CHEMISTRY

AAKASH INSTITUTE ENGLISH

MOCK_TEST_20

Example

1. For the reaction $N_2 + 3H_2 \rightarrow 2NH_3$, the rate of change of concentration for hydrogen is $-0.3 \times 10^{-4} \mathrm{Ms}^{-1}$. The rate of change of concentration of ammonia is

A. $1.25 \times 10^{-3} molL^{-1}s^{-1}$

B. $2.5 \times 10^{-3} molL^{-1}s^{-1}$

C. $3.75 \times 10^{-3} molL^{-1}s^{-1}$

D. $6.25 \times 10^{-5} molL^{-1}s^{-1}$

Answer: B

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2. The rate constant of a reaction changes with

A. Pressure

B. Temperature

C. Initial concentration of reactants

D. Extent of reaction

Answer: B

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3. For a first order reaction A→B, the reaction rate at reactant concentration of 0.01 M is found to be $2.0 \times 10^{-5} mol L^{-1} s^{-1}$.The half-life period of the reaction is:

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4. The half life period for a reaction at initial concentration of 0.2 and 0.4 mol L`^(-1) are 100 s and 200

s respectively. The order of the reaction is

A. 0

B. 1

C. 2

D. 3

Answer: A

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5. For the first order reaction. $N_2O_5(g) \rightarrow N_2O_4(g) + \frac{1}{2}O_2(g)$, the volume of O_2 produced is 15 mL and 40 mL after 8 minutes and at the

end of the reaction respectively. The rate constant is equal to

A. $\frac{1}{8} \ln \frac{80}{50}$

B. $\frac{1}{8} \ln \frac{40}{25}$

C. $\frac{1}{8} \ln \frac{40}{10}$

D. $\frac{1}{8} \ln \frac{80}{65}$

Answer: A

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6. Consider the following statements:

I) The value of rate constant is never negative

II) A zero order reaction is an elementary reaction

III). For elementary reactions, molecularity and order are equal

IV). Average and instantaneous rate of reaction are defined for micro and macroscopic time interval respectively The correct statement(s) is/are

A. I, II, Ill

B. Only III

C. I, III

D. I, II, IV

Answer: C

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7. For a particular reaction (A $\rightarrow$ B) the rate constant is $0.693(\text{ min})^{-1}$ If the initial concentration of the reactant, A is 1 M, then the rate of reaction after 1 minute will be

A. $0.35M(\text{ min})^{-1}$

B. $0.14M(\text{ min})^{-1}$

C. $0.693M(\text{ min})^{-1}$

D. $0.30M\ (\text{ min})^{-1}$

Answer: A

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8. For an elementary reaction. A + 2B $\rightarrow$ C if volume of the vessel is reduced to $\frac{1}{3}$ of its original volume the rate of the reaction will

A. Increase 27 times

B. Remain unaltered

C. Increase 9 times

D. Decrease 3 times

Answer: A

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9. The time t_1 and t_2 are time period for $\frac{1}{3}$rd and $\frac{2}{3}$rd completion of two first order reactions If the half lives are in the ratio 10:3. then the ratio of t_1 and t_2 will be

A. 1.23

B. 0.81

C. 0.11

D. 2.7

Answer: A

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10. Half life of a certain zero order reaction, A $\rightarrow$ P is 2 hour when the initial concentration of the reactant, 'A' is 4 mol L^{-1}. The time required for its concentration to change from 0.40 to 0.20 mol L^{-1} is

A. 0.75 min

B. 2 min

C. 12 min

D. 8 min

Answer: C

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11. $83Bi^{2H}\left(t\frac{1}{2}=130\,\text{sec}\right)$ decays to $81Tl^{207}$ by α-emission. In an experiment starting with 5 moles of $83Bi^{211}$. how much pressure would be developed in a 350 L closed vessel at 25 C after 760 sec? [Antilog (1.759) = 57 41]

A. 0.68 atm

B. 0.22 atm

C. 0.34 atm

D. 0.54 atm

Answer: C

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12. The reaction, $A + B \rightarrow P$ can never be

A. Second order reaction

B. First order reaction

C. Unimolecular reaction

D. Biomolecular reaction

Answer: D

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13. Calculate the time to deposit 1.27 g of copper at cathode when a current of 2A was passed through the

solution of $CuSO_4$.

$\left(\text{Molar mass of } Cu = 63.5 g mol^{-1}, 1F = 96500 C mol^{-1}\right)$.

A. $\frac{-d[NH_4NO_2]}{dt} = k$

B. $\frac{-d[NH_4NO_2]}{dt} = k[NH_4NO_2]$

C. $\frac{-d[NH_4NO_2]}{dt} = k[NH_4NO_2]^{-1}$

D. $\frac{-d[NH_4NO_2]}{dt} = k[NH_4NO_2]^2$

Answer: B

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14. The rate constant of a reaction is equal to the rate of reaction when

A. Concentration of all reactants are unity

B. Concentration of all reactants and products are equal

C. Concentration of reactants and products do not change with time

D. The reaction takes infinite time for completion

Answer: A

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15. Hydrolysis of ethyl acetate in acidic medium is an example of

A. Unimolecular

B. Pseudo first order

C. Zero order

D. Second order

Answer: B

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16. The plot of In k versus $\frac{1}{T}$ is liner with slope of

A. $\frac{E_a}{R}$

B. Ea/2.303R

C. In A

D. $-\frac{E_a}{R}$

Answer: D

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17. The activation energies of the forward and backward reactions in the case of a chemical reaction are 37.5 and 51.3 kJ/mole respectively The reaction is

A. Endothermic

B. Exothermic

C. Neither exothermic nor endothermic

D. Independent of temperature

Answer: B

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18. Catalyst increases the rate by

A. Increasing the activation energy

B. Decreasing the activation energy

C. Increasing the average KE of the molecules

D. Changing enthalpy (ΔH) of the reaction

Answer: B

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19. The Arrhenius equation expressing the effect of temperature on the rate constant of a reaction is given as

A. $k = \frac{E_a}{R}T$

B. $k = e^{-\frac{E_a}{R}T}$

C. $k = Ae^{-\frac{E_a}{R}T}$

D. $k = In\frac{E_a}{R}T$

Answer: C

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20. The correct plot for In k vs 1/T?

A. 

B. 

C. 

D. 

Answer: A

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21. With respect to the equation, k = Ae^(-Ea/RT) in chemical kinetics, which one of the following statements is correct?

A. R is Boltzmann constant

B. E_a is energy of activation

C. A is concentration of reactant molecule

D. k is equilibrium constant

Answer: B

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22. For a reaction, activation energy (E_a) =0 and rate constant, $k = 1.5x10^4 s^{-1}$ at 300 K. What is the value of rate constant at 320 K'?

A. $3.2x10^6 s^{-1}$

B. $3.2x10^4 s^{-1}$

C. $1.5x10^4 s^{-1}$

D. $6.4x10^8 s^{-1}$

Answer: C

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23. The activation energy for a reaction that doubles the rate when the temperature is raised from 300 K to 310 K is (log 2 = 0.3)

A. $50.6kJmol^{-1}$

B. $75.45kJmol^{-1}$

C. $45.5kJmol^{-1}$

D. $53.4kJmol^{-1}$

Answer: D

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24. Which among the following is the most appropriate statement about collision theory of reaction rates?

A. It only states that rate depends upon the frequency at which reactants collide

B. It only explains the effect of temperature on rate of reaction

C. The collisions of the molecules having energy equal to threshold value and proper orientation give successful reaction

D. It only assumes that the reactants must he in correct orientation to react

Answer: C

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25. The activation energy for a reaction is 9 kcal/mol. The increase in late (XI 'slant when its temperature is increased from 298K to 308 K is $\left(R = 2calK^{-1}mot^{-1}, 10^{0.213} = 1.63\right)$

A. 0.75

B. 0.25

C. 1

D. 0.63

Answer: D

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26. The rate constant, activation energy, and Arrphenius parameter of a chemical reaction are $3.0 \times 10^{-4} s^{-1}$, $104.4 KJmol^{-1}$, and $6.0 \times 10^{14} s^{-1}$, respectively. The value of rate constant as $T \to \infty$ is

A. $1.5x10^{5} s^{-1}$

B. $2.0x10^{10}s^{-1}$

C. $6.0x10^{14}s^{-1}$

D. Zero

Answer: C

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27. A catalyst lowers the activation energy of a reaction from 20 kJ mol^(-1) to 10 kJ mol^(-1). The temperature at which uncatalysed reaction will have same rate as that of catalysed at 27°C is

A. 327°C

B. 283°C

C. 445°C

D. 600°C

Answer: A

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

A. 350.5 K

B. 270.2 K

C. 453.6 K

D. 311.5 K

Answer: D

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29. The rate constant for the decomposition of N_2O_5 in $\mathbb{C}l_4$ is 6.2 x 10 ^ $(-4)s^{-1}$ at 45°C. Calculate the rate constant at 100°C if the activation energy is 103 kJ mol^{-1} [Ant (2.49) = 309]

A. $1.9x10^{-1}s^{-1}$

B. $3.5x10^{-2}s^{-1}$

C. $4.5x10^{-1}s^{-1}$

D. $1.75x10^{-2}s^{-1}$

Answer: A

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