



Seat No. : _____

TC-119

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 chelates 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.
3. Answer any **two** of the following : **14**
- (a) Draw a diagram of glass electrode and explain its working.
 - (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. Answer any **two** of the following : **14**
- (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 metal to membrane. Discuss the difference between hydrophobic and micro-porous membrane.
 - (c) Explain the working mechanism of CO₂ and O₂ 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**) **14**
- (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 measurement.
 - (13) Give two characteristics of reference electrode.
 - (14) Explain asymmetric potential.
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