Harcourt Butler Technical University
Department of Chemistry

Question Bank for MCQs from Unit: Chemical Kinetics

Subject: Engineering Chemistry
Subject Code: BCY102
Name of Faculty: Dr. Sudhir Kumar Gupta

Q1. Which of the following is not a method for determination of the order of a reaction?
(a) Van't Hoff method
(b) Ostwald's dilution method
(c) Half life method
(d) Lewis method

Answer: (d)

Q2. Flow technique is used to study
(a) Condensation reaction
(b) Fast reaction
(c) Complex reactions
(d) Slow reactions

Answer: (b)

Q3. A second order reaction, whose rate constant at 800°C was found to be 5×10^{-3} lit mol^{-1} sec^{-1} has activation energy of 45 kJ mol^{-1}. What is the value of rate constant at 875°C?
(a) 7×10^{-3} lit mol^{-1} sec^{-1}
(b) 7.5×10^{-3} lit mol^{-1} sec^{-1}
(c) 3.5×10^{-3} lit mol^{-1} sec^{-1}
(d) 8×10^{-3} lit mol^{-1} sec^{-1}

Answer: (a)

Q4. Catalysts increase the rate of reaction by
(a) Weakening the bonds of reactants
(b) Giving proper orientation to the reactions
(c) Changing the reaction pathway
(d) All of the above

Answer: (d)

Q5. Which of these does not influence the rate of reaction?

(a) Nature of the reactants
(b) Concentration of the reactants
(c) Temperature of the reactants
(d) Molecularity of the reaction

Answer: (d)

Q6. The role of a catalyst is to change _____.
(a) Gibbs free energy of reaction.
(b) enthalpy of reaction.
(c) activation energy of reaction.
(d) equilibrium constant.
Answer: (c)

Q7. In the presence of a catalyst, the heat evolved or absorbed during the reaction _____.
(a) increases.
(b) decreases.
(c) remains unchanged.
(d) may increase or decrease.
Answer: (c)

Q8. Activation energy of a chemical reaction can be determined by
(a) determining the rate constant at standard temperature.
(b) determining the rate constants at temperature.
(c) determining probability of collision.
(d) using catalyst.
Answer: (b)

Q9. In which method for the determination of order of a reaction, the concept of the pseudo order reaction is applied?
(a) Integrated rate equation method
(b) Van't Hoff method
(c) Ostwald's dilution method
(d) Differential method
Answer: (c)

Q.10. Consider the Arrhenius equation given below and mark the correct option

$$K = A\, e^{-Ea/RT}$$

(a) Rate constant increases exponentially with increasing activation energy and decreasing temperature.
(b) Rate constant decreases exponentially with increasing activation energy and decreasing temperature.
(c) Rate constant increases exponentially with decreasing activation energy and decreasing temperature.
(d) Rate constant increases exponentially with decreasing activation energy and increasing temperature.
Answer: (d)

Q.11. Which of the following statements is not correct about order of a reaction.
(a) The order of a reaction can be a fractional number.
(b) Order of a reaction is experimentally determined quantity.
(c) The order of a reaction is always equal to the sum of the stoichiometric coefficients of reactants in the balanced chemical equation for a reaction.

(d) The order of a reaction is the sum of the powers of molar concentration of the reactants in the rate law expression.

Answer: (c)

Q.12. Michaelis Menten equation is related to

(a) Effect of temperature on reaction rate
(b) Enzyme catalysis
(c) Chemical equilibrium
(d) Heterogeneous reactions

Answer: (b)

Q.13. Rate law for the reaction $A + 2B \rightarrow C$ is found to be Rate = k [A][B]. Concentration of reactant 'B' is doubled, keeping the concentration of 'A' constant, the value of rate of reaction will be_____.

(a) the same
(b) doubled
(c) quadrupled
(d) halved

Answer: (b)

Q.14. Which of the following statements is incorrect about the collision theory of chemical reaction?

(a) It considers reacting molecules or atoms to be hard spheres and ignores their structural features.
(b) Number of effective collisions determines the rate of reaction.
(c) Collision of atoms or molecules possessing sufficient threshold energy results into the product formation.
(d) Molecules should collide with sufficient threshold energy and proper orientation for the collision to be effective.

Answer: (c)

Q.15. Effect of temperature on reaction rate is explained by

(a) Michaelis Menten Equation
(b) Van't Hoff equation
(c) Arrhenius equation
(d) None of the above

Answer: (d)

Q.16. The rate of reaction where the concentration of the reactants is unity is called as

(a) Specific reaction rate
(b) Absolute reaction rate
(c) Overall reaction rate
(d) Instantaneous reaction rate

Answer: (a)

Q.17. Flow methods are used to study the kinetics of:

(a) Complex reactions
(b) Acid-base reactions
(c) Catalytic reactions
(d) Fast reactions

Answer: (d)

Q.18. Which factors can change the value of k?

(a) Order of reaction
(b) Concentration of reactants

(c) Temperature of reaction
(d) Both (a) and (c)
Answer: (d)

Q.19. Temperature coefficient is defined as the ratio of rate constants of the reaction
(a) differing by 100°C
(b) differing by 10°C
(c) differing by 5°C
(d) differing by 5 K
Answer: (b)

Q.20. What is the important factor for a reaction to occur?
(a) Sufficient energy for collision
(b) Proper orientation
(c) Both of these
(d) Only (a)
Answer: (c)

Q.21. Enzymes are _____ with high relative molar mass.
(a) Carbohydrates
(b) Fats
(c) Vitamins
(d) Proteins
Answer: (d)

Q.22. Which of the following is the correct form of Michaelis Menten equation?
(a) $r= k_2[E]_0[S]/(K_m+ [S])$
(b) $r= k_m[E]_0[S]/(K_m+ [S])$
(c) $r= k_m[E]_0[S]/(K_1- [S])$
(d) $r= k_2[S]/(K_m+ [S])$
Answer: (a)

Q.23. For an elementary reaction, which of the following statement is true?
(a)
Answer: (c)

Q.24. The equation $k_n=0.693/t_{1/2}$, is valid for
(a) zero order reaction
(b) first order reaction
(c) second order reaction
(d) third order reaction
Answer: (b)

Q.25. The study of Chemical Kinetics includes:
(a) The rate of the reactions and rate laws.
(b) The factors as temperature, pressure, concentration and catalyst, which influences the rate of a reaction.
(c) The mechanism or the sequence of steps by which a reaction occurs.
(d) All of the above
Answer: (d)

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Question Bank for MCQs from Unit: Environmental Chemistry

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1. Which of the following statement is true?
(a) Eutrophication is good for aquatic life
(b) Eutrophication has no effect on aquatic life
(c) Eutrophication is not good for aquatic life
(d) None of these
Answer: (c)

2. Which vertical section of earth's atmosphere extends from18 km of its surface to 150 km?
(a) Stratosphere
(b) Ionosphere
(c) Troposphere
(d) Exosphere
Answer: (a)

Q.3. VOC in air pollution stands for
(a) Variable organic components
(b) Volatile oxidative components
(c) Volatile organic compounds
(d) Vital organic compounds
Answer: (c)

Q.4. Hydrocarbons can be converted into photochemical oxidant by a series of reactions called as _____
(a) PAN
(b) CFC
(c) NO_x
(d) Freon
Answer: (a)

Q.5. Particulate matter is also called as:
(a) CFC
(b) Green house gas
(c) Aerosol
(d) Gasoline
Answer: (c)

Q.6. Which of the following is not a method for control of particulate matter
(a) Fabric Filter
(b) Cyclone separator
(c) Electrostatic precipitator
(d) Eutrophication
Answer: (d)

Q.7. Ozone present is a ground level of atmosphere is
(a) good for health
(b) a pollutant
(c) causes no effect
(d) None of the above
Answer: (b)

Q.8. Smog is a combination of
(a) Smoke and particulate matter
(b) Smoke and fog
(c) Particulate matter and fog
(d) humidity and particulate matter
Answer: (b)

Q.9. Which of the following is not a ozone depleting substances (ODS)?
(a) chlorofluorocarbons
(b) bromine
(c) hydrofluoroalkane
(d) CO_2
Answer: (d)

Q.10. Ingestion of cadmium in water causes following disease
(a) Dancing cat
(b) itai-itai
(c) COVID-19
(d) cancer
Answer: (b)

Q.11. Photochemical smog normally does not contain
(a) Chlorofluorocarbons
(b) Peroxyacetyl nitrate
(c) Ozone
(d) Acrolein
Answer: (a)

Q.12. Depletion of the ozone layer is caused due to
(a) Ferrocene
(b) Fullerenes
(c) Freons
(d) Polyhalogens
Answer: (c)

Q.13. Find the incorrect statement
(a) BOD value of clean water is less than 5 ppm
(b) Drinking water pH should be between 5.5-9.5
(c) carbon, sulphur and nitrogen oxides are the most widespread air pollutants
(d) dissolved oxygen concentration below 5 ppm is ideal for the growth of fish
Answer: (d)

Q.14. Find the secondary pollutant among these
(a) PAN
(b) N_2 O
(c) SO_2
(d) CO_2
Answer: (a)

Q.15. The reaction responsible for the radiant energy of the Sun is
(a) nuclear fission
(b) nuclear fusion
(c) chemical reaction
(d) combustion
Answer: (b)

Q.16. Alum's capacity to purify water is due to
(a) softens hard water
(b) pathogenic bacteria gets destroyed
(c) impurities' coagulation
(d) it improves taste
Answer: (c)

Q.17. The coldest region of the atmosphere
(a) Troposphere
(b) Thermosphere
(c) Stratosphere
(d) Mesosphere
Answer: (d)

Q.18. Which of the oxide of nitrogen is not a common pollutant?
(a) N_2 O_5
(b) N_2 O
(c) NO_2
(d) NO
Answer: (a)

Q.19. The compound essential for the process of photosynthesis has this element
(a) Ca
(b) Ba
(c) Fe
(d) Mg

Answer: (d)

Q.20. In the air, N and O occur naturally but they do not react to form oxides of nitrogen because
(a) oxides of nitrogen are unstable
(b) catalyst is required for the reaction
(c) the reaction is endothermic
(d) N and O do not react with each other
Answer: (c)

Q.21. Which bacteria produce offensive smell during degradation of organic matter?
(a) Aerobic bacteria
(b) Anaerobic bacteria
(c) Pathogenic bacteria
(d) Non-pathogenic bacteria
Answer: (b)

Q.22. Domestic sewage water contains
(a) bad odour
(b) Organic and inorganic impurities
(c) pathogenic bacteria
(d) All of these
Answer: (d)

Q.23. Sewage treatment is carried out in:
(a) two stage- primary and secondary
(b) three stages- primary, secondary and tertiary
(c) single step
(d) four stage- primary, secondary, tertiary and quaternary
Answer: (b)

Q.24. In secondary stage of sewage treatment we use:
(a) bacteria
(b) filteration
(c) chemicals
(d) disinfectants
Answer: (a)

Q.25. Disinfection of waste water can be done by
(a) passing Chlorine gas
(b) UV-light
(c) Ozone
(d) All of these
Answer: (d)