

15G-106
May-2015
M.Sc., Sem.-II
410 : Chemistry
(Analytical Chemistry)

Time : 3 Hours]

[Max. Marks : 70

Instructions : All questions are compulsory and carry equal marks.

1. Answer the following : **14**
- (a) Explain the process of extracting method from aqueous to non-aqueous phase.
- OR**
- Derive a relation between distribution ratio and partition coefficient with a suitable illustration and justify the relationship.
- (b) How is Crag's counter current extraction useful in extracting analytes having similar partition coefficients ?
- OR**
- Describe the process for accelerated and microwave assisted extraction.
2. Answer the following : **14**
- (a) Give comparison between TLC and HPTLC of their salient features.
- OR**
- Discuss the principle of chromatography. Explain its classification based on mechanism of retention / interaction.
- (b) Explain the process of hydrodynamic and hydrostatic equilibrium in counter current chromatography.
- OR**
- Give the importance of plate theory and rate theory in chromatography.
3. Answer the following : **14**
- (a) Discuss different applications of conductometric titrations with suitable examples.
- OR**
- Explain modern definition of pH and discuss in brief the validity of the equation.
- (b) Give the different application of calcium ion selective electrode and explain the working mechanism of the electrode.
- OR**
- Explain the process of measuring pH by glass electrode and state its limitation.

4. Answer the following : 14

- (a) State the working of CO₂ and O₂ gas sensing probes and give their application in the analysis of environmental samples.

OR

Write a short note on European, American and IUPAC concept of sign convention for expressing the electrode potential.

- (b) Explain the application of potentiometric titration with suitable examples.

OR

Give different applications of fluoride ion selective electrode and explain the working mechanism of the electrode.

5. Answer in brief : 14

- (1) Define Volume flow rate.
 - (2) What is distribution coefficient ?
 - (3) Give the relation between Activity coefficient and Ionic strength.
 - (4) What is Chromatographic resolution ?
 - (5) Explain asymmetric potential.
 - (6) Give two limitation of liquid-liquid extraction.
 - (7) What is a chromatogram ?
 - (8) Give van-Deemter equation for plate height measurement.
 - (9) Give the composition of glass used for pH measurement.
 - (10) Define capacity factor and give its equation.
 - (11) Give the unit of conductance and resistance.
 - (12) What are enzyme electrodes ?
 - (13) Give two application of potentiometry.
 - (14) Define : Specific and Equivalent Conductance.
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