Unit IIA

Que. Galvanic cell is capable of converting ----------------
A. Electrical energy into chemical energy
B. Thermal energy into chemical energy
C. Electrical energy into thermal energy
D. Chemical energy into Electrical energy
Ans. D

Que. For spontaneous cell reaction
$\Delta G^0 = -nFE^0$ where ΔG^0 must be
A. Zero
B. Negative
C. Positive
D. Half
Ans. B

Que------------------- is a primary reference electrode.
A. Calomel electrode
B. Standard Hydrogen electrode
C. Ag-AgCl electrode
D. Glass electrode
Ans. B

Que. Reference electrode is the electrode with ---------------
A. Potential
B. Known and constant EMF
C. Zero current
D. Equal resistance
Ans. B

Que. Calomel electrode is ----------------
A. Primary reference electrode
B. Secondary reference electrode
C. Indicator electrode
D. Standard electrode
Ans. B

Que. Glass electrode is ----------------
A. Primary reference electrode
B. Secondary reference electrode
C. Indicator electrode
D. Standard electrode
Ans. C

Que. The Glass electrode comprise of the thin walled bulb of ----------------
responsive glass at the bottom.

A. Anion
B. Cation
C. Electron
D. Nucleus
Ans. B

Que. In glass electrode response is relatively indifferent to----------------
A. Cation
B. Anion
C. H^+ ion
D. None of the above
Ans. B

Que. In glass electrode response is not dependent upon concentration of -------------
A. Cation
B. Anion
C. H^+ ion
D. None of the above
Ans. B

Que. $HgHgCl_2$, KCl (saturated)   is representation of
A. Calomel electrode
B. Standard Hydrogen electrode
C. Ag-AgCl electrode
D. Glass electrode
Ans. A

Que.   Degree of selectivity and order of selectivity of ions in ion selective electrode can be changed with an appropriate adjustment in --------------- --.
A. Internal solution
B. Composition of membrane
C. External solution
D. None of the above
Ans. B

Que. The glass electrode comprise of thin bulb of ----------------------- glass.
A. Anion responsive
B. High resistivity
C. Cationresponsive
D. High conductivity
Ans. C

Que. The part of glass electrode that directly participate in the equilibrium is ……………
A. Internal reference electrode
B. The gel layer of the glass
C. External reference electrode
D. None of the above
Ans. B

Que.   The potential developed across the ion selective membrane is related to---------------
A. H^+ ion concentration of solution only
B. Activities of ion of interest in the internal gel and sample solution
C. Concentration of ion of interest in sample solution only
D. H+ ion and ion of interest in sample solution of only
Ans. B

Que. Ion selective electrode measured --------------
A. Activity rather than potential
B. Concentration rather than Activity
C. Potential rather than activity
D. Activity rather than concentration
Ans. D

Que. Cells which produce electricity are called
A. Galvanic cells
B. Electrochemical cells
C. Electrolytic cells
D. None of the above
Ans. A

Que. Cells which use electric energy are called
A. Galvanic cells
B. Electrochemical cells
C. Electrolytic cells
D. None of the above
Ans. C

Que. The emf of primary reference electrode is arbitrarily fixed at
A. One
B. Ten
C. Zero
D. Hundred
Ans. C

Que. In glass electrode, glass membrane acts as a
A. Membrane filter
B. Adsorbing membrane
C. Ion exchange resin
D. Separating membrane
Ans. C

Que. Potential of ion selective electrode depends upon ------
A. Concentrations of selected ions
B. Type of ions
C. H^+ ion concentration
D. Proportion of ionised and non- ionised species
Ans. A

Que. The measure of tendency of metallic electrode to lose or gain electrons when it is in contact with solution of its own salt is called
A. Electromotive force
B. Electrical conductance
C. Electrode potential
D. None of the above
Ans. C

Que.   In case of calomel electrode, potential decreases with
A. Increase in concentration of KCl
B. Decrease in concentration of KCl
C. Increase in concentration of Hg Cl_2
D. Decrease in concentration of Hg Cl_2
Ans. B

Que. Choose the correct option with respect to reference electrode
A. It has a stable and reproducible electrode potential
B. Obeys Nernst's equation
C. It has high electrode potential stability via a redox system or oxidation-reduction reactions
D. All of these

Ans. D

Que. Calomel is made by using
A. Hg with mercurous chloride
B. Hg with mercuric chloride
C. Zn with mercurous chloride
D. Ca with mercurous chloride
Ans. A

Que. Secondary reference electrode is
A. Hydrogen electrode
B. Hydrogen chloride electrode
C. Glass electrode
D. Silver electrode
Ans. C

Que. In glass electrode, the potential produced across the membrane is used to measure
A. pH of the solution
B. Pressure of the solution
C. Concentration of the solution
D. Temperature of the solution
Ans. A

Que. Calomel is an example of
A. Primary reference electrode
B. Secondary reference electrode
C. Galvanic electrode
D. None of these
Ans. B

Que.　Potential of calomel electrode for 1 N KCl at 25^0C is
A. 0.280 V
B. 0.380 V
C. 0.480 V
D. 0.580 V
Ans. A

Que.　Potential of calomel electrode for 0.1 N KCl at 25^0C is
A. 0.3080 V
B. 0.3338 V
C. 0.3480 V
D. 0.3580 V
Ans. B

Que.　Electrolysis involves --------- at anode and ------------- at cathode
A. Deposition, dissolution
B. Dissolution, oxidation
C. Reduction, oxidation
D. Oxidation, reduction
Ans. D

Que.　Inert platinum electrode is used as --------- electrode in the potentiometric titrations
A. Redox, acid-base
B. Indicator, redox
C. Reference, precipitation
D. Primary, complexometric
Ans. B

Que.　Glass electrode is represented as- -------. The main advantage of glass electrode is---
A. Ag, AgCl ∣ 1M HCl, portable and compact
B. Ag, AgCl ∣ 0.01M HCl, cheaper than calomel
C. Ag, AgCl 0.1M HCl, can be used in presence of oxidizing and reducing agents
D. Ag, AgCl　0.001M HCl, easily available
Ans. A

Que.　Which is the characteristics of cell EMF from the following properties:
1. It is the maximum voltage the cell can deliver
2. It is not responsible for the steady flow of current in the cell
3. It is always less than the maximum value of voltage
4. It is the potential difference between the two electrodes when no current is flowing in the circuit
A. 1 and 2
B. 2 and 3
C. 1 and 4
D. 1 and 3
Ans. C

Que. Match the following terms with their units

1	Specific resistance	L	Mho.cm^2.gm ol^{-1}
2	Cell constant	M	Mho.cm-1
3	Molar conductance	N	Ohm.cm
4	Specific conductance	O	cm-1

A. 1-N, 2-O, 3-L, 4-M
B. 1-M, 2-O, 3-N, 4-L
C. 1-L, 2-N, 3-M, 4-O
D. 1-O, 2-L, 3-M, 4-N
Ans. A

Que. The equivalent conductance of an electrolyte solution is equal to the sum of the conductivities of constituent cation Λ^+ and an anion Λ^-.This is the statement of --------------------
A. Lambert's law
B. Beer's law
C. Kohlrausch law
D. Beer's –Lambert's law
Ans. C

Que. The ratio of specific conductance of the solution and its measured conductance is known as --------
A. Specific resistance
B. Cell constant
C. Conductance
D. Equivalent conductance
Ans. B

Que. In electrolytic cell electrode at which oxidation takes place is known as ---------------
A. Anode
B. Cathode
C. Oxielectrode
D. None of the above
Ans. A

Que. In electrolytic cell electrode at which reduction takes place is known as ---------------
A. Anode
B. Cathode
C. Oxielectrode
D. None of the above
Ans. B

Que. Oxidation is -----------------
A. Loss of electron
B. Gain of electron
C. Transfer of electron
D. Excitation of electron
Ans. A

Que. Reduction is -----------------
A. Loss of electron
B. Gain of electron
C. Transfer of electron
D. Excitation of electron
Ans. B

Que. The metal with half -cell reactions which gives negatives E^0 value with respect SHE is -------
A. Powerful reducing agent than H_2
B. Powerful Oxidising agent than H_2
C. Mild reducing agent than H_2
D. None of the above
Ans. A

Que. E^0 value of Cu which is placed below H_2 in ECS is observed to be--------------
A. Positive
B. Negative
C. Zero
D. Any one of the above
Ans. A

Que. The analytical technique in which two identical inert electrodes are used along with electrolyte is --------- --.
A. Potentiometry
B. Conductometry
C. pHmetry
D. None of the above
Ans. B

Que. The traditional instrument used for measuring electrolytic conductance is ----------------
A. Potentiometer
B. Conductometer
C. pH meter
D. None of the above
Ans. B

Que. In voltaic cell the salt bridge---------------
A. Is not essential
B. Allows mechanical mixing
C. Allows charge balance
D. Is plugged firmly to avoid mixing of ion
Ans. C

((Q))_2//Which of the following statement hold true for an operating galvanic cell---------------
A. $\Delta G > 0$ and Ecell < 0
B. $\Delta G = 0$ and Ecell < 0
C. $\Delta G = 0$ and Ecell $= 0$
D. $\Delta G < 0$ and Ecell > 0
Ans. D

((Q))_2//Which of the following statement hold true for operating electrolytic cell---------------
A. $\Delta G > 0$ and Ecell < 0
B. $\Delta G = 0$ and Ecell < 0
C. $\Delta G = 0$ and Ecell $= 0$
D. $\Delta G < 0$ and Ecell > 0
Ans. B

Que. Cell constant $\times$ Observed conductance =----------------------
A. Specific conductance
B. Molar conductance
C. Equivalent conductance
D. None of the above
Ans. A

Que. Unit of Specific conductance is --------------------.
A. mhos cm^{-1}
B. S cm^{-1}
C. mhos
D. None of the above
Ans. A

Que. Unit of Molar conductance is --------------.
A. mhos cm^{-1}
B. S cm^{-1}
C. mhos
D. None of the above
Ans. C

Que. Unit of Cell constant is----------------.
A. mhos cm^{-1}
B. S cm^{-1}
C. mhos
D. None of the above
Ans. D

Que. Unit for specific conductance is
A. Ω
B. mho
C. Ω cm
D. Ω^{-1}cm^{-1}
Ans. D

Que. unit for molar conductivity is
A. Ωcm^{2}mol^{-1}
B. Ω^{-1}cm^{2}mol
C. Ω^{-1}cm^{2}mol^{-1}
D. Ω^{-1}cmmol^{-1}
Ans. C

Que. Cell constant of a conductivity cell is given as
A. Ratio of distance between the electrodes and cross sectional area of the electrodes
B. Ratio of specific conductance and measured conductance
C. Both A and B
D. None of these
Ans. C

Que. A conductivity cell consists of
A. Two parallel electrodes one made of Ag and the other of Pd
B. Two parallel electrodes one made of Pt and the other of Pd

C. Two perpendicular electrodes one made of Pt

D. Two parallel electrodes made of Pt

Ans. D

Que. electrodes in a conductivity cell are coated with layer of finely divided platinum black

A. to reduce ionization

B. to reduce depolarization

C. to reduce chromatization

D. to reduce polarization

Ans. D

Que. Distance between electrodes in a conductivity cell

A. Can be altered according to the reaction

B. Is kept fixed

C. Can be altered as per the requirement

D. Alters as reaction proceeds

Ans. B

Que. Molar conductance of a solution is

A. Specific conductance x volume in cc containing 1 gm mole of electrolyte

B. Specific conductance x volume in cc containing 1 gm equivalent of electrolyte

C. Molar conductance x volume in cc containing 1 gm equivalent of electrolyte

D. Equivalent conductance x volume in cc containing 1 gm equivalent of electrolyte

Ans. A

Que. A pair of electrodes used for measurement of conductometric titration are made up of

A. Pt

B. Ag

C. Hg

D. Graphite

Ans. A

Que. The reciprocal of resistance is called-----

A. Conductance

B. Potential

C. Current

D. Cell constant

Ans. A

Que. The reciprocal of specific resistance is called-----

A. Conductance

B. Specific Conductance

C. Molar Conductance

D. Equivalent Conductance

Ans. B

Que. For weak electrolyte $\dfrac{\Lambda}{\Lambda_0}$ gives the value of----

A. Dissociation constant

B. Degree of dissociation

C. Degree of hydrolysis

D. Dissociation of ions

Ans. B

Que. Equivalent conductance of a solution is----

A. Specific conductance x volume in cc containing 1 g mole of electrolyte

B. Specific conductance x volume in cc containing 1 g equivalent of electrolyte

C. Molar conductance x volume in cc containing 1 g equivalent of electrolyte

D. Equivalent conductance x volume in cc containing 1 g equivalent of electrolyte

Ans. B

Que. Conductance of strong acid- strong base titration increases because of conductivity of-

A. Excess of OH^- ions

B. Neutralized H^+ ions

C. Heavy alkali metal

D. Heavy halide ions

Ans. A

Que. The conductance remains almost constant till equivalence point in conductometric precipitation titration of $AgNO_3$ vs NaCl as ionic conductance of

A. Ionic conductance of Ag^+ has high value

B. Ionic conductance of Na^+ has high value

C. Ionic conductance of Ag^+ & Na^+ has almost similar value

D. Ionic conductance of Ag^+ & Na^+ is zero

Ans. C

Que. Unit of Equivalent conductance is --------------.
A. mhos cm-1
B. S cm-1
C. mhos
D. None of the above
Ans. D

Que. The conductance of volume of solution containing one gram equivalent of electrolyte when distance between two parallel electrode is 1 cm is called as-----------------.
A. Molar conductance
B. Equivalent conductance
C. Specific conductance
D. Molecular conductance
Ans. B

Que. The conductance of a conductor of one meter in length with uniform cross sectional area of $1m^2$ is called as -----------------.
A. Molar conductance
B. Equivalent conductance
C. Specific conductance
D. Molecular conductance
Ans. C

Que. Conductance of solution depends upon---------------------- --.
A. Concentration of solution.
B. Temperature.
C. Mobility of ions
D. All above
Ans. D

Que. Titration curve of conductometric titration consist of two intersecting lines the intersection point is known as-----------------.
A. Conductivity point
B. End point
C. Break curve point
D. None of the above
Ans. B

Que. The measurement of conductance is based on the principle ---------------
A. Closed end circuit
B. Wheatstone bridge circuit
C. Open end circuit
D. None of the above
Ans. B

Que. $\Lambda^0_{(AB)}=\Lambda^0_{(A+)}+\Lambda^0_{(B+)}$ is the mathematical statement for----
A. Nernst law
B. Faraday law
C. Kohlrausch law
D. Helmholtz law
Ans. C

Que. The specific conductance of a solution falls on dilution because
A. Ions present per cm^3 of the solution become less
B. Electrons present per cm^3 of the solution become less
C. H^+ ions present per cm^3 of the solution become less
D. OH^- ions present per cm^3 of the solution become less
Ans. A

Que. According to Kolhrausch's law, "the equivalent conductance of an electrolyte at inifinite dilution is equal to----
A. Contribution of equivalent conductance of cations - equivalent conductance of anions
B. Contribution of equivalent conductance of cations + equivalent conductance of anions
C. Contribution of equivalent conductance of cations x equivalent conductance of anions
D. Contribution of equivalent conductance of cations /equivalent conductance of anions
Ans. B

Que. According to Kohlrausch's law, ions of an electrolyte move independently at-----
A. Any concentration
B. Infinite dilution

C. Infinite concentration
D. None of these
Ans. B

Que. In case of weak electrolyte, on dilution, there is increase in conductance which is due to--
A. Decreased dissociation
B. Moderate dissociation
C. Increased dissociation
D. None of these
Ans. C

Que. The conductance of solution increases with increase in temperature, due to----
A. Increase in the velocity of ions
B. Decrease in the viscosity of the medium
C. Decrease in the interaction between the ions
D. All of these
Ans. D

Que. In case of strong electrolyte, on dilution, increase in conductance is due to
A. Increase in the mobility of ions
B. Decrease in the mobility of ions
C. Increased dissociation
D. Decreased dissociation
Ans. A

Que. At infinite dilution ions move independently in electrolyte according to----
A. Ohm's law
B. Faraday's law
C. Kohlrausch's law
D. Nernst law
Ans. C

Que. /Equivalent, molar and specific conductance-----
A. Decrease with increase in temperature
B. Increase with increase in temperature
C. Increase with decrease in temperature
D. Remains constant with increase in temperature
Ans. B

Que. The relationship between equivalent conductance and specific conductance is
A. $\wedge = k.1000/C$
B. $k = \wedge.100/C$
C. $\wedge = k.C$
D. $k = \wedge/C$
Ans. A

Que. According to Kohlrausch's law, the equivalent conductance of an electrolyte at infinite dilution is equal to
A. $\wedge^0 a. \wedge^0 c$
B. $\wedge^0 a + \wedge^0 c$
C. $\wedge^0 c - \wedge^0 a$
D. $\wedge^0 a - \wedge^0 c$
Ans. B

Que. When concentrated solution of an electrolyte is diluted
A. Its specific conductance increases
B. Its specific conductance decreases
C. Its specific conductance increases and equivalent conductance decreases
D. Its specific conductance decreases and equivalent conductance increases
Ans. D

Que. In conductometric strong acid-strong base titration the conductance of the solution
A. Decreases upto end point and then increases
B. Increases upto end point and then decreases
C. Increases upto end point and then remains constant
D. Decreases upto end point and then remains constant
Ans. A

Que. In conductometric strong base-weak acid titration the conductance of the solution
A. Decreases upto end point and then increases
B. Increases very slowly upto end point and then increases rapidly
C. Increases upto end point and then decreases

D. remains constant upto end point and then increases
Ans. B

Que. In conductometric strong acid-weak base titration the conductance of the solution
A. Increases upto end point and then decreases
B. Remains constant upto end point and then decreases
C. Remains constant upto end point and then increases
D. Decreases upto end point and then remains constant
Ans. D

Que. When a strong acid is titrated against a strong base, the end point of the titration is the point of
A. Zero conductance
B. Minimum conductance
C. Maximum conductance
D. None of these
Ans. B

Que. In conductivity cell a pair of platinum electrodes are coated with
A. Platinum chloride
B. KCl
C. Silver chloride
D. Platinum black
Ans. D

Que. Which of the following solution has highest equivalent conductance?
A. NaCl
B. LiCl
C. HCl
D. KCl
Ans. C

Que. Conductivity of a solution is directly proportional to
A. Distance between the electrodes
B. Number of ions per cubic centimetre
C. Molecular weight of electrolyte
D. Volume of solution
Ans. B

Que. Which of the following relation is true for molar conductivity of a solution?
A. $\mu = K.1000/V$
B. $\mu = K/V$
C. $\mu = V.1000/K$
D. $\mu = K.V$
Ans. D

Que. Which of the following does not conduct electricity?
A. KCl
B. NaOH
C. CH_3COOH
D. Acetone
Ans. D

Que. Advantage of conductometric titration is-----
A. Can be used for colored solution
B. Can be used for weak acid-weak base titration
C. Can be used for mixture of acids
D. All of these
Ans. D

Que. Conductometric titrations of mixture of acids versus strong base is possible only if
A. Dissociation constants of the two acids are the same
B. Dissociation constants of the two acids differ by more than 10^4
C. Dissociation constants of one acid is zero
D. Dissociation constants of both the acids is zero
Ans. B

UNIT IIB

((Q))1_1//Buffer solution is one which resist the change in ---------------
A. pH
B. volume
C. pressure
D. temperature
Ans. A

Que. Acidic buffer is a mixture of ----------

A. Strong acid and its salt with weak base.
B. Weak acid and its salt with strong base.
C. Strong base and its salt with weak acid.
D. Weak base and its salt with strong acid.
Ans. B

Que. Basic buffer is a mixture of -----------

A. Strong acid and its salt with weak base.
B. Weak acid and its salt with strong base.
C. Strong base and its salt with weak acid.
D. Weak base and its salt with strong acid.
Ans. D

Que. Which of the following mixture will not form buffer solution.
A. HCl +NH$_4$ OH
B. CH$_3$COOH +CH$_3$COONa
C. NH$_4$ OH +NH$_4$Cl
D. NH$_3$ +NH$_4$ OH
Ans. A

Que. An acidic buffer can be prepared by mixing----------------
A. ammonium acetate in acetic acid
B. ammonium chloride in ammonium hydroxide
C. sodium acetate in acetic acid
D. sodium chloride in Hydrochloric acid
Ans. C

Que. pH of acidic buffer is related to pKa as
A. pH= pKa + log ([salt] / [acid])
B. pH= pKa + log ([acid] / [salt])
C. pH= ½ pKa - log ([acid] / [salt])
D. pH= log pKa + log ([acid] / [salt])
Ans. A

Que. pH of basic buffer is related to pKa as------------------
A. pH= pKb + log ([salt] / [acid])
B. pH= 14-pKb - log ([salt] / [base])
C. pH= ½ pKb - log ([base] / [salt])
D. pH= log pKb + log ([base] / [salt])
Ans. B

Que. Addition of small amount of either base or acid to a buffer solution causes only small changes in pH because buffer solution ------------------
A. Doesn't contain H3O+ or OH-
B. Contains large amount of both H3O+ or OH-
C. Reacts with added acid or base
D. contains strong base and salt of strong base
Ans. C

Que. In buffer solution prepared by mixing sodium formate to formic acid pH of the solution becomes equal to pKa value of formic acid if
A. [HCOOH< HCOO-]
B. [HCOOH= HCOO-]
C. [HCOOH> HCOO-]
D. None of the above
Ans. B

Que. Acidic buffer can be obtained by mixing
A. Weak acid with salt of weak acid and strong base
B. Strong acid with salt of weak acid and strong base
C. weak acid with salt of weak acid and weak base
D. weak base with salt of weak acid and weak base
Ans. A

Que. Example of acidic buffer is
A. NH$_4$OH + NH$_4$Cl
B. HCl + NaCl
C. CH$_3$COOH + CH$_3$COONa
D. NH$_4$Cl + CH$_3$COOH
Ans. C

Que. Basic buffer can be prepared by mixing
A. Weak acid with salt of weak acid and strong base
B. Weak base with salt of weak base and strong acid
C. Weak acid with salt of weak acid and weak base

D. Weak base with salt of weak acid and weak base
Ans. B

Que. Example of basic buffer is
A. $NH_4OH + NH_4Cl$
B. $NH_4OH + CH_3COOH$
C. $CH_3COOH + CH_3COONa$
D. $NH_4Cl + CH_3COOH$
Ans. A

Que. In acidic buffer, due to acetate ions
A. ionization of NaCl is inhibited
B. ionization of CH_3COOH is suppressed
C. ionization of CH_3COOH is accelerated
D. ionization of CH_3COONa is accelerated
Ans. B

Que. On addition of small amount of acid in the solution containing buffer, the pH of the solution
A. Increases
B. Decreases
C. Remains unaltered
D. Attains pH 7
Ans. C

Que. Acid buffer consists of a solution of
A. Weak acid and its salt with strong base
B. Weak acid and its salt with weak base
C. Strong acid and its salt with weak base
D. Strong acid and its salt with strong acid
Ans. A

Que. The solution of pH 7 signifies
A. Pure solution
B. Neutral solution
C. Basic solution
D. Acidic solution
Ans. B

Que. An aqueous solution of pH=1 is
A. Neutral solution
B. Basic solution
C. Acidic solution
D. Amphoteric solution
Ans. C

Que. Which of the following is not a buffer solution?

A. $NH_4OH + NH_4Cl$
B. CH_3COO $NH_4 + H_2O$
C. $CH_3COOH + CH_3COONa$
D. Borax + Boric acid
Ans. B

Que. When a few drops of NaOH are added to the basic buffer, the OH^- ions combine with
A. Excess NH_4^+ ions
B. Excess H^+ ions
C. Excess K^+ ions
D. Excess Na^+ ions
Ans. A

Que. When a few drops of acid are added to the basic buffer, the H^+ ions combine with
A. Cl^- ions
B. OH^- ions
C. Excess NH_4OH
D. Excess CH_3COO^-
Ans. B

Que. A few drops of HCl added to the basic buffer leads to the formation of
A. Completely ionized water molecules
B. Nearly unionized NH_4OH
C. Completely ionized NH_4OH
D. Nearly unionized water molecules
Ans. D

Que. Acidic solution have-------pH
A. Less than 7
B. greater than 7
C. equal to 7
D. equal to 14
Ans. A

Que. Formation of buffer before end point is observed in which of the following titration
A. Redox titration
B. strong acid and strong base titration
C. weak acid and strong base titration
D. Precipitation titration
Ans. C

Que. Which of the following solution has pH=11?
A. 1 x 10⁻¹¹ M NaOH
B. 1 x 10⁻³ M HCl
C. 1 x 10⁻³ M NaOH
D. 1 x 10³ M NaOH
Ans. C

Que. which of the following solution has the highest pH value?
A. 0.1 N HCl
B. 0.01 N HCl
C. 0.1 N NaOH
D. 0.01 N NaOH
Ans. C

Que. Which of the following solution has the highest pH value?
A. 0.01 M KCl
B. 0.01 M HCl
C. 0.01 M KCl
D. 0.001 M KCl
Ans. C

Que.   To prepare a buffer solution with a specific pH equation used is

A. $pH = pK_a + log \frac{(conjugate\ acid)}{(acid)}$

B. $pH = pK_a + log \frac{(conjugate\ base)}{(base)}$

C. $pH = pK_a + log \frac{(conjugate\ base)}{(acid)}$

D. $pH = pK_b + log \frac{(conjugate\ base)}{(acid)}$

Ans. C

Que. Potentiometry is used for determination of end point in analytical titration involves measurement of _____
A. current developed
B. EMF
C. Resistance
D. Potential energy of titrant
Ans. B

Que. A plot of measured E_{cell} as a function of titrant in Potentiometric redox titration of 1:1 mole ratio is ---------
A. S shaped
B. T shaped
C. V shaped
D. L shaped
Ans. A

Que. In differential plot of Potentiometric titration, following variables are considered
A. On X-axis ΔV &Y-axis ΔE
B. On X-axis $\Delta E/ \Delta V$ &Y-axis ΔV
C. On X-axis V& Y-axis $\Delta E/ \Delta V$
D. On X-axis V& Y-axis E_{cell}
Ans. C

Que. In mixture of strong acid (HCl) and weak acid (H_3PO_4) Vs strong base (NaOH) first neutralization point corresponds to ------------.
A. Neutralisation of HCl and 1/3 neutralisation of (H_3PO_4)
B. Partial neutralization of HCl and NaOH
C. Complete neutralization of HCl and (H_3PO_4)
D. Neutralization of (H_3PO_4)
Ans. A

Que. Titration of mixture of acidsvs strong base is possible only if-------------
A. Dissociation constants of two acids are same
B. Dissociation constants of two acids differ by more than 10^4
C. Dissociation constant of one acid is zero
D. None of the above
Ans. B

Que. In potentiometric titration, concentration ratio changes rapidly at……………
A. Intermediate state
B. At initial stage
C. At equivalence point
D. None of the above
Ans. C

Que. In potentiometry, calomel electrode is used as
A. Indicator electrode
B. Primary electrode

C. Related electrode
D. Reference electrode
Ans. D

Que. Silver electrode is used in which type of potentiometric titration?
A. Redox titration
B. Precipitation titration
C. Complexometric titration
D. Acid-Base titration
Ans. B

Que. In potentiometric titration, end point from the graph of EMF of cell versus volume of titrant is determined by considering
A. The maxima
B. The minima
C. The point of inflection
D. The point of intersection with Y-axis
Ans. C

Que. As H^+ ion concentration decreases, EMF of the cell
A. Decreases
B. Increases
C. Remains zero
D. Remains constant
Ans. B

((Q))_2//Reduction potential of a reducing agent---- with rise of temperature and ---- with increase in concentration of reducing solution.
A. Increases, increases
B. Decreases, decreases
C. Increases, decreases
D. Decreases, increases
Ans. D

Que. An electrolyte
A. Forms complex ions in solution
B. Gives ions only when electricity is passed
C. Possess ions even in solid state
D. Gives ions when dissolved in suitable solvent
Ans. D

Que. An electrolyte is one
A. That conducts electric current
B. That is capable of ionization by passing electric current
C. That dissociate into ions by dissolving in a suitable solvent
D. None of these
Ans. C

Que. Electrolyte when dissolved in water dissociate into ions because
A. They are unstable
B. The water dissolves it
C. The force of repulsion increases
D. The force of electrostatic attraction is broken by water
Ans. D

Que. In an electrochemical cell the flow of electron is from
A. Cathode to anode in solution
B. Cathode to anode through internal supply
C. Anode to cathode through external supply
D. Anode to cathode through internal supply
Ans. C

Que. In potentiometric redox titration between Fe2+ and Ce4+, if the ratio of $\frac{[Fe^{3+}]}{[Fe^{2+}]}$ = 1, then the electrode potential (E_{cell}) is equal to
A. E^0_{Fe} + 0.0591
B. 0.0591
C. E^0_{Fe}
D. E^0_{Fe} + E^0_{Ce}
Ans. C

Que. In potentiometric redox titration between Fe^{2+} and Ce^{4+}, the overall cell reaction is
A. $Fe^{2+} + Ce^{4+} \square Fe^{3+} + Ce^{3+}$
B. $Fe^{3+} + Ce^{4+} \square Fe^{2+} + Ce^{3+}$
C. $Fe^{2+} + Ce^{3+} \square Fe^{3+} + Ce^{4+}$
D. $Fe^{3+} + Ce^{3+} \square Fe^{2+} + Ce^{4+}$
Ans. A

Que. The law of electrolysis was given by
A. Newton
B. Faraday
C. Arrhenius
D. Ostwald
Ans. B

Que. In galvanic cell
A. Electrical energy is converted to chemical energy
B. Electrical energy is converted to heat
C. Chemical energy is converted to electrical energy
D. Chemical energy is converted to heat
Ans. C

Que. The calomel electrode is made from which of the following
A. $ZnCl_2$
B. $CuCl_2$
C. $HgCl_2$
D. Hg_2Cl_2
Ans. D

Que. Stronger the oxidizing agent
A. Greater is the reduction potential
B. Greater is the oxidation potential
C. Smaller is the reduction potential
D. Smaller is the oxidation potential
Ans. A

Que. In potentiometric titration, cell is constructed, in which
A. Reference electrode is always calomel and platinum is always indicator electrode
B. Reference electrode is always calomel and glass electrode is always indicator electrode
C. Reference electrode is always calomel and indicator electrode is always reversible with respect to one of the ions involved in the titration
D. Reference electrode is always calomel and silver electrode is always indicator electrode
Ans. C

Que. The first differential derivative plot of a potentiometric titration gives a sharp end point from the graph as
A. Point of intersection on Y-axis
B. Minima of the curve
C. Point on inflection
D. Maxima of the curve
Ans. D

Que. which of the following is not a characteristic of membrane used in ion selective electrodes
A. it should not get affected by oxidizing or reducing agents
B. it should not get attacked by organic solvents
C. it should have high electric resistance
D. it should have sufficient mechanical strength
Ans. C

Que. In potentiometric redox titration between Fe^{2+} and Ce^{4+}, at equivalence point
A. $[Fe^{3+}]$ and $[Fe^{2+}]$ ions are present
B. $[Ce^{3+}]$ and $[Fe^{3+}]$ ions are present
C. $[Ce^{3+}]$ and $[Ce^{4+}]$ ions are present
D. $[Fe^{3+}]$ and $[Ce^{4+}]$ ions are present
Ans. C

Que.   When a salt bridge is removed between the two half cells, then
A. voltage suddenly drops to zero due to loss in connection
B. voltage is unaltered as the concentration in each half cell is unaltered
C. voltage increases gradually due to rise in temperature
D. voltage increases due to fall in temperature
Ans. A

Que.   When mixture of ($HCl + H_3PO_4$) is titrated against NaOH the second equivalence point indicates neutralization of
A. $[H_3PO_4]$
B. $[HCl + 2/3H_3PO_4]$
C. $[HCl + 1/3\ H_3PO_4]$

D. $[HCl + H_3PO_4]$

Ans. B

Que.   Select the correct equation used for calculating cell EMF after equivalence point when Fe^{+2} ions are titrated with standard solution of Ce^{+4} ions potentiometrically

A. $E = E^0_{cell} + \frac{0.0591}{n} . \log\frac{[Fe^{3+}]}{[Fe^{2+}]}$

B. $E = E^0_{cell} + \frac{0.0591}{n} . \log\frac{[Fe^{2+}]}{[Fe^{3+}]}$

C. $E = E^0_{cell} + \frac{0.0591}{n} . \log\frac{[Ce^{3+}]}{[Ce^{4+}]}$

D. $E = E^0_{cell} + \frac{0.0591}{n} . \log\frac{[Ce^{4+}]}{[Ce^{3+}]}$

Ans. D

Que.   In potentiometric redox titration when 100 ml of 0.1 N Fe^{2+} ions is titrated with 120 ml of 0.1 N Ce^{+4} ions, calculate the cell EMF, if E^0_{cell} is 1.45 V

A. 1.1V

B. 1.4V

C. 1.31V

D. 1.43V

Ans. B

Que. In the plot of $\square^2E/ \square V^2$ vs V, steeper portion of the curve joining the maximum and minimum value of $\square^2E/ \square V^2$ indicates------------

A. Incomplete titration

B. completion of the titration reaction

C. pH of titration mixture

D. Zero EMF value

Ans. B

Que.   In potentiometric acid-base titrations, EMF of the cell----------

A. initially decreases slowly and at equivalence point, decreases sharply

B. initially increases slowly and at equivalence point, increases sharply

C. initially increases slowly and at equivalence point, decreases sharply

D. initially decreases slowly and at equivalence point, increases sharply

Ans. B

Que. In potentiometric titration, potential of the oxidation-reduction electrode is given by--

A. Hittoff's equation

B. Ohm's equation

C. Nernst equation

D. Faraday's equation

Ans. C

Que. For oxidation-reduction electrode, potential is given by-----

A. $E_{el} = E^0_{el} + \frac{RT}{F}ln \frac{[Fe^{3+}]}{[Fe^{2+}]}$

B. $E^0_{el} = E_{el} + \frac{RT}{F}ln \frac{[Fe^{3+}]}{[Fe^{2+}]}$

C. $E_{el} = E^0_{el} - \frac{RT}{F}ln \frac{[Fe^{3+}]}{[Fe^{2+}]}$

D. None of these

Ans. A

Que. At 25^0C potential of oxidation-reduction electrode is given by----

A. $E_{el} = E^0_{el} - 0.0591 log \frac{[Fe^{3+}]}{[Fe^{2+}]}$

B. $E^0_{el} = E_{el} - 0.0591 log \frac{[Fe^{3+}]}{[Fe^{2+}]}$

C. $E^0_{el} = E_d + 0.0591 log \frac{[Fe^{3+}]}{[Fe^{2+}]}$

D. $E_{el} = E^0_{el} + 0.0591 log \frac{[Fe^{3+}]}{[Fe^{2+}]}$

Ans. D

Que. In redox titration, if ratio of $[Fe^{3+}]/[Fe^{2+}]$ is 0.01, the electrode potential is-----

A. $E_{el} = E^0$ -0.0591

B. $E_{el} = E^0$ -0.1182

C. $E_{el} = E^0$ -0.01

D. $E_{el} = E^0$ -0.01182

Ans. B

Que. In redox titration, electrode potential at equivalence point is given by------
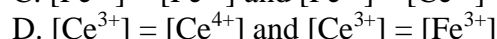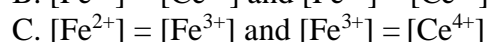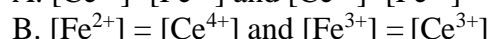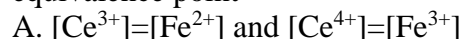
A. $E_{eq} = (E^0_1 + E^0_2)/2$

B. $E_{el} = E^0{}_1 - 0.0591\log\frac{[Fe^{3+}]}{[Fe^{2+}]}$

C. $E_{eq} = 2(E^0{}_1 + E^0{}_2)$

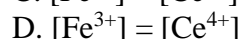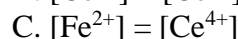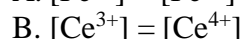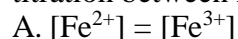D. $E_{el} = E^0{}_1 + 0.0591\log\frac{[Fe^{3+}]}{[Fe^{2+}]}$

Ans. A

Que. In potentiometric redox titration between Fe^{2+} and Ce^{4+}, at equivalence point------
A. $[Ce^{3+}]=[Fe^{2+}]$ and $[Ce^{4+}]=[Fe^{3+}]$
B. $[Fe^{2+}] = [Ce^{4+}]$ and $[Fe^{3+}] = [Ce^{3+}]$
C. $[Fe^{2+}] = [Fe^{3+}]$ and $[Fe^{3+}] = [Ce^{4+}]$
D. $[Ce^{3+}] = [Ce^{4+}]$ and $[Ce^{3+}] = [Fe^{3+}]$
Ans. B

Que. At equivalence point in redox titration between Fe^{+2} and Ce^{+4},-----
A. $[Fe^{2+}] = [Fe^{3+}]$
B. $[Ce^{3+}] = [Ce^{4+}]$
C. $[Fe^{2+}] = [Ce^{4+}]$
D. $[Fe^{3+}] = [Ce^{4+}]$
Ans. C

Que. For the reaction Fe^{3+} (aq) + e⁻ $\square Fe^{2+}$ (aq)
A. E^0=0.47 V
B. E^0=1.61V
C. E^0=0.74V
D. E^0=0.77V
Ans. D

Que. For the reaction Ce^{4+} (aq) + e⁻ $\square Ce^{3+}$ (aq)
A. E^0=6.11 V
B. E^0=1.61V
C. E^0=0.161V
D. E^0=0.77 V
Ans. B

Que. In the Fe/Ce redox titration, at equivalence point EMF of the cell is
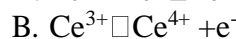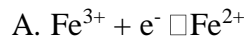A. E=0.24 + 0.77 + 1.61/2
B. E=(1.61 +0.24)/2 + 0.77
C. E=(0.77 +0.24)/2 + 1.61
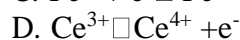D. E=$\frac{0.77+1.61}{2}$ 0.24

Ans. D
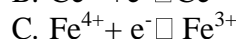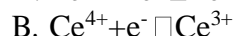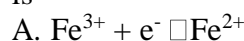

Que. In Fe/Ce redox titration, before equivalence point, one of the half- cell reactions is
A. $Fe^{3+} + e^- \square Fe^{2+}$
B. $Ce^{3+} \square Ce^{4+} + e^-$
C. $Fe^{2+} \square Fe^{3+} + e^-$
D. none of these
Ans. C

Que. one of the half -cell reactions in the Fe/Ce titration, before equivalence point is----
A. $Fe^{3+} + e^- \square Fe^{2+}$
B. $Ce^{4+} + e^- \square Ce^{3+}$
C. $Fe^{4+} + e^- \square Fe^{3+}$
D. $Ce^{3+} \square Ce^{4+} + e^-$
Ans. B

Que. For the Fe/Ce redox titration, the overall reaction is-------
A. $Fe^{2+} + Ce^{4+} \square Fe^{3+} + Ce^{3+}$
B. $Fe^{4+} + Ce^{2+} \square Fe^{3+} + Ce^{3+}$
C. $Fe^{3+} + Ce^{3+} \square Fe^{2+} + Ce^{4+}$
D. all of these
Ans. A
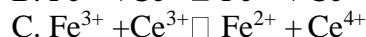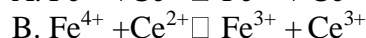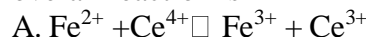
Que. Potentiometric titrations are preferred over volumetric titrations because----
A. Indicators are not required
B. They can be carried out above 200^0C
C. They require calomel electrode
D. End point is always pink
Ans. A

Que. Advantages of potentiometric titration is
A. There are no calculations as $N_1V_1>N_2V_2$
B. Colored solutions can be titrated
C. Solid mixtures can be titrated
D. Only one indicator is required
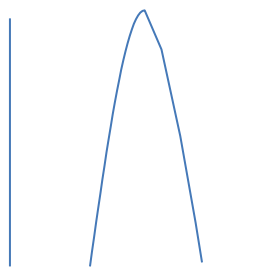
Ans. B

Que. End-point of potentiometric titration is indicated in the plot of $\Delta E/\Delta V$ vs volume of titrant--
A. By the minima
B. By the point of inflection
C. By the point where color changes to blue
D. By the maxima
Ans. D

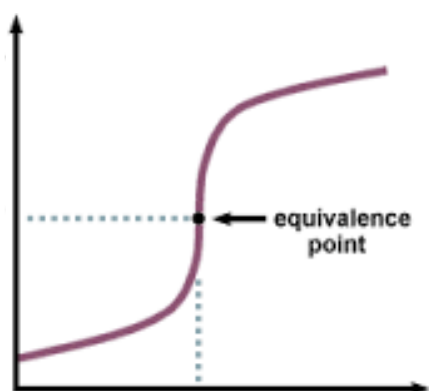Que.   The nature of graph shown for the potentiometric titration curve is plot between

A. EMF of cell and volume of titrant
B. $\Delta E/\Delta V$ and volume of titrant
C. $\Delta^2E/\Delta V^2$ and volume of titrant
D. $\Delta E/\Delta V^2$ and volume of titrant
Ans. B

Que. Potentiometric titration curve of the type shown is obtained if graph is plotted between

Potentiometric titration curve of the above type is obtained if graph is plotted between----
A. $\Delta E/\Delta V$ and volume of titrant
B. $\Delta^2E/\Delta V^2$ and volume of titrant
C. None of these
D. EMF of cell and volume of titrant
Ans. D

Que. the following curve is obtained in potentiometric titration, if graph is plotted between----
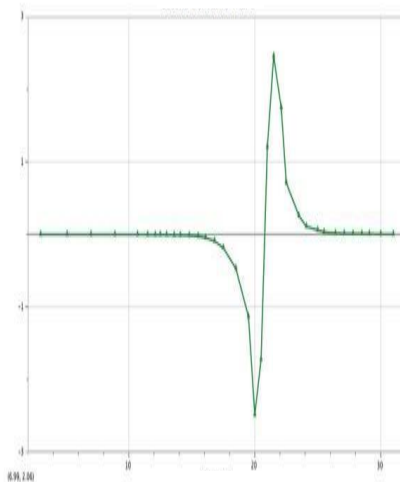
A. EMF of cell and volume of titrant
B. $\Delta E/\Delta V$ and volume of titrant
C. $\Delta^2E/\Delta V^2$ and volume of titrant
D. pH and conductance
Ans. C

Que. In potentiometric titration, if graph is plotted between $\Delta E/\Delta V$ and volume of titrant, its nature is

A.

B.

C.

D.

Ans. A

Que. In potentiometric titrations, more accurate equivalence point is obtained if graph is of
A. EMF of cell and volume of titrant
B. $\Delta E/\Delta V$ and volume of titrant
C. pH and volume of titrant
D. EMF of cell and pH of acid
Ans. B
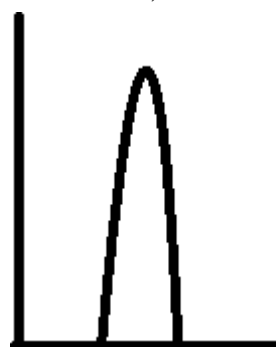
Que. In potentiometric titrations, as pH of the solution increases , EMF of the cell-----
A. Increases
B. Decreases
C. Remains zero
D. Remains constant
Ans. A

Que. The advantage of potentiometric titration is that it can be used for solutions
A. Where precipitation occurs during the reaction
B. Where gases liberate during the reaction
C. Where heat is liberated during the reaction
D. None of these
Ans. A

Que. The advantage of potentiometric titration is that it can be used for
A. Titration of calcium salt solutions
B. Titration of charcoal solutions
C. Titration of colored solutions
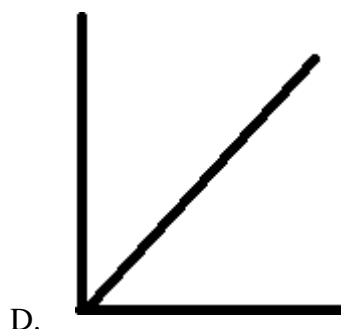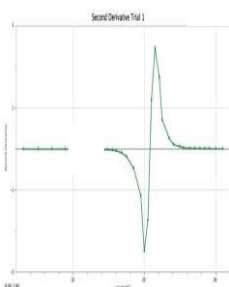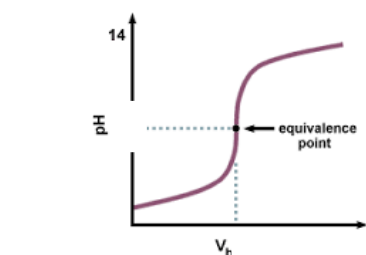D. Titration of calomel solutions
Ans. C

Que.   In potentiometric titration cell is constructed in which
A. Reference electrode is always calomel and platinum is always indicator electrode
B. Reference electrode is always calomel and glass is always indicator electrode
C. Reference electrode is always calomel and indicator electrode is always reversible with respect to one of the ions involved in the titration
D. Reference electrode is always calomel and silver is always indicator electrode
Ans. C

Que.   The first differential derivative plot of a potentiometric titration gives a sharp end point from the graph as
A. Point of intersection on Y-axis
B. Minima of the curve
C. Point of inflection

D. Maxima of the curve
Ans. D

UNIT IIC

Que. Lambert's law states that the rate of decrease in intensity of monochromatic light passing through transparent medium with thickness of medium is proportional to ---------------
A. Wavelength of incident light.
B. Intensity of incident light.
C. Wavelength of transmitted light.
D. Intensity of visible light
Ans. B

Que. Beer's law states that the intensity of monochromatic light passing through transparent medium decreases as ---------------of the absorbing substance increases arithmetically
A. Volume
B. Concentration
C. Cost
D. Standard oxidation potential
Ans. B

Que. Operating range of uv-spectrophotometer is ----------------------.
A. 400nm-800nm
B. 200nm-400nm
C. 200nm-800nm
D. 500nm-1500nm
Ans. B

Que. Operating range of uv- visible spectrophotometer is ----------------------.
A. 400nm-800nm
B. 200nm-400nm
C. 200nm-800nm
D. 500nm-1500nm
Ans. C

Que. The magnitude of molar absorption coefficient is dependent on the wavelength of incident beam of radiation and--------------------
A. Physical state of absorbing substance
B. Chemical nature of absorbing substance

C. Thermal energy of substance
D. Electrical conductivity of absorbing substance
Ans. B

Que. If I_t is intensity of transmitted light I_0 is intensity of incident light, K is the constant for wavelength, l is thickness and c is concentration $I_t = I_0 . e^{-kl}$ is--------------
A. Beer's law
B. Lambert's law
C. Kohlrausch's law
D. None of the above
Ans. B

Que. Visible spectrophotometer has operational range………….
A. 400nm-800nm
B. 200nm-400nm
C. 200nm-800nm
D. 500nm-1500nm
Ans. A

Que. The solution of substance that appears coloured to human eyes absorbs in the range…………
A. 400nm-800nm
B. 200nm-400nm
C. 200nm-800nm
D. 500nm-1500nm
Ans. A

Que. The solution of substance that absorbs in UV region appears.............. to human eyes
A. Coloured
B. Transparent
C. Turbid
D. None of the above
Ans. B

Que.   In UV visible spectrophotometer measurement of absorbs is preferred over % transmittance because---------
A. UV visible spectrophotometer is equipped to measure absorbance

B. Absorbance is α C while % transmittance is not

C. % transmittance can't be measured with 100 % accuracy

D. % transmittance is dependent on the power of incident radiations

Ans. B

Que. According to Beer's Lamberts law

A= εcl

Where ε is

A. Absorbance

B. Molar absorptivity

C. Path length

D. Transmittance

Ans. B

Que. Spectroscopy deals with the study of

A. interaction of electrical waves with magnetic waves

((B)interaction of electrical waves with matter

C. interaction of electromagnetic waves with matter

D. interaction of magnetic waves with waves

Ans. C

Que. In electromagnetic wave, reciprocal of wavelength is

A. Frequency

B. Velocity

C. Wave number

D. Amplitude

Ans. C

Que. When atoms or molecules are exposed to radiations they absorb only those wavelength of radiation that

A. have exactly the energy necessary for the transition

B. cause temporary or permanent excitations

C. Both A and B

D. None of these

Ans. C

Que. absorption of radiation by a molecule depends upon

A. The structural features of molecule

B. The environmental features of molecule

C. the physical features of molecule

D. None of these

Ans. A

Que. The total energy possessed by the molecule is

A. $E=E_{el} \times E_{vib} \times E_{rot}$

B. $E=E_{el} / E_{vib} / E_{rot}$

C. $E=E_{el} + E_{vib} + E_{rot}$

D. $E=E_{el} - E_{vib} - E_{rot}$

Ans. C

Que. Choose the correct relation between the energy possessed by the molecule

A. $E_{vibration}>E_{rotational}>E_{electronic}$

B. $E_{rotational}>E_{electronic}>E_{vibration}$

C. $E_{electronic}>E_{vibration}>E_{rotational}$

D. $E_{electronic}>E_{rotational}>E_{vibration}$

Ans. C

Que. Rotational energy level transitions occur

A. In infrared region of electromagnetic spectrum

B. In microwave region of electromagnetic spectrum

C. In UV region of electromagnetic spectrum

D. In visible region of electromagnetic spectrum

Ans. B

Que. Vibrational energy level transitions occur

A. In infrared region of electromagnetic spectrum

B. In microwave region of electromagnetic spectrum

C. In UV region of electromagnetic spectrum

D. In visible region of electromagnetic spectrum

Ans. A

Que. Electronic energy level transitions occur
A. In infrared region of electromagnetic spectrum
B. In microwave region of electromagnetic spectrum
C. In UV-visible region of electromagnetic spectrum
D. In gamma region of electromagnetic spectrum
Ans. C

Que. Spectroscopy helps to
A. Determine molecular structure of a compound
B. Quantitative determination of both organic and inorganic compounds
C. Qualitative determination of both organic and inorganic compounds
D. All of these
Ans. D

Que. The most common solvent fo UV-visible spectroscopy is
A. Ethyl alcohol
B. Hexane
C. Water
D. All of these
Ans. D

Que. Cuvette used for sample, in UV spectroscopy
A. is transparent to UV light
B. do not absorb UV light
C. Both A and B
D. None of these
Ans. C

Que. Cuvette used for sample, in UV spectroscopy is made up of
A. Glass
B. Quartz
C. Ceramic
D. SS
Ans. B

Que. Absorbance is
A. $A = \ln(1/T)$
B. $A = \log_{10}(1/T)$
C. $A = \log_{10}(T)$
D. $A = \log_e(1/T)$
Ans. B

Que. Laws that govern colorimetry are
A. Lambert's law
B. Beer's law
C. Both A and B
D. None of these
Ans. C

Que. Any isolated covalently bonded functional group that shows a characteristic absorption in uv-visible region is known as --------------
A. Auxochrome
B. Chromophore
C. Phosphoresce
D. Chromatophore
Ans. B

Que. Any group which does not itself act as a functional group but whose presence brings about a shift in absorption band towards longer wavelength is known as ------------------
A. Auxochrome
B. Chromophore
C. Phosphoresce
D. Chromatophore
Ans. A

Que. The energy required for the transition is highest in case of ----------------------- transition.
A. $\pi\text{-}\sigma^*$
B. $\sigma\text{-}\sigma^*$
C. $\sigma\text{-}n$
D. $n\text{-}\sigma$
Ans. B

Que. Substitution of group if shifts absorption to the longer wavelength the shift is known as ----
A. chromophoric shift
B. bathochromic shift

C. blue shift
D. yellow shift
Ans. B

Que. Absorption shifted to shorter wavelength due to substitution of group is known as ----------
A. chromophoric shift
B. bathochromic shift
C. blue shift
D. red shift
Ans. C

Que. An effect accompanied by increase in the intensity of absorption maxima is known as ------
A. Hypsochromic shift
B. Hypochromic shift
C. Hyperchromic shift
D. None of the above
Ans. C

Que. An effect accompanied by decrease in the intensity of absorption maxima is known as -----------
A. Hypsochromic shift
B. Hypochromic shift
C. Hyperchromic shift
D. None of the above
Ans. B

Que. An effect due to which absorption maxima is shifted towards shorter wavelength known as
A. Hypsochromic shift
B. Hypochromic shift
C. Hyperchromic shift
D. None of the above
Ans. A

Que. Benzene absorbs at 255nm while aniline absorbs at 280nm because -----------------
A. Bezene is auxochrome
B. -NH$_2$ is auxochrome
C. -NH$_2$ is chromophpre
D. None of the above
Ans. B

Que------------------------is known as colour enhancing group.
A. Auxochrome
B. Chromophore
C. Chromatophor
D. None of the above
Ans. A

Que. Transition which requires highest energy in uv-visible spectrophotometer is ---------------- transition.
A. π-σ*
B. σ-σ*
C. σ-n
D. n-σ
Ans. B

Que. Transition which requires lowest energy in uv-visible spectrophotometer is _____transition.
A. π-σ*
B. σ-σ*
C. σ-n
D. n-π *
Ans. D

Que. Transition which requires radiation of shortest wavelength in uv-visible spectrophotometer is ---------------- transition.
A. π-σ*
B. σ-σ*
C. σ-n
D. n-π *
Ans. B

Que. Transition which requires radiation of longest wavelength in uv-visible spectrophotometer is ---------------- transition.
A. π-σ*
B. σ-σ*
C. σ-n
D. n-π *
Ans. D

Que. The relative energy changes involved in the transition has order----------------

A. n- π * < σ-σ* < π- π *
B. n- π * > σ-σ* > π- π *
C. n- π * < π- π * < σ-σ*
D. n- π * > π- π *> σ-σ*
Ans. C

Que. Transition which requires radiation of longest wavelength in uv-visible spectrophotometer is ----------------- transition.
A. π-σ*
B. σ-σ*
C. σ-n
D. n- π *
Ans. D

Que. Electron transition is allowed transition or forbidden depends upon -------------
A. The geometry of the molecular orbital in ground state
B. The geometry of the molecular orbital in excited state
C. The orientation of the electric dipole of the incident light responsible for including the transition
D. On appropriate symmetry relationship between the above three factors
Ans. D

Que. Conjugated enone shows UV visible absorption maxima for π- π * at 245nm if hexane is used as solvent. If ethanol is used as solvent absorption maxima of same enone will--------
A. Shift to longer wavelength
B. Remain unaffected
C. Disappeared
D. Shift to shorter wavelength
Ans. A

Que. An isolated functional groups capable of absorbing radiations above 200 nm are called
A. Chromophore
B. Auxochrome
C. Hypochrome

D. Hypsochrome
Ans. A

Que. If absorption of molecule is shifted towards longer wavelength due to solvent effect then it is called ------
A. Hypsochromic shift
B. Hypochromic shift
C. Bathochromic shift
D. Hyperchromic shift
Ans. C

Que. Maximum energy is required for transition of
A. σ-σ*
B. π- π *
C. n- π *
D. n-σ*
Ans. A

Que. Minimum energy is required for transition of
A. σ-σ*
B. π- π *
C. n- π *
D. n-σ*
Ans. C

Que. In electromagnetic spectrum, the visible region is-----
A. 200-400 nm
B. 400-800 nm
C. 800-900 nm
D. 100-200 nm
Ans. B

Que. A group of atoms in a molecule responsible for absorption of radiation is called as
A. Chromophore
B. Auxochrome
C. Chromosome
D. Parent molecule
Ans. A

Que. π- π * transitions are associated with compound containing-----
A. Alkenes
B. Aromatic compounds
C. Alkynes

D. All of these
Ans. D

Que. Which of the following is a chromophore?
A. C-OH
B. C-Br
C. C=O
D. C-NH$_2$
Ans. C

Que. For the study of UV/visible spectroscopy, spectrophotometers used are namely----
A. Double and triple beam
B. Single and double bond
C. Single and double beam
D. Double and triple bond
Ans. C

Que. Which of the following is not a chromophore?
A. C=C
B. C=O
C. -N=N-
D. C-OH
Ans. D

Que. A module which provides a beam of light of given single wavelength is known as ----------
A. window
B. monochromator
C. selector
D. spectrometer
Ans. B

Que. Detector used in uv- visible spectrophotometer is ----------------------.
A. Photomultiplier tube
B. Electric buzzer
C. Null point detector
D. None of the above
Ans. A

Que. Source used in uv-visible spectrophotometer is ------------- --.
A. Incandescent lamp
B. Hydrogen lamp
C. Duterium lamp

D. Any of the above
Ans. D

Que. The parts of spectrophotometer is used to obtain a light rays with single wavelength is known as --------------
A. Monochromator
B. Source of light
C. Slit
D. Detector
Ans. A

Que. In Photomultiplier tube sensitivity of photometric cell--------------
A. Is considerably decreased
B. Is kept constant
C. Is considerably increased
D. None of the above
Ans. C

Que. The essential component of monochromator are entrance exit slit and-- ------------
A. Dispersing element like prism
B. Photovoltaic cell
C. Galvanometer
D. None of the above
Ans. A

Que. Cuvettes used in uv-visible spectrophotometer are made up of ---------- -----.
A. Glass
B. Quartz
C. Metal
D. None of the above
Ans. B

Que. UV – Visible spectrophotometer has application in --------------------
A. Detection of function group
B. Determination of conjugation
C. Identification of unknown compound
D. All above
Ans. D

Que.   uv spectroscopy helps in the study of
A. Kinetics of chemical reaction

B. Kinetics of physical reaction
C. Kinetics of stable reaction
D. Kinetics of colored reaction
Ans. A

Que.   Match the following

1	Uv spectroscopy	A	Wheatstone bridge
2	conductometry	B	No visual indicators
3	pH metry	C	Colored solutions
4	potentionmetry	D	Electronic transitions

A. 1-D, 2-A, 3-B, 4-C

B. 1-C, 2-B, 3-A, 4-D

C. 1-A, 2-B, 3-C, 4-D

D. 1-C, 2-A, 3-D, 4-B

Ans. A

Que.   Match the following:

1.	Bathochromic shift	E.	Absorption intensity decreases
2.	Hyperchromic shift	F.	λmax shifts to longer wavelength
3.	Hypsochromic shift	G.	Absorption intensity increases
4.	Hyperchromic shift	H.	λmax shifts to shorter wavelength

A. 1-E, 2-F, 3-H,4-G
B. 1-H,2-E, 3-G, 4-F
C. 1-F, 2-G, 3-H, 4-E
D. 1-G,2-E,3-H, 4-F
Ans. C

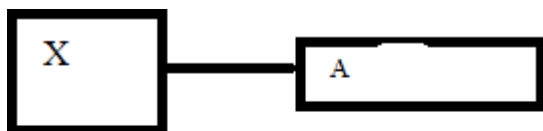Que.   Match the following and choose the correct option:

1.	Beer's law	M.	$A=\varepsilon l$
2.	Lambert's law	N.	$A=\varepsilon Cl$
3.	Beer-Lambert's law	O.	$A=\varepsilon C$

A. 1-O, 2-M, 3-N
B. 1-M, 2-O, 3-N
C. 1-N, 2-M, 3-O
D. 1-O, 2-N, 3-M
Ans. A

Que.   Which of the following molecules has maximum absorption? What is the reason?
Benzaldehyde, Benzene, Aniline
A. aniline, presence of auxochrome
B. Benzene, presence of auxochrome
C. Benzaldehyde, presence of chromophore
D. Aniline, presence of chromophore
Ans. A

Que.   Identify the components 'X' and 'Y' in the following schematic diagram of single beam spectrophotometer.

	mic shift		solvent
3.	Hypsochromic shift	G.	Presence of auxochrome
4.	Hyperchromic shift	H.	Removal of conjugation

A. X: Source, Y:Detector
B. X: Sample cell, Y:amplifier
C. X: Lens, Y:Detector
D. X: Monochromator, Y:amplifier
Ans. A

Que. Identify the components 'X' and 'Y' in the following schematic diagram of double beam spectrophotometer
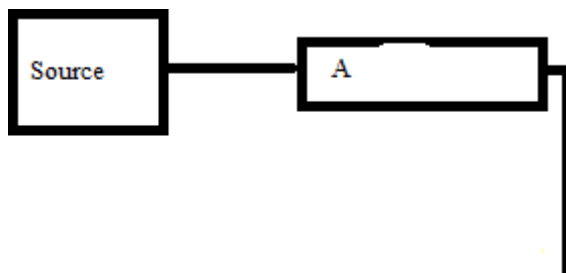
A. X: Monochromator, Y:Detector
B. X: Sample, Y:Detector
C. X: Reference, Y:Detector
D. X: water, Y:Detector
Ans. C

Que. Match the following absorption and intensity shifts with their reason.

1.	Bathochromic shift	E.	Introduction of group that distorts the geometry
2	Hyperchro	F.	Change of

A. 1-F, 2-H, 3-E,4-G
B. 1-F, 2-G 3-H,4-E
C. 1-H, 2-G, 3-F,4-E
D. 1-G, 2-E, 3-F,4-H
Ans. B

Que. Select the correct option showing relative energies for various electronic excitations
A. n□π*> π□π*> σ□ π*> σ□σ*> n□σ*

B. n□σ*>n□π*> π□π*> σ□ π*> σ□σ*
C. σ□ π*> π□π*> σ□σ*> n□π*>n□σ*
D. σ□σ*> σ□ π*>π□π*> n□σ*> n□π*
Ans. B

Que. In case of naphthalene due to introduction of methyl group ---- shift occurs which is --- shift.
A. Hyperchromic , absorption
B. Bathochromic, absorption
C. Hypsochromic, intensity
D. Hypochromic, intensity
Ans. D

Que. Aniline in acidic medium shows- -- due to-----
A. Blue shift, loss of conjugation
B. Red shift, loss of conjugation
C. Red shift, presence of conjugation
D. Hyperchromic shift, presence of conjugation
Ans. A

Que.
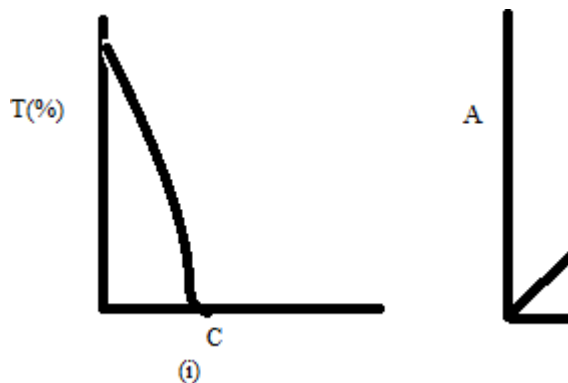
The graph which is more convenient to interpret is -----
A. graph (i)
B. graph (ii)
C. Both (i) and (ii)
D. none of these
Ans. B

Que. Limitation of Beer-Lambert law is----
A. it governs absorption behaviour of solutions at high temperature
B. it governs absorption behaviour of solutions at low temperature
C. it governs absorption behaviour of dilute solutions only
D. it governs absorption behaviour of concentrated solutions only
Ans. C