

- NOTE: i) All the questions are compulsory.
 ii) Figures to the right indicate full marks.
 iii) Use of non-programmable calculator / log table is allowed.

Q1. Attempt any twelve

A. Multiple choice questions:

[12]

1. Which of the following is the example of liquid-liquid chromatography.
 a) GSC b) GLC c) HPLC d) ion exchange
2. The glass electrode is -----electrode.
 a) Indicator b) Reference c) Both d) None of them
3. Which is a measure of dispersion of data?
 a) Mean b) mode c) dispersion d) range
4. The most frequently obtained observation from the given set is known as.....
 a) Mean b) median c) range d) mode
5. Which of the following is not a type of gas-solid separation
 a) Adsorption b) Sublimation c) Gas – Solid chromatography d) Ion exchange
6. A-----is that electrode whose potential is known and remain constant
 a) reference electrode b) indicator electrode c) PH electrode d) glass electrode
7. The unit of cell constant is-----
 a) $1/\text{cm}^2$ b) $1/\text{m}$ c) $1/\text{m}^2$ d) $1/\Omega$
8. The Variance is given as.....
 a) S b) S^2 c) S^3 d) S^4
9. The doubtful value in a given measurements is rejected or retained using.....
 a) Q test b) F test c) Student's T test d) Z test
10. The range of normal distribution is:
 a) 0 to n b) 0 to ∞ c) -1 to +1 d) $-\infty$ to $+\infty$
11. In combined glass electrode, the reference electrode used is-----electrode.
 a) saturated calomel b) glass electrode c) saturated hydrogen d) none of them
12. Which part of the cell is responsible for movement of current between two solutions? *
 a) electrode b) Salt bridge c) Platinum wire d) cathodes
13. Electrophoresis is a -----
 a) Separation method b) electroanalytical method c) separation method using electric field d) electrolysis of the solution
14. Iodine chamber is used for -----
 a) Detection in TLC b) determination in TLC c) detection in paper chromatography d) determination in paper chromatography
15. Which technique is used to measure EMF?
 a) Acid base titration b) pH metry c) Potentiometry d) Conductometry
16. ----- Convert electrical energy into chemical energy with the non- spontaneous redox reaction.

- a) Galvanic cell b) Electrolytic cell c) Voltaic cell d) Daniel cell
17. In electrolytic cell anode and cathode have----- and ----- charge.
a) positive and negative b) positive and positive c) negative and positive d) negative and negative
18. The electrode at which oxidation reaction takes place is called as-----?
a) cathode b) anode c) electrolytic cell d) photovoltaic cell

B. Match the following.

[5]

1. Median
2. Unit of conductance
3. Indeterminate error
4. Separation of miscible liquids
5. Separation of metal ion

- a. fractional distillation
- b. Random error
- c. paper chromatography
- d. Measure of central tendency
- e. Siemen

C. Write true or false.

[3]

1. Spectrophotometers are more sensitive than calorimeter.
2. Potentiometric titration method is applicable to only aqueous solution.
3. The mechanism of separation in paper chromatography is partition.

Q.2. Attempt any four:

[20]

- a) Define :- Precipitation, Filtration, Crystallisation, Azotropic distillation and Extractive distillation.
- b) What do you understand by the term Separation factor as applied in solvent extraction?
- c) Describe batch Extraction in solvent extraction?
- d) Give a brief description of Thin layer Chromatography.
- e) Write application of Paper Chromatography in separation of cations.
- f) What are the Principles of paper chromatography? How are the components of a mixture identified in paper chromatography? What is meant by R_f value?

Q.3. Attempt any four:

[20]

- a) Give advantages and disadvantages of conductometric titration.
- b) Describe principle and working of glass electrode.
- c) Explain principle of PH metry.
- d) Explain basic principle of Potentiometric titration on the basis of Nernst equation.
- e) Describe the graph of Conductometric titration for : i) strong acid Vs strong base
(ii) strong acid Vs weak base.
- f) Explain basic principle of Conductometric titration? Give the construction of conductivity cell with neat and labelled diagram.

Q.4. Attempt any four:

[20]

- a) Explain the different ways for minimization of errors.
- b) Define the following terms: deviation, relative average deviation, range, standard deviation and variance.
- c) (i) Explain the terms mean, mode, median.
(ii) Calculate the mean and the median for the following set of values.
18.30, 18.28, 18.32, 18.27 and 18.28

- d) The hardness of water samples was determined with the following observations in ppm.
2.40, 2.55, 2.50, 2.54, 2.47
Calculate the standard deviation, variance, relative standard deviation and coefficient of variance.
- e) Write a short note on null hypothesis.
- f) Explain the Q- test.

Q.5. Attempt any four:

[20]

- a) Write short note on (i) Electrophoresis (ii) Steam Distillation.
- b) Give applications of Thin layer Chromatography.
- c) Write a short note on primary reference electrode and secondary reference electrode.
- d) What are the different types of pH meters? What is the use of pH metry in biological and environment at analysis?
- e) Describe the Gaussian distribution curve with its salient features.
- f) In the analysis of sulphur content of a sample, the following values were reported.
Sulphur content (percent): 0.47, 0.48, 0.47 and 0.50.
The value 0.50 appears doubtful. This value is therefore provisionally discarded.