CHEMISTRY

BOOKS - NEET PREVIOUS YEAR (YEARWISE + CHAPTERWISE)

CHEMICAL KINETICS

Mcq

1. which one of the following statements is not correct ?

A. Catalyst does not initiate any reaction

B. the value of equilibrium constant is changed in the presence of a catalyst in the reaction equilibrium

C. Enzymes catalyse mainly biochemical reaction

D. Coenzymes increase the catalytic activity of enzyme

Answer: B

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2. A first order reaction has a specific reaction rate of $10^{-2}S^{-1}$. How much time will it take for 20 g of the reactant to reduce to 5 g?

A. 238.6s

B. 138.6s

C. 346.5s

D. 693.0s

Answer: B

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3. Mechanism of a hypothetical reaction

$X_2 + Y_2 \rightarrow 2XY$ is given below:

(i) $X_2 \rightarrow X + X$ (fast)

(ii) $X + Y_2 \Leftrightarrow XY + Y$ (slow)

(iii) $X + Y \rightarrow XY$ (fast)

The overall order of the reaction will be :

A. 1

B. 2

C. 0

D. 1.5

Answer: D

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4. the rate of a first - order reaction is 0.04 mol $L^{-1}s^{-1}$ at 10 sec and 0.03 mol $L^{-1}S^{-1}$ at 20 sec after initiation of the reaction the half -

life period of the reaction is

A. $34.1s$

B. 44.1 s

C. 54.1s

D. 24.1

Answer: D

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5. The decomposition of phosphine $[PH_3]$ on tungsten at low pressure is a first-order reaction. It is because the

A. rate is proportional to the surface coverage

B. rate is inversely proportional to the surface coverage

C. rate is independent of the surface coverage

D. rate of decomposition is very slow

Answer: A

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6. when initial concentration of a reactant is dubled in a reaction its half -life period is not affected , the order if the reaction is

A. zero

B. first

C. second

D. more than zero but less than first

Answer: B

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7. The activation energy of a reaction can be determined from the slope of which of the following graphs ?

A. in K Vs T

B. $\frac{\text{in}K}{T} vsT$

C. in K vs $\frac{i}{T}$

D. $\frac{T}{\text{in}K} vs \frac{I}{T}$

Answer: C

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8. The rate constant of the reaction $A \rightarrow B$ is 0.6×10^{-3} mole per second. If the concentration of A is $5M$, then concentration of B after 20 minutes is:

A. 1.08M

B. 3.60M

C. 0.36M

D. 0.72M

Answer: D

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9. What is the activation energy for a reaction if its rate doubles when the temperature is raised from $20^{\circ}C$ to $35^{\circ}C$? $(R = 8.314 J \text{mol K}^{-})$

A. $342 kjmol^{-1}$

B. $269 kjmol^{-1}$

C. $34.7 kjMol^{-1}$

D. $15.1 kjMol^{-1}$

Answer: C

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10. In a reaction , $A + B \rightarrow$ Product, rate is doubled when the concentration of B is doubled, and rate increases by a factor of 8 when the concentration of both the reactants (A and B) are doubled, rate law for the reaction can be written as

A. $rate = K[A][b]^2$

B. $rate = k[A]^2[B]^2$

C. $rate = K[A][B]$

D. $rate = k[A]^2[B]$

Answer: D

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11. In a zero-order reaction for every 10° rise of temperature, the rate is doubled. If the temperature is increased from $10^\circ C$ to $100^\circ C$, the

rate of the reaction will become

A. 256 times

B. 512 times

C. 64 times

D. 128 times

Answer: B

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12. which one of the following statements for the order of a raction is incorrect ?

A. order is not influenced by stoichliometric coefficient of the reactants

B. Order of reaction is sum of power to the concentration terms of reactants to express the rate of reaction

C. Order of reaction is always whole number

D. Order can be determined only experimentally

Answer: C

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13. For the reaction $N_2O_5 \rightarrow 2NO_2 + \frac{1}{2}O_2$, the rate of disappearance of N_2O_5 is $6.25 \times 10^{-3} \text{mol L}^{-1} s^{-1}$. The rate of formation of NO_2 and O_2 will be respectively.

A. $6.25 \times 10^{-3} molL^{-1}S^{-1}$ and $6.25 \times 10^{-3} molL^{-1}S^{-1}$

B. $1.25 \times 10^{-2} molL^{-1}S^{-1}$ and $3.125 \times 10^{-3} molL^{-1}S^{-1}$

C. $6.25 \times 10^{-3} molL^{-1}S^{-1}$ and $3.125 \times 10^{-3} molL^{-1}S^{-1}$

D. $1.25 \times 10^{-2} molL^{-1}S^{-1}$ and $6.25 \times 10^{-3} molL^{-1}S^{-1}$

Answer: B

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14. For an endothermic reaction energy of activation is E_a and enthlpy of reaction is ΔH (both in $kJ\mathrm{mol}^{-1}$). Minimum value of E_a will be

A. Less than ΔH

B. Equal to ΔH

C. More than ΔH

D. equal to zero

Answer: C

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15. During the kinetic study of the reaction , $2A + B \rightarrow C + D$,

following results were obtained

Run	A/mol L^{-1}	B/mol L^{-1}	Initial rate of formation of D/mol $L^{-1}min^{-1}$
I	0.1	0.1	6.0×10^{-3}
II	0.3	0.2	7.2×10^{-2}
III	0.3	0.4	2.88×10^{-1}
IV	0.4	0.1	2.40×10^{-2}

Based on the above date which one of the following is correct ?

A. $Rate = k[A]^2[B]$

B. $Rate = K[A][B\}$

C. $Ratek[A]^2[B]^2$

D. $Rate = k[A][B]^2$

Answer: D

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16. In the reaction

$$BrO^{-3}(aq) + 5Br^{-}(aq) + 6H^{+} \rightarrow 3Br_2(1) + 3H_2O(1)$$

The rate of appearance of bromine (Br_2) is related to rate of disapperance of bromide ions as folllwoing :

A. $\frac{d[Br_2]}{dt} = -\frac{3}{5}\frac{d[Br^{-}]}{dt}$

B. $\frac{d[Br_2]}{dt} = -\frac{5}{3}\frac{d[Br^{-}]}{dt}$

C. $\frac{d[Br_2]}{dt} = \frac{5}{3}\frac{d[Br^{-}]}{dt}$

D. $\frac{d[Br_2]}{dt} = \frac{3}{5}\frac{d[Br^{-}]}{dt}$

Answer: A

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

A. $3 \times 10^{-4} molL^{-1} S^{-1}$

B. $4 \times 10^{-4} molL^{-1} S^{-1}$

C. $6 \times 10^{-4} molL^{-1} S^{-1}$

D. $1 \times 10^{-4} molL^{-1} S^{-1}$

Answer: A

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18. For the reaction $A + B$ products, it is observed that:

(1) on doubling the initial concentration of A only, the rate of reaction is also doubled and

(2) on doubling te initial concentration of both A and B, there is a charge by a factor of 8 in the rate of the reaction.

The rate of this reaction is given by

A. $Rate = k[A]^2[B]$

B. $rate = k[A][B]^2$

C. $Rate = k[A]^2[b]^2$

D. $rate = k[A][B]$

Answer: B

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19. Half-life period of a first-order reaction is 1386 seconds. The specific rate constant of the reaction is

A. $5.0 \times 10^{-3} s^{-1}$

B. $0.5 \times 10^{-2} S^{-1}$

C. $0.5 \times 10^{-3} S^{-1}$

D. $5.0 \times 10^{-3} S^{-1}$

Answer: C

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20. The rate constant k_1 and k_2 for two different reactions are $10^{16}e^{-2000/T}$ and $10^{15}e^{-1000/T}$, respectively. The temperature at which $k_1 = k_2$ is

A. 1000K

B. $\frac{2000}{2.303}K$

C. 2000K

D. $\frac{1000}{23.03}K$

Answer: D

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21. The bromination of acetone that occurs in acid solution is represented by this equation.

$CH_3COCH_3(aq) + Br_2(aq) \rightarrow$

$CH_3COCH_2Br(aq) + H^+(aq) + Br(aq)$

These kinetic data were obtained for given reaction concentrations.

Initial concentration, M

$[CH_2COCH_3]$	$[Br_2]$	$[H^+]$	(Initail rate) (disappearance of Br_2)
0.30	0.05	0.05	5.7×10^{-5}
0.30	0.10	0.05	5.7×10^{-5}
0.30	0.10	0.10	1.2×10^{-4}
0.40	0.5	0.20	3.1×10^{-4}

A. $rate = K[CH_2COCH_3]\left[H^+\right]$

B. $rate = K[CH_2 = COCH_3[Br_2]$

C. $rate = K[CH_3COCH_3][Br_2]\left[H^+\right]^2$

D. $rate = k[CH_3COCH_3][BR_2]\left[H^+\right]$

Answer: A

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22. The reaction obey I order with respect to H_2 and ICl both.

$H_2(g) + 2ICl(g) \rightarrow 2HCl(g) + I_2(g)$

Which of the following mechanism is in consistent with the given fact ?

Mechanism A: $H_2(g) + 2Cl \rightarrow 2HCl(g) + I_2(g)$

Mechanism B: (i) $H_2(g) + ICl(g) \xrightarrow{\text{slow}} HCl(g) + HI(g)$

(ii) $HI(g) + ICl(g) \rightarrow HCl(g) + I_2$

A. only B

B. Both A and B

C. Neither A nor B

D. Only A

Answer: A

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23. If 60 % of a first order reaction was completed in 60 minutes, 50 % of the same reaction would be completed in approximately [log = 4 = 0.60, log 5 = 0.69].

A. 50min

B. 45min

C. 60min

D. 40min

Answer: B

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24. In a first-order reaction $A \rightarrow B$, if K is the rate constant and initial concentration of the reactant is $0.5M$, then half-life is

A. $\frac{0.693}{0.5K}$

B. $\frac{\log 2}{k}$

C. $\frac{\log 2}{k\sqrt{0.5}}$

D. $\frac{\text{in}2}{k}$

Answer: D

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25. Consider the reaction:

$N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$.

The equally relationship between $-\frac{d[NH_3]}{dt}$ and $-\frac{d[H_2]}{dt}$ is:

A. $\frac{d[NH_3]}{dt} = -\frac{1}{3}\frac{d[H_2]}{dt}$

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

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

D. $\frac{d[NH_3]}{dt} = -\frac{d[H_2]}{dt}$

Answer: B

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26. for the reaction, $2A + B \rightarrow 3C + D$, which of the following does not express the reaction rate

A. $-\frac{d[C]}{3dt}$

B. $-\frac{d[B]}{dt}$

C. $-\frac{d[D]}{dt}$

D. $-\frac{d[A]}{2dt}$

Answer: A

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27. The rate of reaction between two A and B decreases by factor 4 if the concentration of reactant B is doubled. The order of this reaction with respect to B is

A. -1

B. -2

C. 1

D. 2

Answer: B

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28. For a first-order reaction $A \rightarrow B$ the reaction rate at reactant concentration of $0.10M$ is found to be $2.0 \times 10^{-5} \mathrm{mol} L^{-1} s^{-1}$. The half-life period of the reaction is

A. 200s

B. 30s

C. 300s

D. 347s

Answer: D

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29. The rate of first-order reaction is $1.5 \times 10^{-2} M \min^{-1}$ at $0.5M$ concentration of reactant. The half-life of reaction is

A. 0.383 min

B. 23.1 min

C. 8.73 min

D. 7.53 min

Answer: B

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30. The activation energy for a simple chemical reaction $A \rightarrow B$ is E_a in the forward reaction: The activation of the reverse reaction

A. can be less than or more than E_α

B. is always double of E_α

C. is negative of E_a

D. is always less than E_a

Answer: A

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31. If the rate of the reaction is equal to the rate constant, the order of the reaction is

A. 2

B. 3

C. 0

D. 1

Answer: C

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32. The temperature dependence of rate constant (k) of a chemical reaction is written in terms of Arrhenius equation, $k = Ae^{-E_a/RT}$) Activation energy (E_a) of the reaction can be calculate by plotting

A. $\log kvs\frac{1}{T}$

B. $\log kvs \frac{1}{\log T}$

C. $kvsT$

D. $kvs \frac{1}{\log T}$

Answer: A

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33. The reaction $A \rightarrow B$ follows first order kinetics. The time taken for $0.8mol$ of A to produce $0.6mol$ of B is $1hr$. What is the time taken for the conversion of $9.0mol$ of A to Product $0.675mol$ of B ?

A. $0.25h$

B. $2h$

C. $1H$

D. $0.5h$

Answer: C

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34. $3A \rightarrow B + C$ it would be a zero order reaction , when

A. the rate of reaction is proportinal to square of concentration of A

B. the rate of reaction remains same at any concentration of A

C. the rate remains uncharged at any concentration of B and C

D. the rate or reaction doubles if concentration of B is increased to double

Answer: B

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35. If $3A \rightarrow 2B$, then the rate of reaction of $+\frac{dB}{dt}$ is equal to

A. $-\frac{3}{2}\frac{d[A]}{dt}$

B. $-\frac{2}{3}\frac{d[A]}{dt}$

C. $-\frac{1}{3}\frac{d[A]}{dt}$

D. $+2\frac{d[A]}{dt}$

Answer: B

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36. When a biochemical reaction is carried out in laboratory from outside of human body in the absence of enzyme, the rate of reaction obtained is 10^{-6} times, then activation energy of the reaction in the presence of enzyme is

A. $\frac{6}{RT}$

B. P is reqired

C. Different froms E_a obtained in laboratory

D. cannot say any things

Answer: C

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37. For the reaction, $2N_2O_5 \rightarrow 4NO_2 + O_2$ rate and rate constant are $1.02 \times 10^{-4} M \sec^{-1}$ and $3.4 \times 10^{-5} \sec^{-1}$ respectively, the concentration of N_2O_5, at that time will be

A. 1.732

B. 0

C. 1.02×10^{-4}

D. 3.4×10^5

Answer: B

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38. For a first order reaction, the half-life period is independent of

A. initial concentration

B. cube root of initial concentration

C. first power of final concentration

D. square root of final concentration

Answer: A

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39. Activation energy of a chemical reaction can be determined by

A. evaluating rate constant at standard temperature

B. evaluating velocities of reaction at two different temperatures

C. evaluating rate constants at two different temperatures

D. changing concentration of reactants

Answer: C

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40. The experimental data for the reaction $2A + B_2 \rightarrow 2AB,$ is :

Expt. No.	$[A]$	$[B_2]$	Rate (mol l^{-1} s^{-1})
1.	0.50	0.50	1.6×10^{-4}
2.	0.50	1.00	3.2×10^{-4}
3.	1.0	1.00	3.2×10^{-4}

The rate equation for the above data is :

A. $rate = k[B_2]$

B. $rate = k[B_2]_2$

C. $rate = k[A]^2[B]^2$

D. $rate = k[A]^2[B]$

Answer: A

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41. in a reversible reaction the energy of activation of the forward reaction is 50 kcal .

the energy of activation for the reverse reaction will be

A. lt 50 kcal

B. 50 kcal

C. either greater tan or less than 50 kcal

D. gt 50 kcal

Answer: C

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42. The plot of concentration of the reactant vs time for a reaction is a straight line with a negative slope. This reaction follows

A. zero order rate equation

B. first order rate equation

C. second order rate equation

D. third order rate equation

Answer: B

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43. A substance 'A' decomposes by a first order reaction starting initially with $[A] = 2.00M$ and after 200 min, [A] becomes $0.15M$. For this reaction, $t1/2$ is

A. $53.49\ \text{min}$

B. $50.49\ \text{min}$

C. $48.45\ \text{min}$

D. $46.45\ \text{min}$

Answer: A

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44. A chemical reaction has catalyst X. Hence X

A. Reduce enthalpy of the reaction

B. Dercreases rate constant of the reaction

C. increasees activation energy of the reaction

D. does not affect equilibrium constant of the reaction

Answer: D

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45. For an exothermic reaqction, the energy of activation of the reactants is

A. equal of the energy of activation of products

B. less than the energy of activation of products

C. greater than the energy of aactivation of products

D. sometimes greater and sometimes less than that of the products

Answer: B

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