M Sc SEM II
CHNN-503
PHYSICAL CHEMISTRY

Q 1 Which factor has no influence on the rate of reaction ?
- (a) Molecularity
- (b) Temperature
- (c) Concentration of Reactant
- (d) Nature of Reactant

Q 2 For a Zero order reaction.
- (a) Plot of $[R_0]$ vs time is a straight line.
- (b) Plot of [R] vs time is a straight line.
- (c) Plot of [R] vs time has slope = k
- (d) Plot of $[R_0]$ vs time has slope = -k

Q 3 The unit and value of rate constant and that of rate of reaction are same for
- (a) First order
- (b) Zero order
- (c) Second order
- (d) None of these

Q 4 A reaction A→B follows second order kinetics, doubling the concentration of A will increase the rate of formation of B by a factor of
- (a) 2
- (b) ½
- (c) 4
- (d) ¼

Q 5 The rate constant for a first order reaction is equal to the initial rate of reaction when the initial concentration of the reactant is
- (a) 100 M
- (b) 1×10^{-2} M
- (c) 1.0 M
- (d) 0.1 M

Q 6 The hydrolysis of ethyl acetate is a reaction of
- (a) First order
- (b) Second order
- (c) Third order
- (d) Zero order

Q 7 A reaction is 50 % complete in 2 hours and 75 % complete in 4 hours. The order of the reaction is

(a) 0
(b) 1
(c) 2
(d) 3

Q 8 Which of the following is the correct relation for $t_{1/2}$ of a first order reaction?

(a) $t_{1/2} = 0.693/k$
(b) $t_{1/2} = \ln 2/k$
(c) Both (a) and (b)
(d) None of these

Q 9 Which of the following option is true for a second order reaction?

(a) $t_{1/2}\ \alpha\ 1/a$
(b) Unit of k is s^{-1}
(c) $k = \frac{1}{t}\ \frac{a(a-x)}{x}$
(d) T1/2 is independent of initial concentration.

Q 10 Which of the following expression gives the effect of temperature on the rate constant?

(a) $\ln k = \ln A + E_a/RT$
(b) $\ln k = A - E_a/RT$
(c) $K = \ln A + \ln E_a/RT$
(d) $\ln k = \ln A - E_a/RT$

Q 11 The plot of log k vs 1/T helps to calculate

(a) energy of activation
(b) rate constant of the reaction
(c) order of the reaction
(d) energy of activation as well as the frequency factor.

Q 12 Effect of temperature on reaction rate is given by

(a) claisen-clapeyron equation
(b) Arrhenius equation
(c) Gibb's-Helmholtz equation
(d) Kirchoff's equation

Q 13 Collision theory is applicable to

(a) First order reactions
(b) Zero order reactions
(c) Bimolecular reactions

(d) Intermolecular reactions.

Q 14 For effective collisions, colliding molecules must have

(a) Minimum potential energy
(b) Sufficient kinetic energy
(c) Sufficient potential energy
(d) Maximum energy of activation

Q 15 Freundlich adsorption isotherm gives a straight line on plotting

(a) x/m vs p
(b) log x/m vs p
(c) log x/m vs log p
(d) x/m vs 1/p

Q 16 How many layers are absorbed in chemical adsorption?

(a) One
(b) Two
(c) Many
(d) Zero

Q 17 Langmuir adsorption isotherm works particularly well for

(a) Where multilayer adsorption can take place
(b) Where only unimolecular adsorption takes place
(c) At initial stage where unimolecular adsorption takes place and after that multimolecular adsorption starts
(d) All of these.

Q 18 At CMC the surfactant molecules

(a) Decompose
(b) Become completely soluble
(c) Associate
(d) Dissociate.

Q 19 The CMC of a given soap in water is 10^{-3} mol litre^{-1}. A 10^{-4} mol litre^{-1} solution of this soap in water is a

(a) Lyophilic sol.
(b) Lyophobic sol.
(c) True solution
(d) None of these.

Q 20 Micelles are

(a) Emulsion cum gel
(b) Adsorbed catalysts
(c) Ideal solutions
(d) Associated colloids.

Q 21 Soap removes grease by
(a) Adsorption
(b) Emulsification
(c) Coagulation
(d) None of these.

Q 22 Micelles may be formed by aggregates of soap anions in water as the anions are
(a) Hydrophilic
(b) Hydrophobic
(c) Diphilic (one hydrophilic head being attached to a long hydrophobic tail)
(d) Carriers of electricity.

Q 23 In Freundlich adsorption isotherm,the value of 1/n is
(a) Between 0 and 1 in all cases
(b) Between 2 and 4 in all cases
(c) 1 in case of physical absorption
(d) 1 in case of chemisorptions.

Q 24 Which one of the following characteristics is associated with adsorption?
(a) ΔG and ΔH are negative but ΔS is positive.
(b) ΔG and ΔS are negative but ΔH is positive.
(c) ΔG is negative but ΔH and ΔS are positive.
(d) ΔG, ΔH and ΔS all are negative.

Q 25 Thermosets are
(a) Cross-linked polymers
(b) Don't melt or soften on heating.
(c) Cross-linking is usually developed at the time of moulding where they harden.
(d) All of the above.

Q 26 A condensation polymer among the following is
(a) Melamine
(b) PVC
(c) Polystyrene
(d) Teflon.

Q 27 Which of the following is not an addition copolymer?
(a) Saran
(b) Vinyon
(c) SBR

(d) PVC

Q 28 Cellulose acetate is
(a) Natural rubber
(b) Semi-synthetic polymer
(c) Synthetic polymer
(d) Plasticizer.

Q 29 PVC is an example of
(a) Thermoset
(b) Cellulose
(c) Natural rubber
(d) Nylon

Q 30 Polymers can be classified on the basis of
(a) Origin
(b) Structure
(c) Mechanism of formation
(d) All of these.

Q 31 Chemically, pure cotton is named as
(a) Acetate rayon
(b) Cellulose
(c) Viscose rayon
(d) All of these

Q 32 Which of the following is a monomer of natural rubber?
(a) Chloroprene
(b) Caprolactum
(c) Urea
(d) None of these

Q 33 Which of the following is a polyamide?
(a) Teflon
(b) Nylon-6,6
(c) Terylene
(d) Bakelite

Q 34 The raw material to from nylon is
(a) Adipic acid
(b) Butadiene
(c) Isoprene
(d) Ethylene.

Q 35 Terylene is made by polymerization of terephthalic acid with
(a) Ethylene glycol

(b) Phenol
(c) Ethanol
(d) Catechol

Q 36 If 30% molecules have M=20000, 40% molecules have M=30000, rest of them have M=60000, PDI is
(a) 0.83
(b) 1.45
(c) 0.98
(d) 1.20

Q 37 The mass average molecular mass is obtained by measurement of a property such as
(a) Osmotic pressure
(b) Light scattering
(c) Vapour pressure
(d) Refractive index.

Q 38 Polydispersity index (PDI) is
(a) $\frac{\bar{M}_w}{\bar{M}_n}$
(b) $\frac{\bar{M}_n}{\bar{M}_w}$
(c) $\bar{M}_w \, x \, \bar{M}_n$
(d) $\bar{M}_w - \bar{M}_n$

Q 39 Which of the following is a biodegradable polymer?
(a) Cellulose
(b) Polythene
© Polyvinyl chloride
(d) Nylon-6

Q 40 Which of the following is used to make non-stick cookware?
(a) PVC
(b) Polystyrene
(c) Polyethylene
(d) Polytetrafluoroethylene

Q 41 The increase in the molar conductivity of HCl with dilution is due to
(a) Increase in the self ionization of water
(b) Hydrolysis of HCl
(c) Decrease in the self ionization of water
(d) Decrease in the interionic forces

Q 42 Which one of the following statements is incorrect?
(a) Specific conductivity decreases with dilution

(b) Equivalent and molar conductivities increase with dilution
(c) $\wedge_\infty$ for a weak electrolyte cannot be found by extrapolation of the graph between ∧ and concentration to zero concentration.
(d) Molar conductivity of a strong electrolyte increases with dilution because ionization increases with dilution.

Q 43 Molten sodium chloride conducts electricity due to the presence of
(a) Free electrons
(b) Free ions
(c) Free molecules
(d) Atoms of sodium chlorine.

Q 44 The correct order of equivalent conductance at infinite dilution of LiCl,NaCl and KCl is
(a) LiCl > NaCl > KCl
(b) KCl > NaCl > LiCl
(c) NaCl > KCl > LiCl
(d) LiCl > KCl > NaCl

Q 45 Specific conductance of 0.1 M nitric acid is 6.3×10^{-2} ohm^{-1} cm^{-1}. The molar conductance of the solution is
(a) 630 ohm^{-1} cm^2 mol^{-1}
(b) 315 ohm^{-1} cm^2 mol^{-1}
(c) 6.300 ohm^{-1} cm^2 mol^{-1}
(d) 63.0 ohm^{-1} cm^2 mol^{-1}

Q 46 The conductivity of 0.001028 mol L^{-1} acetic acid is 4.95×10^{-5} S cm^{-1}. Calculate its dissociation constant if Λ_m^0 for acetic acid is 390.5 S cm^2 mol^{-1}.
(a) 1.78×10^{-5} mol L^{-1}
(b) 1.87×10^{-5} mol L^{-1}
(c) 0.178×10^{-5} mol L^{-1}
(d) 0.0178×10^{-5} mol L^{-1}

Q 47 Which of the following postulates of Debye-Huckel theory is/are true?
(a) The strong electrolyte is completely ionized at all dilutions.
(b) The oppositely charged ions are completely distributed in the solution but the cations tend to be found in the vicinity of anions and vice-versa.
(c) Decrease in equivalent conductance with increase in concentration is due to fall in mobilities of ions due to inter-ionic effect.
(d) All of the above.

Q 48 Variation of molar conductivity with concentration of strong electrolyte is given by Huckel-Onsager equation expressed as:

(a) $\Lambda_M = \Lambda_\infty - b\sqrt{c}$
(b) $\Lambda_\infty = \Lambda_M - b\sqrt{c}$
(c) $\Lambda_M = b\sqrt{c} - \Lambda_\infty$
(d) none of ahese

Q 49 The degree of dissociation of an electrolyte depends on

(a) nature of solute
(b) nature of solvent
(c) concentration of solute
(d) all of these

Q 50 The term infinite dilution refers when:

(a) $\alpha \rightarrow 1$, for weak electrolytes
(b) An electrolyte is 100% dissociated
(c) All interionic effects disappears
(d) All of the above.

Que.	Ans.	Que.	Ans.	Que.	Ans.	Que.	Ans.	Que.	Ans.
1	a	11	d	21	b	31	b	41	d
2	b	12	b	22	c	32	d	42	d
3	b	13	c	23	a	33	b	43	b
4	c	14	b	24	d	34	a	44	b
5	c	15	c	25	d	35	a	45	a
6	a	16	a	26	a	36	d	46	a
7	b	17	b	27	d	37	b	47	d
8	c	18	c	28	b	38	a	48	a
9	a	19	c	29	b	39	a	49	d
10	d	20	d	30	d	40	d	50	d