

TC-IIS

April-2013

M.Sc. Sem. II

410-CHEMISTRY(Analytical Chemistry)

Time: 3 Hours]

[Max. Marks: 70]

1. Answer any two of the following: 14

- (a) Discuss different equilibria in extracting metal cations from aqueous phase.
- (b) Write a brief note on counter-current extraction.
- (c) Derive a relation between distribution ratio and partition coefficient with a suitable illustration. Define each term involved in the final equation and justify the relationship.
- (d) How solid phase extraction technique is useful in the extraction of biological samples?

2. Answer any two of the following: 14

- (a) Discuss the principle and applications of ion-exchange chromatography
- (b) Give the importance of plate theory and rate theory in chromatography.
- (c) What is chromatography? Discuss its principle and explain its classification.
- (d) State the principles of TLC and HPTLC and compare their salient features.

Important -

3. Answer any two of the following: 14

(a) Draw a diagram of glass electrode and explain its working. (1)

(b) Write a brief note on errors in pH measurement. (+)

(c) Discuss different applications of conductometric titrations with suitable examples.

(d) Explain modern definition of pH and discuss in brief the validity of the equation. (4)

TC-IIS

1

4. Answer any two of the following:

- (a) Write a short note on European, American and IUPAC concepts of sign convention for expressing the electrode potential.
- (b) Give the classification of electrodes from inert to membrane. Discuss the difference between hydrophobic and micro-porous membrane.
- (c) Explain the working mechanism of CO_2 and O_2 gas sensing probes along with their application in the analysis of environmental samples.
- (d) Illustrate different applications of calcium ion selective electrode and explain the working mechanism of the electrode.

5. Answer in brief (1 mark each)

- (1) Give two applications of accelerated solvent extraction technique.
- (2) What is the shape of spot in HPTLC?
- (3) Define retention time and retention volume in chromatography.
- (4) Define dead time and dead volume.
- (5) State the van Deemter equation and define each term.
- (6) Write the equation for multiple batch extraction.
- (7) Give an example of ion association complex.
- (8) State the difference between homogeneous and heterogeneous membrane.
- (9) What is the unit of molar conductivity?
- (10) Give the composition of glass membrane used in glass electrodes.
- (11) What is the relation between activity and activity coefficient?
- (12) Explain boundary potential in pH measurements.
- (13) Give two characteristics of reference electrode.
- (14) Explain asymmetric potential.