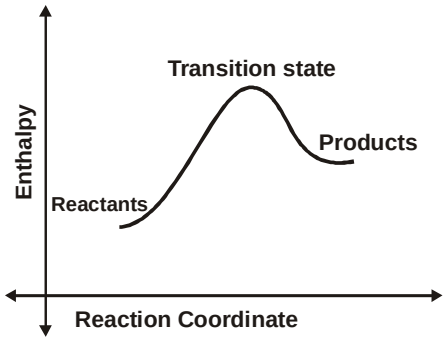
4. Assuming completely equivalent parabolas (the equations of P_1 and P_2 are same except for a shift in coordinates), calculate the value of $E_A^{\dagger}$ in terms of λ and ΔG^0. **[TIFR-2011]**



(a) $E_A^{\dagger} = \lambda^2/4$ (b) $E_A^{\dagger} = \left(\lambda - \Delta G^0\right)^2 / \left(4\Delta G^0\right)$

(c) $E_A^{\dagger} = \left(\lambda + \Delta G^0\right)^2 / \left(4\lambda\right)$ (d) $E_A^{\dagger} = \left(\Delta G^0\right)^2 / \lambda$

5. The enthalpy of a reaction is plotted vs. its reaction coordinate below. Which of the following is true about the forward reaction ? **[TIFR-2012]**



(a) The reaction is spontaneous (b) The reaction is endothermic

(c) A catalyst will not be useful for this reaction (d) All of the above

6. The half-life of a radioactive element is 72 hours. In how many days will the radioactivity fall to 1/32th of its original value? **[TIFR-2012]**

(a) 9 days (b) 18 days (c) 15 days (d) 12 days

7. A molecule contains only nitrogen and oxygen. 30.40% of this molecule of nitrogen (by mass). If the molar mass of the molecule is 92 g/mol, what is the molecular formula ? **[TIFR-2012]**

(a) NO_2 (b) N_2O_2 (c) N_2O_4 (d) NO

8. Which is the most likely rate constant for the reaction $X + 2Y \rightarrow XY_2$: **[TIFR-2013]**

(a) $9X\ 10^{-3}\ sec^{-1}$ (b) $5X\ 10^{-3}\ M^{-2}\ sec^{-1}$ (c) $6X\ 10^{-5}\ M\ sec^{-1}$ (d) $8X\ 10^{-4}\ M^{-2}\ sec$

9. The activity of an enzyme is modulated by calcium. Oddly, the shape of the modulation is a bell curve, so that the maximum activity is at intermediate levels of calcium. We know that there are two binding sites for calcium, X and Y. X activates the enzyme. Y inhibits the enzyme. Which of the following mechanisms might account for the bell curve. **[TIFR-2013]**

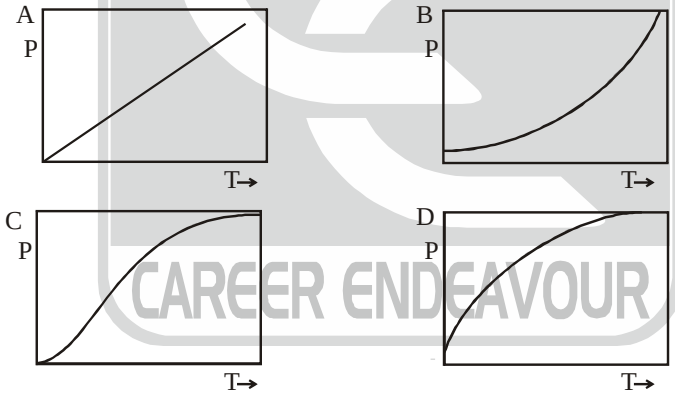
(a) Site X has high affinity, Y has low affinity, (b) Site X has low affinity, Y ahas high affinity,

(c) Site X and Y have the same affinity (d) Calcium is a divalent cation

10. An enzyme reaction obeys the Michaelis-Menten form **[TIFR-2013]**

$$E + S \leftrightarrow E.S \rightarrow E + P$$

Which of the following curves best describes the amount of P as a function of time:



(a) A & C (b) C alone (c) B & C (d) None of these

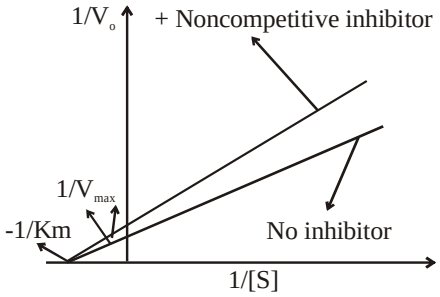
11. The unit of the rate constant of a second-order process is: **[TIFR-2014]**

(a) $mol\ L^{-1}\ s^{-1}$ (b) s^{-1} (c) $L\ mol^{-1}\ s^{-1}$ (d) $mol\ L^{-1}$

12. $A + B \rightarrow C$ is an irreversible reaction. I mix equal volumes of 2M A with 1M b. I measure the rate of the reaction at the start and when half of b is consumed. What is the ratio of the final rate to the starting rate?

(a) 0 (b) 3:8 (c) 3:4 (d) 1:1 **[TIFR-2014]**

13. The effect of an enzyme inhibitor is shown in the following graph. Which type of inhibitor is it? **[TIFR-2014]**



(a) Competitive (b) Non-competitive (c) Uncompetitive (d) None of these

14. The following rates were determined for a reaction in which A and B combine to give a product. What is the overall rate law of this reaction? **[TIFR-2015]**

[A]	[B]	Initial Rate
0.5 M	0.5 M	10 M s^1
0.5 M	1.0 M	20 M s^1
0.25 M	0.5 M	5 M s^1
1.0 M	1.0 M	40 M s^1

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

15. When investigating enzyme/substrate interaction, which of the following would be expected to show a linear relationship under constant conditions ? **[TIFR-2015]**

I. Rate of reaction against enzyme concentration in the presence of excess substrate

II. Rate of reaction against enzyme concentration with the amount of substrate limited

III. Amount of product against time, with the amount of substrate limited

IV. Rate of reaction against substrate concentration

(a) I only (b) I and II (c) III only (d) II and IV

16. The percentage (%) increase in the rate of a chemical reaction will be maximum when the temperature is increased from: **[TIFR-2016]**

(a) 270 K to 280 K

(b) 280 K to 290 K

(c) 290 K to 300 K

(d) In all these cases the increase will be the same

17. You are observing a chemical reaction $(R \rightarrow P)$ either in the absence or presence of an enzyme catalyst, which has $K_M = 10^6 \mu M$. At euilibrium 20 moles of reactant and 2 moles of product are present in the un-catalysed reaction. What would the reactant and product concentrations be at equilibrium in the presence of the enzyme?

(a) R = 0, P = 22 **[TIFR-2016]**

(b) R = 2, P = 20

(c) R = 20, P = 2

(d) This cannot be answered without knowing the reaction volume

18. Reactions with positive free energy change ($\Delta G_0 > 0$) can be made to occur by: **[TIFR-2017]**
(a) coupling them with exergonic reactions via a common intermediate
(b) manipulating the concentrations of products and reactants
(c) coupling them to hydrolysis of ATP
(d) All of the above

19. In an enzyme-catalysed reaction, if [S] = 10 K_M the velocity of the reaction is about **[TIFR-2018]**
(a) 0.9 V_{max} (b) 0.7 V_{max}
(c) 0.5 V_{max} (d) 0.1 V_{max}

20. Consider a reversible reaction $A \rightleftharpoons B$ with forward and backward rate constants $k_+ = k_- = 1\text{sec}^{-1}$. Suppose we start with a 1 molar solution of A. How long will be concentration of A take to reach 0.75 molar?
(a) 0.25 sec (b) $\ln\left(\frac{4}{3}\right) \sim 0.29\text{sec}$ **[TIFR 2019]**
(c) $\ln\sqrt{2} \sim 0.35\text{sec}$ (d) It will never reach that concentration

21. For an endothermic reaction, where ΔH represents the enthalpy of the reaction in kJ/mol, the minimum value of the energy of activation will be : **[TIFR 2019]**
(a) Less than ΔH (b) Zero (c) More than ΔH (d) Equal to ΔH

22. Two solutions of the same molecule, with concentrations of 10^{-3} M and 5×10^{-4} M, are kept in two different cuvettes with path lengths 1 cm and 2 cm, respectively. If the absorbance for 1st sample is 1.2, what will be the absorbance for the second sample? **[TIFR 2020]**
(a) 1.0 (b) 1.2 (c) 2.4 (d) 6.0

23. Which of the following statements are true? **[TIFR 2021]**
(a) Vmax of an enzyme remains constant with increasing enzyme concentrations.
(b) K_M of an enzyme for a substrate remains constant with increasing enzyme concentrations.
(c) K_M of an enzyme for a substrate increases with increasing enzyme concentrations.
(d) Both K_M and Vmax of an enzyme remains constant with increasing enzyme concentrations.

24. What does Kcat/Km signify? **[TIFR 2022]**
(a) Specificity of enzyme for different substrates (b) Rate of product formation
(c) Rate of substrate consumption (d) Maximum rate of reaction

25. The rate of reaction for a second order reaction can be **[TIFR 2022]**
(a) dependent on concentration of one reactant
(b) dependent on concentration of two reactants
(c) independent of product concentration
(d) all of the above

26. The data in the table below is collected for an enzyme-catalyzed reaction **[TIFR 2022]**

$[S]\,mM$	$V_0\,(\mu\,\text{mol.min}^{-1})$
8×10^{-6}	80
2×10^{-5}	140
8×10^{-5}	224
4×10^{-3}	277
2×10^{-2}	280
1×10^{-1}	279

What is the approximate Km of this enzyme?

(a) 8×10^{-6} mM (b) 2.0×10^{-5} mM

(c) 8.0×10^{-5} mM (d) 2×10^{-2} mM

Answer Key

PART A: IIT-JAM PREVIOUS YEARS QUESTION

1. (c)	**2. (b)**	**3. (d)**	**4. (b)**	**5. (b)**	**6. (a)**	**7. (b)**
8. (a)	**9. (c)**	**10. (b)**	**11. (d)**	**12. (b)**	**13. (d)**	**14. (c)**
15. 120.17 min		**16. (0.161)**	**17. (_)**	**18. (_)**	**19. (_)**	**20. (_)**
21. (_)	**22. (c)**					

PART B: JNU PREVIOUS YEARS QUESTION

1. (b)	**2. (b)**	**3. (d)**	**4. (c)**	**5. (d)**	**6. (c)**	**7. (d)**
8. (a)	**9. (b)**	**10. (c)**	**11. (b)**	**12. (a)**	**13. (c)**	**14. (a)**
15. (a)	**16. (c)**	**17. (c)**	**18. (b)**	**19. (b)**	**20. (c)**	**21. (b)**
22. (d)	**23. (d)**	**24. (c)**	**25. (c)**	**26. (c)**		

PART C: TIFR PREVIOUS YEARS QUESTION

1. (a)	**2. (a)**	**3. (b)**	**4. (*)**	**5. (b)**	**6. (c)**	**7. (c)**
8. (b)	**9. (a)**	**10. (b)**	**11. (c)**	**12. (b)**	**13. (b)**	**14. (d)**
15. (a)	**16. (a)**	**17. (c)**	**18. (d)**	**19. (a)**	**20. (c)**	**21. (c)**
22. (b)	**23. (b)**	**24. (a)**	**25. (d)**	**26. (a)**		