**UNIT- I (P21CH2MBE2:1)**

 **InstrumentalMethodsofAnalysis**

**1. EAFS – expanded as**

a) Extended X-ray absorption fine structure

b) Expanded X-ray absorption fine structure

C) External X-ray absorption fine structure

d) all of these A**ns** : **a**

**2. XAS – techniques follow**

 a) Beer’s law b) Lamberts law c) Grothus dropper’s law d) None of the above

A**ns** : **a**

3. **XASSpectra are most often collected at**

 a) Cyclotrons b) synchrotrons C) Neutrons d) protons. A**ns** : **a**

**4. Highly penetrating rays is**

 a) gamma ray b) Cosmic ray c) x – ray d) α-ray A**ns** : **c**

**5. EXAFS Samples are**

 a) Gases b) Liquids c) solids d) all of the above A**ns** : **d**

**6. The normalised absorption spectra are often called**

a) ZANES b) EANES c) XANES d) YANES A**ns** : **c**

**7. The ejected photo electron’s energy will be equal to that of the State absorbed photon minus of**

**the initial core**

a)Binding energy b) Internal energy c) Free energgy c) Kinetic energy A**ns** : **a**

8**. Ejected Photoelectron nature is**

a) Particle b) wave c) Both a & b d) None of these A**ns** : **b**

**9. EXAFS is useful to determine the Sample in**

a) Physical state b) amorphous state c) chemical state d) Liquid state A**ns** : **c**

**10. EXAFS Can be used in**

a) Forensic Science b) chemical Suence c) physical above d) all of the above A**ns** : **a**

**11. Which of the following is the principle of Atomic Absorption Spectroscopy?**

a) Radiation is absorbed by non-excited atoms in vapour state and are excited to higher states

b) Medium absorbs radiation and transmitted radiation is measured

c) Colour is measured d) Colour is simply observed A**ns** : **a**

**12. In Atomic Absorption Spectroscopy, which of the following is the generally used radiation source?**

a) Tungsten lamp b) Xenon mercury arc lamp c) Hydrogen or deuterium discharge lamp

d) Hollow cathode lamp A**ns** : **d**

**13. In Atomic Absorption Spectroscopy, with what material is the cathode in Hollow cathode lamp constructed?**

a) Tungsten

b) Quartz

c) Element to be investigated

d) AluminiumA**ns** : **c**

**14. How can the intensity of radiation be increased in Hollow cathode lamp?**

a) Addition of non-conductive protective shield of mica

b) Addition of nitrogen to neon or argon in the lamp

c) Increasing the pressure of the filling gas

d) Changing the metal of the anode A**ns** : **a**

**15**. **Which of the following is the function of the chopper in Atomic Absorption Spectroscopy?**

a) To split the beam into two

b) To break the steady light into a pulsating light

c) To filter unwanted components

d) To reduce the sample into atomic state A**ns** : **b**

**16**. **Which of the following is the function of the Flame or Emission system in Atomic Absorption Spectroscopy?**

a) To split the beam into two

b) To break the steady light into pulsating light

c) To filter unwanted components

d) To reduce the sample into atomic state A**ns** : **d**

**17.Another name of Atomic absorption spectroscopy is also called as**

a) Absorption Flame Photometry

b) Adsorption Flame Photometry

c) Absorption emission Photometry

d) none of these A**ns** : **a**

**18. Which of the following is not a component of the emission system in Flame photometer?**

a) Burner

b) Atomiser

c) Fuel gases and their regulation

d) Chopper A**ns** : **d**

**19. Which of the following is the function of the atomiser in the emission system of Atomic Absorption Spectroscopy?**

a) To split the beam into two

b) To break the steady light into pulsating light

c) To break large mass of liquid into small drops

d) To reduce the sample into atomic state A**ns** : **c**

**20. Which of the following is not a fuel used in flame photometry?**

a) Acetylene

b) Propane

c) Hydrogen

d) Camphor oil A**ns** : **d**

**21 .Which of the following is not the requirement of a good flame in flame photometer?**

a) Liquid sample must be evaporated to form solid residue

b) Solid residue must decompose to form atoms

c) Atoms must be produced such that they have the ability to get excited to higher states

d) Atoms must be produced such that they are in stable state A**ns** : **c**

**22. Atomic Absorption Spectroscopy is used for the analysis of**

a) metals

b) non metals

c) alkane

d) alkene A**ns** : **a**

**23. Which of the following options explains the process of ‘sputtering’ that occurs in Hollow Cathode Lamp?**

**a) Positive ions collide with cathode surface and metal atoms from cathode are ejected**

b) Negative ions collide with cathode surface and metal atoms from anode are ejected

c) Positive ions collide with negative ions and metal atoms from anode are ejected

d) Positive ions collide with negative ions and photons are ejected A**ns** : **a**

**24. At what pressure should the gases in the sealed tube be maintained in the Hollow cathode lamp?**

a) 1 to 5 torr

b) 20 to 30 torr

c) 40 to 50 torr

d) 50 to 55 torr A**ns** : **a**

**25**. **Which of the following is the principle of Atomic Absorption Spectroscopy?**

a) Radiation is absorbed by non-excited atoms in vapour state and are excited to higher states

b) Medium absorbs radiation and transmitted radiation is measured

c) Colour is measured

d) Colour is simply observed A**ns** : **a**

**26. In Atomic Absorption Spectroscopy, with what material is the cathode in Hollow cathode lamp constructed?**

a) Tungsten

b) Quartz

c) Element to be investigated

d) AluminiumA**ns** : **c**

**27. How can the intensity of radiation be increased in Hollow cathode lamp?**

a) Addition of non-conductive protective shield of mica

b) Addition of nitrogen to neon or argon in the lamp

c) Increasing the pressure of the filling gas

d) Changing the metal of the anode A**ns** : **a**

**28**. **Which of the following is the function of the chopper in Atomic Absorption Spectroscopy?**

a) To split the beam into two

b) To break the steady light into a pulsating light

c) To filter unwanted components

d) To reduce the sample into atomic state A**ns** : **b**

**29. Which of the following is the function of the Flame or Emission system in Atomic Absorption Spectroscopy?**

a) To split the beam into two

b) To break the steady light into pulsating light

c) To filter unwanted components

d) To reduce the sample into atomic state A**ns** : **d**

**30**. **Which of the following is not a component of the emission system in Flame photometer?**

a) Burner

b) Atomiser

c) Fuel gases and their regulation

d) Chopper A**ns** : **d**

**31. Which instrument is used to convert sample in mist or aersol ?**

(a) Atomizer

(b) Hollow cathode lamps

c) Nebulizer

(d) Detector A**ns** : **c**

**32. Which of the following is the function of the atomiser in the emission system of Atomic Absorption Spectroscopy?**

a) To split the beam into two

b) To break the steady light into pulsating light

c) To break large mass of liquid into small drops

d) To reduce the sample into atomic state A**ns** : **c**

**33. Which of the following is not the requirement of a good flame in flame photometer?**

a) Liquid sample must be evaporated to form solid residue

b) Solid residue must decompose to form atoms

c) Atoms must be produced such that they have the ability to get excited to higher states

d) Atoms must be produced such that they are in stable state A**ns** : **d**

**34. Choose the correct sequence of process during Atomization in atomic absorption spectroscopy?**

1. Desolvation → Nebulization→ Dissociation →Volatilization → Ionization ion
2. Nebulization → Desolvation → Volatilization →Dissociation → Ionization ion

 c) Desolvation → Nebulization → Volatilization → Dissociation →Ionization ion

d) Nebulization →Volatilization → Desolvation →Dissociation →Ionization A**ns** : **c**

**35. Which of the following is the principle of Flame emission photometers?**

a) Radiation is absorbed by non-excited atoms in vapour state and are excited to higher states

b) Medium absorbs radiation and transmitted radiation is measured

c) Colour and wavelength of the flame is measured

d) Only wavelength of the flame is measured A**ns** : **c**

**36. Which of the following is not an advantage of Laminar flow burner used in Flame photometry?**

a) Noiseless

b) Stable flame for analysis

c) Efficient atomization of sample

d) Sample containing two or more solvents can be burned efficiently A**ns** : **d**

**37. Which of the following is not a detector used in Flame emission photometers?**

a) Photronic cell

b) Photovoltaic cell

c) Photoemissive tube

d) Chromatogram A**ns** : **d**

**38**. **If Propane and air are used in burner how many °C temp. is produced ?**

a) 1900°C b) 2200°C c) 2300°C d) 2100°CA**ns** : **d**

**39. If Hydrogen and air are used in burner how many °C temp. is produced ?**

a) 1900°C b) 2200°Cc) 2300°Cd) 2100°C A**ns** : **a**

**40. Which is not application of flame photometry ?**

a) To estimate sodium, magnesium, calcium

b) Assay of metformin.

c) Used to determine magnesium and calcium in cement.

 d) To detected metalic ions in sample. A**ns** : **b**

**41. Boltzmann Equations is**

a) N\* / N =R Ae–∆E/kT

b) N\* / N = e–∆E/kT

c) N\* / N = Ae–∆E/kT

d) N\* / N = Ae–∆E/kc A**ns** : **c**

**42. Choose correct sequence of flame photometry ?**

a) Sample residue → excited state atoms → Return in ground state → Emission of radiation

b) Sample residue → ground state → excited state → Emission of radiation

c) Emission of radiation → excited state  →ground state → Sample residue

d) Sample residue → ground state → excited state → Emission of radiation A**ns** : **a**

**43. Which equations are used to determine wavelength of radiation ?**

a) λ =  hc/ E2-E1

b) N\* / N = e–∆E/kT

c) λ = h/E2-E1

d) N\* / N = Ae–∆E/kT A**ns** : **a**

**44**. **Whichis application of flame photometry ?**

a) To determine functional group

b) To study of chemical structure

c) To assay of drug

d) To estimate metallic ions like sodium, potassium, etc. A**ns** : **d**

**45**. **Which of the following is not an advantage of Laminar flow burner used in Flame photometry?**

a) Noiseless

b) Stable flame for analysis

c) Efficient atomization of sample

d) Sample containing two or more solvents can be burned efficiently A**ns** : **d**

**46. Laminar flow burner used in Flame photometers is also known as \_\_\_\_\_\_\_\_\_\_\_\_**
a) Turbulent burner

b) Premix burner
c) Total consumption burner
d) Nozzle mix burner A**ns** : **b**

**47**. **Which of the following is not a detector used in Flame emission photometers?**
a) Photronic cell
b) Photovoltaic cell
c) Photoemissive tube

d) Chromatogram
A**ns** : **d**

**48) Which of the following is not an application of Flame emission photometers?**

a) Analysis of biological fluids

b) Determination of sodium, potassium in soil

c) Determination of metals such as Mn, Cu

d) analysis of complex mixture A**ns** : **d**

**49) Which of the following is not an advantage of a photovoltaic cell which is used as a detector in Flame emission photometers?**

a) Portable

b) No external supply

c) Robust in construction

d) doesn’t show fatigue A**ns** :**d**

**50) Which of the following is the principle of Flame emission photometers?**

a) Radiation is absorbed by non-excited atoms in vapour state and are excited to higher states

b) Medium absorbs radiation and transmitted radiation is measured

C) colour and wavelength of the flame is measured

d) Only wavelength of the flame is measured A**ns** : **c**

**51. In Flame emission photometers, the measurement of \_\_\_\_\_\_\_\_\_\_\_\_\_ is used for qualitative analysis.**

a) colourb) Intensity c) Velocity d) Frequency A**ns** : **a**

**52**. **In Flame emission photometers, the measurement of \_\_\_\_\_\_\_\_\_\_\_\_\_ is used for quantitative analysis.**

**a)** Colour b) Intensity c) Velocity d) Frequency A**ns** : **b**

**53. What is principle of Turbidimetry ?**

a) Light scattered **b) Light transmitted c) A and B d) None of the above**A**ns** : **b**

**54. Which technique is used to analyze colloidal system?**

1. **Nephelometry**
2. **Turbidimetry**
3. **A and B**

 **d) None of the above** A**ns** : **c**

**55. Which sentence is True about Turbidimetry ?**

**a) It is more sensitive**

 **b) Wavelength is not important**

 **c) Intensity of the light and concentration graph is linear**

 **d) It is similar to colorimetery**A**ns** : **c**

**56. Which sentence is false about Turbidimetry ?**

1. **It is more sensitive.**
2. **Wavelength is  important according to the equation.**
3. **Intensity of the light and concentration realtion ship is according to the equation.**

 **d) It is similar to colorimetery**A**ns** : **a**

**57. Which is filter are used in Turbidimetry ?**

**a) Blue filter b)Visible filter c) Absorption filter d)All of the above** A**ns** : **a**

**58.** Which detector are used in Fluorimetry?.

a) Photo voltaic cell b) PMT c) Photo tube d) All of the above A**ns** : **d**

**59. XANES stands for**

a) X-ray adsorption near edge structure

b) X-ray adsorption near equal structure c) x-ray absorption near edge structure

d) x-ray absorption near equal structure A**ns** :**c**

**60. Which of the following is not fuel used in Flame photometry?**

a) Acetylene b) Propane c) Hydrogen d) Camphor oilA**ns** : **d**

**UNIT- II**

**DATAANDERRORANALYSIS**

1. **A Determinate error can be evaluated**
2. Experimentlly b) Theoretically c) By both methods d) Can not be evaluated

**Ans - b**

1. **Which type of error effects to the same degree the results of a series of determination**
2. Indeterminateb) Accidental c) Determinate d) Erratic

**Ans - d**

1. **A statistical analysis of random errors reveals that**
2. Random errors of frequent occurrence are those of small magnitude
3. Large error are not likely to occur at all
4. Positive and negative difference are equally likely to occur d)All the above

**Ans - d**

1. **How many significant figures are present in the number 0.0025**
2. 5 b) 4 c) 2 d) 6

**Ans - c**

1. **Which of the errors does not fall under the category of constant errors?**
2. Operational errors b) Reagent errors c) Erratic errors d) Proportional errors

**Ans - c**

1. **Which of the method can not be used to determine accuracy**?
2. Absolute b) Minimal c) Comparative d) All of these

**Ans - b**

1. **The closeness of data to other data that have been obtained in exactly the same way is**
2. Accuracy b) Absolute error c) Relative error d) Precision

**Ans - d**

1. **The closeness of a result to its true or accepted value is**
2. Precision b) Accuracy c) Median d) None of these

**Ans - b**

1. **Random or Intermediate errors are the errors in the measurement which affects**
2. Accuracy b) Precision c) Both (a) and (b) d) None of these

**Ans - b**

1. **Of the three types of systematic errors encountered in chemical analysis which is most difficult to identify and correct**
2. Instrument errors b) Method errors c) Personal errors d) All are correct

**Ans - b**

1. **Precision refers to**
2. Agreement of measured parameter with the theoretical value
3. Agreement among repetitive values of the measured parameter
4. Difference between the highest and lowest values of the measured parameter
5. Systematic errors only

**Ans - c**

1. **What is the significant number of the value 0.000102?**
2. 2 b) 3 c) 6 d) 7

**Ans - b**

1. **If ‘O’ represent observed value and T represent true value then the absolute error is represented by**
2. O –T b) T – O c) O + T d) O / T

**Ans - a**

1. **In the following expression R = (E/T \* 100) % where E is the absolute error and T is the true or measured value R represents**
2. Determinate error b) Indeterminate error c) relative error d) none of them

**Ans - c**

1. **What is the significant number of the value 10.002?**
2. 2 b) 3 c) 5 d) 4

**Ans - c**

1. **A set of measurement of an experimental data shows the values 28.7, 28.9 and 28.8 while the true value is 24.4, thus the experimental data shows**
2. Good accuracy but poor precision
3. Good accuracy but good precision
4. Poor accuracy but good precision
5. Poor accuracy but poor precision

**Ans - c**

1. **15,000,000 cm can be expressed by two significant numbers as**
2. 150 km **b) 1.5 x 107 cm** c) 0.15 x 106 m d) 0.0150 x 109 cm

**Ans - b**

1. **Proportional error is an example of**
2. Absolute error b) Relative error c) Determinate error d) Indeterminate error

**Ans - c**

1. **The percentage of a constituent x in a compound was found to be 48.32, 48.36 and 48.22. Thus the mean deviation would be**
2. 0.053 b) 0.53 c) 5.3 d) 0.0053

**Ans - a**

1. **Accuracy cannot be determined by method**
2. Comparative b) Minimal c) Absolute d) None of the above

**Ans - b**

1. **Which of the following errors cannot be avoided?**
2. Instrumental errors b) Persional errors c) Indeterminate errors d) Additive errors

**Ans - c**

1. **Accuracy expresses the**
2. Correctness of an experiment b) Deviation from experiment c) Feasibility of an experiment d) Reproducibility of an experiment

**Ans - a**

1. **A precipitate is ignited in a crucible and the error varies due to the loss of weight of the crucible concerned. This type of error is**
2. Personal error b) Instrumental error c) Proportional error d) Methodic error

**Ans - b**

1. **Which one of the following statements is correct?**
2. Precision expresses the reproducibility of a measurement of an experiment under identical set of condition
3. Accuracy is the measurement of systematic error
4. Mistake are absolute errors
5. Indeterminate errors are constant **Ans - a**
6. **For a set of experimental data the standard deviation is determined to be 1.5. Thus the mean deviation would be approximately**
7. 2.2 b) 3.2 c) 4.2 d) 1.2

**Ans - b**

1. **If all the individual measurements are equivalent then the mean deviation would be**
2. 100 b) 0 c) 1 d) Infinitive

**Ans - b**

1. **The mean deviation expressed as a fraction of the mean value in percentage is known as**
2. Standard deviation b) Relative deviation c) Mean deviation d) Standard mean deviation

**Ans - b**

1. **Which one of the following sets have the same signigicant numbers?**
2. 0.102 and 0.001 b) 0.0102 and 0.1002 **c) 0.01001 and 0.1001** d) 2.302 and 0.232

**Ans - c**

1. **Two sets of experiments have equivalent absolute errors but the number of measurements taken are different. Thus they would have**
2. Equivalent standard deviations b) Equivalent mean deviations c) Equivalent variance

d) None of the above **Ans - d**

1. **Keeping the mean deviation constant, if the arithmetic mean is doubled, the relative deviation would be**
2. Doubled b) Halved c) Quardipled d) No change

**Ans - b**

1. **Which one of the following is determinate error?**
2. Personal error b) Absolute error c) Erratic error d) Relative error

**Ans - a**

1. **The correlation coefficient is the geometric mean between two**
2. Mode b) Standard deviation c) Median d) Regression coefficient

**Ans - d**

1. **What is the mean of 5, 13, 0,6 ?**
2. 4 b) 3 c) 8 d) 6 **Ans - d**
3. **The accuracy of a measurement signifies the closeness with which a estimate approaches the**
4. True value b) Average value c) Both A and B d) None of these

**Ans - a**

1. **The variation due to uncontrolled factors is spoken as**
2. Standard error b) Experimental error c) Treatment effects d) Diminution of error

**Ans - b**

1. **When the value of correlation coefficient is 1 then two variables are**
2. Uncorrelated b) Partially correlated c) Highly correlated d) Perfectly correlated

**Ans - d**

1. **The regression coefficient are independent of charge of**
2. Origin b) Scale c) Both A and B d) None of these

**Ans - a**

1. **Mean deviation is the least when calculated about (minimal property)**
2. Arithmetic mean b) Median c) Weighted HM d) Geometric mean

**Ans - b**

1. **The variance is the square of**
2. Mean deviation b) Standard deviation c) Range d) Correlation

**Ans - b**

1. **When the distribution of data is continuous, which distribution is applicable**
2. Normal distribution b) Binomial c) Poisson d) None of these

**Ans - a**

1. **Normal distribution is due to the work of**
2. James Bernoulli b) SD Poisson c) Laplace and Gauss **d) None of these**

**Ans - d**

1. **Arithmetic mean and variance are always equal in**
2. Normal distribution b) Poisson distribution c) Binomial d) All of these

**Ans - b**

1. **For comparison of two means from independent samples which test is applicable**
2. Z- test b) x2 – Test c) t –test d) None of these

**Ans - c**

1. **Rank correlation is tested by**
2. Quade test b) Friedmann test c) t- test d) Z- test

**Ans - c**

1. **The square of the standard deviation is known as the**
2. Variance b) Standard deviation c) Mean deviation d) Coefficient of variance

**Ans - a**

1. **The ANOVA is a tool by which total variation may be split up into several physically Assignable component was defined by**
2. Horace Pearson b) R.A. Fisher c) A.L. Bowley d) None of these

**Ans - b**

1. **The validity of correlation coefficient is tested by**
2. t – test b) F –test c) x2 – Test d) None of these **Ans - a**
3. **Who has developed the technique of analysis of variance?**
4. Cox b) Raw c) Fisher d) Keon**Ans - c**
5. **The statistical device helps in analyzing the covariation of two or more variables**
6. Correlation b) Regression c) Median d) Standard deviation

**Ans - a**

1. **Coefficient of determination is a squre of**
2. Correlation coefficient b)Regression coefficient c) Both A and B d) None of these

**Ans - a**

1. **Normal Distribution is symmetric is about ----**
2. Variance b) Mean c) Standard deviation d) Covariance

**Ans - b**

1. **Normal distribution is also known as ------**
2. Cauchy’s Distribution b) Laplacian Distribution c) Gaussian Distribution d) Lagrangian Distribution

**Ans - c**

1. **In Normal distribution, the highest value of ordinate occurs at**
2. Mean b) Variance c) Extremes d) Same value occurs at all points

**Ans - a**

1. **Avogadro’s number can be expressed by two significant numbers as**
2. 6.023 x 1023 b) 6.0 x 1023  c) 60.2 x 1022 d) 0.06 x 1025

**Ans - b**

1. **Mathematically standard deviation is represented by**
2. $σ=√(∑(x\_{i}-\overbar{x})^{2}/N b) σ=√(∑(x\_{i}-\overbar{x})^{}/N$ c) $σ=(∑(x\_{i}-\overbar{x})^{2})/N$ d) $σ=√(∑(x\_{i}-\overbar{x})^{2})/N^{2}$

**Ans - a**

1. **In an experiment the densities of Lithium metal are determined to be 0.54, 0.55, 0.52 and 0.51 gm/cm3. What is the mean deviation?**
2. 0.015 b) 0.15 c) 1.5 d) 0.51

**Ans - a**

1. **In an experiment the densities of Lithium metal are determined to be 0.54, 0.55, 0.52 and 0.51 gm/cm3. What is the coefficient of variance will be?**
2. 5. 40 b) 1.74 c) 3.40 d) 2.40

**Ans - c**

1. **In an experiment the densities of Lithium metal are determined to be 0.54, 0.55, 0.52 and 0.51 gm/cm3. What is the standard deviation will be?**
2. 0.218 b) 0.018 c) 0.3 d) 0.115 **Ans - b**
3. **The sum of the following 999.9 + 99.90 + 9.900 is (using significant number)**
4. 1110 b) 1109.7 c) 1.1097 x 103  d) 1109.700

**Ans - a**

1. **The result for (3.33 +33.3+ 333) in terms of significant number would be**
2. 369.9 b) 369.63 c) 370 d) 3.6963 x 102

**Ans - c**

**Unit - 3 - Chromatography**

1. **A mixture of volatile compounds can be easily separated by**
2. Column Chromatography b) Ion – exchange Chromatography c) Gas Chromatography d) Thin layer Chromatography

**Ans – c**

1. **Chromatography is a physical method that is used to separate**
2. Simple mixtures b) Complex mixtures c) Viscous mixtures d) Metals

**Ans - b**

1. **Which force is involved in the Chromatography?**
2. Hydrogen bonding b) London force c) Electric static force d) All of the above

**Ans - d**

1. **Ion exchange chromatography is based on the**
2. Electrostatic attraction b) Electrical mobility of ionic species c) Adsorption chromatography d) Partition chromatography

**Ans - a**

1. **Chromatography with solid stationary phase is called**
2. Circle chromatography b) Square chromatography c) Solid chromatography d) Adsorption chromatography

**Ans - d**

1. **A Combination of paper chromatography and electrophoresis involves**
2. Partition chromatography b) Electrical mobility of the ionic species

c)Both (a) and (b) d) None of these **Ans - c**

1. **The pattern on the paper in chromatography is called**
2. Chroming b) Chroma c) Chromatograph d) Chromatogram

**Ans - d**

1. **In reverse phase chromatography, the stationary phase is made**
2. Non – Polar b) Polar c) Both a and b d) None of these

**Ans - a**

1. **The components which have a small value of K have an affinity for**
2. Mobile phase b) Stationary phase c) No phase d) Solution

**Ans - b**

1. **Which technique is also known as colour writing ?**
2. NMR b) Mass spectroscopy c) Chromatography d) All of the above

**Ans - c**

1. Which of the following HPLC detectors is used as a bulk property or general purpose detector?
2. Electrochemical detector b) Fluorescence detector c) UV- Visible detector

**d) Evaporative light scattering detector**

**Ans - d**

1. **Thin layer chromatography is**
2. Partition chromatography b) Electrical mobility of ionic species c) Adsorption chromatography d) None of the above

**Ans - c**

1. **In which chromatography stationary phase is more polar than mobile phase?**
2. Ion exchange chromatography b) Normal phase chromatography c) Reversed chromatography d) Size exclusion chromatography

**Ans - b**

1. **Which of the following is used as a spraying reagent in paper chromatography?**
2. Conc. HCl b) NaCl c) Ninhydrin solution d) CuSO4 Solution

**Ans - c**

1. **In gas chromatography, the basis for separation of the components of the volatile material is the difference in**
2. Partition coefficients b) Conductivity c) Molecular weight d) Molarity

**Ans - a**

1. **In which type of chromatography, the stationary phase is held in a narrow tube and the mobile phase is forced through it under pressure?**
2. Column chromatography b) Planar chromatography c) Liquid chromatography d) Gas Chromatography

**Ans - a**

1. **In chromatography, the stationary phase can be ------ supported on a solid**.
2. Solid or liquid b) Liquid or gas c) Solid only d) Liquid only

**Ans - a**

1. **What is Eluent?**
2. Is a liquid solution b) Is a liquid solution that is a result from Elution c) It is a solvent that used for separation of absorbed material from stationary phase d) None of the above

**Ans - c**

1. **In Chromatography, Which of the following can the mobile phase be made of?**
2. Solid or liquid b) Liquid or gas c) Gas only d) Liquid only

**Ans - b**

1. **Chromatogram is**
2. Solute concentration Vs Elution time b) Solute concentration Vs Elution volume c) A and B d) None of the above

**Ans - c**

1. **In thin layer chromatography, the stationary phase is made of ----- and the mobile phase is made of ------**
2. Solid, liquid b) Liquid, liquid c) Liquid, gas d) Solid, gas

**Ans - a**

1. **What is the Analyte ?**
2. Substance for separation b) Substance for impurity c) A and B d) None of the above

**Ans - a**

1. **Which of the following is used as a carrier gas in gas chromatography**
2. Carbon dioxide b) Oxygen c) Helium d) Methane

**Ans - c**

1. **Ion exchange chromatography is based on?**
2. Electrostatic attraction b) Electrical mobility of ionic species c) Partition chromatography d) Adsorption chromatography

**Ans - a**

1. **In Thin layer chromatography, the stationary phase is made of ----- and the mobile phase is made of -----**
2. Solid, Liquid b) Liquid, Liquid c) Liquid, gas d) Solid , gas

**Ans - a**

1. **The basis of the technique of chromatography for separating components of a mixture is?**
2. The differing movement of particles of different mass in an electrical field
3. The interaction of the components with a stationary and a mobile phases
4. The absorption of infrared radiation by the components
5. The deflection of charged particles in a magnetic field **Ans - b**
6. **HPLC is an abbreviation for ?**
7. High Profit Liquid Chromatography **b) High Pressure Liquid Chromatography**

c) Higher Performance Low Chromatography d) Higher Profit Low Chromatography

**Ans - b**

1. **Which of the following techniques would be most useful to identify as well as quantify the presence of a known impurity in a drug substance**?
2. NMR b) MS c) IR d) HPLC

**Ans - d**

1. **Liquid chromatography can be performed in which of the following ways?**
2. Only in columns b) Only on plane surfaces c) Either in columns or on plane surfaces
3. Neither in columns nor on plane surfaces

**Ans - c**

1. **The process of passing a mobile phase through a chromatography column is called which one of the following ?**
2. Flushing b) Washing c) Elution d) Partitioning

**Ans - c**

1. **Which of the following cannot be used as adsorbent in column adsorption chromatography?**
2. Magnesium oxide b) Silica gel c) Activated alumina d) Potassium permanganate

**Ans - d**

1. **Which of the following types of chromatography involves the separation of substances in a mixture over a 0.2 mm thick layer of an adsorbent?**
2. Gas Liquid b) Column c) Thin layer d) Paper

**Ans - c**

1. **Separation of different fatty acids by**
2. Counter current Chromatography b) Affinity Chromatography c) Gas Chromatography d) Thin layer Chromatography

**Ans - c**

1. **Silica gel G is used in**
2. Column Chromatography b) Gas Chromatography c) Thin layer Chromatography d) HPLC

**Ans - c**

1. **What is the Analyte ?**
2. **Substance for separation** b) Substance for impurity c) A and B d) None of the above

**Ans - a**

1. **Chromatography with solid stationary phase is called**
2. Circle Chromatography b) Square Chromatography c) Solid Chromatography d) Adsorption Chromatography

**Ans - d**

1. **Mobile phase can be**
2. Gas only b) Liquid only c) Solid d) Gas and Liquid

**Ans - d**

1. **Which type of Mobile phase are used in paper chromatography?**
2. The mobile phase which gives Rf value range between 0.1-0.3
3. The mobile phase which gives Rf value range between 0.2-0.8
4. The mobile phase which gives Rf value range between 0.8- 1
5. The mobile phase which gives Rf value range between 0.6

**Ans - b**

1. **What is the principle of the paper chromatography ?**
2. Partition b) Adsorption c) A and B d) None of the above

**Ans - c**

1. **Rf value is**
2. Distance travelled by the compound at its point of maximum b) Distance travelled by the standard c) Solvent travelled d) None of the above

**Ans - a**

1. **Which type of filter paper are mostly used in paper chromatography?**
2. Butter paper b) Sample paper c) Whatmann filter paper d) Filter paper

**Ans - c**

1. **Which factor is not affect in stationary phases in paper chromatography?**
2. Thickness b) Flow rate c) Purity d) Freezing point

**Ans - d**

1. **Size of spot in Paper Chromatography is**
2. 2-5 mm b) 1-2 mm c) 7- 8 mm d) 6-8 mm

**Ans - a**

1. **What is the ratio of Isopropanol: Ammonia : Water in mobile phase?**
2. 5: 3: 1 b) 6:7:8 c) 9: 1: 2 d) 3: 3: 6

**Ans - c**

1. **How many percentage of the Beta cellulose in stationary phase**
2. 0.3 – 1% b) 2-4% c) 3-7% d) 2-4%

**Ans - d**

1. **Column chromatography is based on the principle of**
2. Ion exchange b) Exclusion principle c) Differential adsorption d) None of the above

**Ans - c**

1. **What is the factor responsible for the separation in column chromatography?**
2. Polarity differences between the solvent b) Polarity differences between the solute c) Polarity indifferences between the solvent d) Polarity indifferences between the solute

**Ans - b**

1. **Which of the following are the practical problems that arise due to the decrease in column diameter**?
2. Requirement of large particle size and high pressure drop
3. Requirement of large particle size and low pressure drop
4. Requirement of small particle size and high pressure drop
5. Requirement of large particle size and low pressure drop **Ans - c**
6. **The Chroma plate or thin layer chromatography plate is made up of ---**
7. Glass b) Wood c) Fibre d) Metal

**Ans - a**

1. **In Iodine chamber, which colour spot are seen?**
2. Red colour b) Brown colour c) Yellow colour d) Green colour

**Ans - b**

1. **In column Half plate size is**
2. 20 x 10 cm b) 10x 10 cm c) 20 x 20 cm d) 5 x 5 cm

**Ans - a**

1. **In HPLC the analytical performance improves when**
2. Particle diameter is increased b) Particle diameter is decreased c) Coarser particles are paire with shorter columns d) Low temperature is used

**Ans - b**

1. **An essential requirement of the mobile phase in HPLC is that**
2. It must have constant flow rate with pulses b) It must run at 20oC only c) It must be freshly distilled d) It must flow with pulses

**Ans - a**

1. **The pressure used in HPLC is**
2. 1000-3000 psi b) 1000-5000 psi c) 2000-6000 psi d) 1000-6000 psi

**Ans - d**

1. **Which of the statements is correct ?**
2. Gas chromatography is used to analyse gases b) Gas chromatography is used to analyse solids c) Gas chromatography is used to analyse gases, solutions and solids d) All of the above

**Ans - d**

1. **Which of the following are not used as stationary phases in a GC column?**
2. Polysiloxanes b) Silica c) Cyclodextrins d) None are used as stationary phases

**Ans - b**

1. **Which of the following gases is unsuitable for use as a GC carrier gas?**
2. Nitrogen b) Helium c) Oxygen d) All of the above **Ans - c**
3. **Which of the following is the most sensitive of the spectral methods ?**
4. Absorption spectroscopy b) Mass spectroscopy c) Flame emission spectroscopy d) Atomic emission spectroscopy **Ans - b**
5. **Which of the following is the disadvantage of gas chromatography?**
6. It is not a good method b) It cannot be used for qualitative analysis c) It cannot be used for the separation of volatile components d) It does not provide direct identification **Ans - d**
7. **GC-MS has been developed for which of the following systems?**
8. **Packed column** b) Open tubular column c) Capillary column d) Porous layer column

**Ans– a**

**UNIT- IV**

**THERMO ANALYTICAL METHODS AND FLOURESCENCE SPECTROSCOPY**

**1 .Which of the following option is appropriate for the TGA and DTA?**a) TGA and DTA measures only weight
b) TGA measures only weight while DTA measures other effects
c) TGA and DTA measures only temperature
d) TGA measures only temperature while DTA measures other effects **Ans: b**

**2. In the schematic DTA sequence having reversible and irreversible changes, starting with the hydrated material, which of the following steps occurs first on heating?**

a) Esterification b) Methylation c) Rehydration d) Dehydration A**ns** : **d**

**3. On studying the reversible process during DTA which of the following is observed on both heating and cooling?**

a) Esterification b) Hysteresis c) Methylation d) Carboxylation A**ns** : **b**

**4. Which one of the following options is not true for hysteresis?**

a) It depends on the nature of the material

b) It depends on the structural change involved

c) It doesn’t depend on the experimental conditions

d) It doesn’t depend on the concentration of the electrode A**ns** : **c**

**5. In the application of DTA and DSC which of the following parameters is measured for the glasses?**a) Concentration of the glassb) Solubility of the glassc) Cooling temperature
d) Transition temperature A**ns** : **d**

**6. Thermal analysis is defined as \_\_\_\_\_\_\_\_\_\_\_**

a) Measurement of concentration of materials as a function of temperature

b) Measurement of solubility of materials as a function of temperature

c) Measurement of physical properties as a function of temperature

d) Measurement of line positions of crystals as a function of temperature A**ns** : **c**

**7. Which of the following method can be used for the measurement of change in weight of the oxysalts?**

a) Thermoelectric analysis b) Wagner analysis c) Stockbarger analysis

d) Thermal analysis **Ans** : **d**

**8. What are the two main techniques for thermal analysis?**a) FTG AND DGG b) MSP AND FCTc) TGA AND DTAd) TSA AND DGF A**ns** : **c**

**9. Dilatometry is also known as by which of the following names?**

a) TGA b) DTA c) DSC d) TMA A**ns** : **d**

**10**. **Which of the following statements given below is false?**a) TGA, DTA and DSC are measured using same instrument
b) TGA and DTA can be carried out simultaneously.
c) TGA, DTA and DSC are measured using different instruments.
d) TMA is a recent name of Dilatometry. A**ns** : **c**

**11. In thermogravimetric analysis, the result obtained appear as a** \_\_\_\_\_\_\_\_\_\_

a) Continuous chartb) Continuous parabolac) Continuous circular positions

 d) Discontinuous chart A**ns** : **a**

**12. Under conditions of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ heating, decomposition usually take place in thermogravimetry. Fill up the suitable option from the choices given below.**

a) First order b) Second order c) Third order d) Dynamic A**ns** : **d**

**13. What is the temperature required for the decomposition of CaCO3 in degree Celsius**?

a) 200 b) 500 c) 900 d) 1200 A**ns** : **b**

**14. Differential scanning calorimetry (DSC) is a technique to measure----------**

 a) specific heat b) thermal expansion c) electrical conductivity d) impact energyA**ns** : **a**

**15. In DTA method, the sample temperature was recorded on ------------**

 a) heating b) cooling c) gaseous d) liquid A**ns** : **b**

**16. TGA used to measure -------------**

a) change in mass- loss of weight b) change in temperature reaction c) pressure d) b and c

A**ns** : **a**

**17. In thermometric titrations the property measured is……….**

a)heat evolved or absorbed b)change in weight c)change in temperature d)fluorescence

A**ns** : **c**

**18. Generally thermometric titrations are carried out in Dewar flask under …………conditions**.

a)isothermal b)adiabaticc)isochoricd)isobaric A**ns** : **a**

**19. In DTA,…………is mostly used as reference material.**

a) MgOb) Sic c) Ca(OH)2 d) NaClA**ns** : **b**

**20. Analysis of the sample with two different methods is used to validate ……….. of the method.**

a) Precision b) Linearity c) Accuracy d) Experience A**ns** : **b**

**21**. **Fusion of sample during DTA is indicated by ………**

a) Exotherm b) endotherm c) no change d) Both a &b A**ns** : **a**

**22. Endothermic peaks in DTA curve is result of ..........**

a) Decomposition of molecules b) Formation of heavier productc )Both of these above process

d) None of these A**ns** : **a**

**23. The purpose of secondary filter in fluorescence spectroscopy is**

a) Allows only excitation radiation b) Allows only emission radiation

c) Allows both excitation and emission radiations d) Allows transmitted radiation A**ns** : **b**

**24**. **Which of the following increase the fluorescence of aromatic compounds**

a) Para substitution b) Ortho c) Meta d) All of the above A**ns** : **c**

**25. The above is due to**

a) Electron donation b) Electron withdrawing c) Confirm planarity to ring

 d) Confirm rigidity A**ns** : **b**

**26. The fluorescence intensity increases with all of the following except**

 a) Rigidity b) Planarity c) No. Of rings **d) dissolved oxygen** A**ns** : **d**

**27. The fluorescence intensity depends on all of the following except**

 a) Concentration b)Polarity c) Path length d) Intensity of incident radiation A**ns** : **d**

**28. Inner filter effect is the fluorescence quenching due to**

a) Absorption of excitation radiation b) Absorption of luminescent radiation c)Both a and b

 d) Collisional deactivation A**ns** : **a**

**29. Differential scanning calorimetry (DSC) can be used to determine which of the following Properties of a semicrystalline polymer sample?**

a) The melting temperature b) The crystallization temperature c) The degree of crystallinity d) All of the above A**ns** : **d**

**30. For typical polymer samples, the melting temperature will be which of the following relative To the crystallization temperature?**

a) The melting temperature will be less than the crystallization temperature.

b) The melting temperature will be equal to the crystallization temperature.

c) The melting temperature will be greater than the crystallization temperature d)None of the aboveA**ns** : **c**

**31. In the schematic DTA sequence having reversible and irreversible changes, starting with the hydrated material, which of the following steps occurs first on heating?**

a) Esterification b) Methylation c) Rehydration d) Dehydration A**ns** : **d**

**32. In the application of DTA and DSC which of the following parameters is measured for the glasses?**

a) Concentration of the glass b) Solubility of the glass c) Cooling temperature d) Transition temperature A**ns** : **a**

**33. DTA can be used for which of the following Process?**

a) Line positions of the crystals b) Mechanical properties of the crystals c) Phase diagrams

d) Catalytic properties of enzymes A**ns** : **c**

**34. In \_\_\_\_\_\_\_\_\_ technique in which a change in theweight of a substance is recorded as function of temperature or time.**

(a) Thermo gravimerty (b) Differential thermal analysis (c) Differential scanning calorimetry

(d) None of above A**ns** : **a**

**35. Thermo gravimetry (TG) is concerned with thechange in weight of a material as its.....,., Changes**.

(a) Pressure (b) Temperature (c) Frequency d) concentration A**ns** : **b**

**36. A plot of weight change versus temperature is referred to as the**

(a) DSC curve (b) DTA curve (c)TG curve (d) all of the above A**ns** : **c**

**37. Sharp endothermic peaks give ideas of changesin**

a) Amorphous processes **b) Crystallinity or fusion processes** c) Cleavage processes d) None of these A**ns** : **b**

**38. In DTA, broad endothermic peak signify\_\_reactions.**

1. Dehydration b) Hydration c) Fusion d) fission A**ns** : **a**

**39. In DTA, Physical changes give rise to Peak.**

1. Positive b) Endothermic c) Exothermic d)Negative A**ns** : **b**

**40. Which detector are used in Fluorimetry?**

a) Photo voltaic cell b) PMT c)Photo tube d)All of the above A**ns** : **d**

**41. Thermometric Titrations are based on measuring theHeat generated in a**

a) Physical change b) chemical reaction c) both a & b d) None of the above A**ns** : **b**

**42. Thermometric titrations Carried out under**

a )Adiabatic condition **b) Isothermal Condition** c)Isobaric condition d)Isochoric Condition

A**ns** : **b**

**43. Thermometric Titrations measured instrument is**

a) Conical flask b) Dewar Flask c) Burette d) pipette A**ns** : **b**

**44. Thermister is connected with**

a) Wheatstone bridge b)Salt bridge c) Dewar flask d) Beaker A**ns** : **a**

**45. In Thermometric titration heat evolved amount is Measured by**

a) Galvanometer b) Thermometer c) potentiometer d)All of the above A**ns** : **a**

**46. Estimation of Ni 2+ by using**

a) DMG b) EDTA c) KMnO4 d) all of the above A**ns** : **a**

**47. In Thermometric titrations end point indicated as**

a) Sharp peak b) broad peak c) both a&b d) flat peak A**ns** : **a**

**48. Advantages of thermometric**

a) Neutralisation Titrations b) Complexometric titrations c) Redox Titrations d) All of the above

A**ns**: **d**

**49. The oxidation of oxalic acid and ferrocyanide ions by permanganate ion is an example of**

a) Neutralisation Titrations b ) Complexometric titrations c) Redox reaction d) Decomposition reaction A**ns** : **c**

**50. The purpose of secondary filter in fluorescence spectroscopy is**

a) Allows only excitation radiation b) Allows only emission radiation c)Allows both excitation and emission radiations d) Allows transmitted radiation A**ns** : **b**

**51. Which of the following is a line source in fluorometry**

a) Mercury vapor lamp b) Xenon discharge lamp c) Deuterium lamp d) Lasers A**ns** : **a**

**52. The quantitative analysis of a non-luminescent compound is done by**

a) Fluorescent quenching b) Formation of fluorescent reactive product c) Fluorescence labelling

d) All of the above A**ns** : **b**

**53. Estimation of Cu2+ by using**

a) DMG b) EDTA c) KMnO4 d) all of the above A**ns** : **b**

**54. Malonic acid decomposed into**

a) CO2 b) acetic acid c) methane d) CO2 and acetic acid A**ns** : **d**

**55. Which type of instrument used in DSC analysis?**

a) calorimetry b) Thermometer c) Thermobalance d) DSC A**ns** : **c**

**56. DSC stands for**

a) Different Scanning Calorimetry b) Differential Scanning Calorimeter

c) Diffraction Scanning Calorimetry d) all the above A**ns** : **b**

**57. Curie temperature is determined by using**

A) DTA (b) TGA (0) DSC (d) TMA A**ns** : **a**

**58. Which type of instrument used in TGA analysis?**

a) calorimetry b) Thermometer c) Thermobalance d) DSC A**ns** : **c**

**59. DTA curves are also known as**

a) UV curve b) Finger print c) visible curve d) flat curve A**ns** : **b**

**60. AgNO3 + HCl is an example for**

a) precipitation reaction b) neutralisation reaction c) redox reaction d) complexometric reaction

A**ns** : **a**

**Unit 5 - Electro analytical Techniques**

1. **Ion selective membranes work on the principle of**
2. Migration of ions from high to low concentration b) Migration of ion from high to low concentration c) Exchange of ions membrane with solution d) Adsorption of ions in solution on membrane

**Ans - c**

1. **A Sensor is a -----**
2. Subsystem b) Machine c) Module d) All the above

**Ans - d**

1. **The function of a sensor is to -----**
2. Detect events within specified environment b) Separate physical parameters c) Track and transfer data to computer processor d) Both a and c

**Ans - d**

1. **Electrochemical Sensor is made up of ----- material**
2. Conductors b) Insulators c) Semiconductor d) None of the above

**Ans - c**

1. **Which of the following is not the characteristic of ion selective electrode?**
2. It is fragile b) Easy to use c) Available in different sizes and shapes d) It is insentive to many ions

**Ans - a**

1. **In glass membrane electrode, the glass containing 11% Na2O, 18% Al2O3, 71% SiO2 is highly sensitive to which of the following ions?**
2. Sodium b) Hydrogen c) Nitrogen d) Chlorine **Ans - a**
3. **In liquid membrane electrode, the liquid ion exchanger is held in a porous disc of -**
4. **Solid material b) Semi – permeable membrane c) Hydrophobic material d) Water absorbing material**

**Ans - c**

1. **In recent liquid membrane electrodes, the porous liquid membrane is replaced with which of the following?**
2. **Polyvinyl chloride b) Polyacryl chloride c) Polyester membrane d) Poly acryl amide**

**Ans - a**

1. **Which of the following is used in potassium electrode in liquid membrane electrodes?**
2. **Lonomycin b) Valinomycin c) Nonactin d) Gramicidin**

**Ans - b**

1. **In solid state membranes, the body of the electrodes are made of which of the following?**
2. **Polyvinyl chloride b) Plastic c) Polythene d) Teflon**

**Ans - d**

1. **Which of the following is not the characteristic of ion selective electrodes?**
2. **Simple to use b) Inexpensive c) Narrow concentration range d) Operates in wide range of temperature**

**Ans - c**

1. **Which of the following is not a problem of ion selective electrodes?**
2. **Interference with other ions b) Output is influences by ionic strength c) Drift in electrode potential during a sequence of measurements d) Can measure only positive ions**

**Ans - d**

1. **Which of the following is the effective concentration measured at the electrode head**
2. **Selectivity co – efficient b) Ionic strength c) Activity d) Activity co-efficient**

**Ans - c**

1. **The value of activity co-efficient is always in which of the following ranges?**
2. **Zero b) Less than Zero c) Less than 1 d) Greater than 1**

**Ans - c**

1. **How many terminals does the FET transistor have?**
2. **One b) Two c) Three d) Four**

**Ans - c**

1. **The field –effect transistors used in ----**
2. **Amplifiers b) Analog switch c) Oscillator d) All of the above**

**Ans - d**

1. **The field – effect transistors has ----**
2. **Very high input impedance b) Small in size c) Low power consumption d) All of the above**

**Ans - d**

1. **Which one is a unipolar device**
2. **FET b) BJT c) Both a and b d) None of the above Ans - a**
3. **How many types of FETs are there**
4. **One b) Two c) Three d) Four**

**Ans - b**

1. **The current in FET flows between ------- terminals**
2. **Drain and gate b) Drain and source c) Both a and b d) None of the above**

**Ans - b**

1. **What are the terminals of FET?**
2. **Anode and cathode b) Source, gate and drain c) Collector, emitter and base d) None of the above**

**Ans - b**

1. **The advantages of FET are ------**
2. **It has better thermal stability b) It predicts less noise c) It can be used at high frequency d) All of the above**

**Ans - d**

1. **The operation of FET relies on**
2. **Free electrons b) Holes c) Both a and b d) Either free electrons or holes**

**Ans - d**

1. **In FET the noise level is**
2. **High b) Very low c) Moderate d) Low**

**Ans - b**

1. **Who invented FETs?**
2. **Juliua Edgar Lilienfeld b) Schockley c) Harris d) None of the above**

**Ans - a**

1. **In FET configuration the voltage gain of the common gate is ------**
2. **High b) Very low c) Moderate d) Low**

**Ans - a**

1. **In FET configuration the current gain of the common gate is ------**
2. **High b) low c) Moderate d) very high**

**Ans - b**

1. **The voltage gain of the common source in FET is ------**
2. **High b) Very low c) Medium d) Low**

**Ans - c**

1. **Which is used as a gate insulator in FE-FET?**
2. **Ferroelectric material** b) Air c) Both a and b d) None of the above

**Ans - a**

1. **Which one is a gas –sensitive FET?**
2. Catalytic gate field –effect transistor b) suspended gate field –effect transistor c) Soild electrolyte based field – effect transistor d) All of the above
3. **In polarography, DME is used as……………. Electrode**
	1. Polarizable electrode b) Reference electrode c) Non- polarizable electrode d) Gas electrode **Ans: a**
4. **Non-polarisable electrode is one which……….**
5. Can take up any potential applied to i
6. Cannot take up any potential applied to it
7. Has its own potential
8. Change its potential occurs **Ans: c**

**33. The half-wave potential is……………. On concentration of electroactive species**

1. Dependent
2. Independent
3. Decrease
4. Increase**Ans: b**

**34. In polarography, the conditions are so maintained that movement of ions to DME isControlled by………….**

1. Concentration gradient
2. Potential gradient
3. Indicator electrode
4. Reference electrode **Ans: a**

**35. In polarography, DME is used as a …………………electrode.**

1. Non-polarizable
2. Anode
3. Polarizable
4. Combined **Ans: c**

**36. In DME when the drop gets detached, the current becomes………**

1. Minimum
2. Maximum
3. Equal
4. Zero **Ans: d**

**37. In polarography gelatin is used as………**

1. Maxima supressor
2. Minima supressor
3. Reference electrode
4. Indicator electrode **Ans: a**

**38. In polarography, saturated calomel electrode is used as…………**

1. Polarizable electrode
2. Reference electrode
3. Non- polarizable electrode
4. Gas electrode **Ans: c**

**39. Capillary constant in the Ilkovic equation is equal to……...**

1. M ½ t
2. D1/6 ½ t
3. Id= 607ncD1/3m2/3t1/6
4. D 1/6½ t 1/3 **Ans: c**

**40. In polarography, DME is stands for.........**

1. Double Mercury Electrode
2. Dropping Mercury Electrode
3. Double Metal Electrode
4. Dropping Methyl Electrode **Ans: b**

**41. The supporting electrolyte used in polarography is......**

1. KCl
2. KH
3. KI
4. KF **Ans: a**

**42 ...........gas is used to remove Dissolved Oxygen on polarographic analysis**

1. Hydrogen
2. Helium
3. Nitrogen
4. Neon **Ans: c**

**43. .......Salts of metals are used as a supporting electrolyte in polarographic analysis**

1. Transition metal
2. Alkali metal
3. Lanthanide
4. Actinide **Ans: b**

**44. In DME, when the drop get detached, the current becomes .....**

1. Maximum
2. Zero
3. Minimum
4. Remain constant **Ans: b**

**45. In polarography, current voltage curve is called as……...**

1. Polarogram
2. Histogram
3. Hologram
4. Bologram**Ans: a**

**46. ........ are used as a maxima suppressor in polarography**

1. Gelatin
2. Triton
3. Methyl red
4. Methyl blue **Ans: a**

**47. Half wave potential is defined as potential at which current flowing through the cell is half of ........ current**

1. Diffusion
2. Residual
3. Limiting
4. Drift **Ans: a**

**48. The ratio of concentration of titrant to the concentration of the analyte in amperometric titrations ideally should be**

1. 2
2. 5
3. 10
4. 0.5 **Ans: c**

**49. A rotating platinum electrode is generally used in….**

1. Potentiometry
2. Polarography
3. Amperometry
4. Conductometry**Ans: c**

**50. Polarography maxima can be suppressed by using….**

1. A supporting electrolyte
2. A surface-active agent
3. Inert gas
4. Sample concentration **Ans: b**

**51. In polarography, Diffusion current is also known as……**

1. Ohmic current
2. Faradaic current
3. Drift current
4. Limiting currernt**Ans: b**

**52. In Polarography, reduction of oxygen is takes place at…….. electrode**

1. SCE
2. SSC
3. CCS
4. DME **Ans: d**

**53. The .........is used as a reference electrode in amperometrictitration**

1. SCE
2. DME
3. Glass electrode

d)Rotating platinum electrode **Ans: a**

**54. ……..is not a part of dropping mercury electrode from following.**

1. Capillary
2. Flexible tubing
3. Mercury reservoir

 d) Hole stem**Ans: d**

**55. The diameter of glass tubing in rotating platinum electrode is …….**

1. 1 mm
2. 3 mm
3. 6 mm

d) 20 mm **Ans**: **c**

**56. The ratio of concentration of titrant to the concentration of the analyte in**

**amperometric titrations ideally should be**

 a) 2

 b) 5

 c) 10

 d) 0.5 **Ans: c**

 **57. The diffusion current is measured in late life period of mercury drop in**

a) Pulsed polarography

 b) Differential pulsed polarography

 c) Tast polarography

 d) Voltammetry **Ans: c**

**58**. **The diffusion current in the polarography depends on all of the following except**

a) Capillary diameter

 b) Life time of mercury drop

 c) Temperature

 d) Charge of the electrolyte **Ans: c**

 **59. The auxillary electrode in polarography is**

a) Dropping mercury

 b) Mercury pool

 c) Graphite electrode

 d) Rotating platinum electrode **Ans: b**

 **60. All of the following are used as working electrode in voltammetry , except**

a) zinc

 b) carbon

 c) gold

 d) copper **Ans: a**