

Seat No. : \_\_\_\_\_

**ZS-110**

**May-2014**

**M.Sc., Sem.-II**

**410 : Chemistry**

**(Analytical Chemistry)**

**Time : 3 Hours]**

**[Max. Marks : 70**

1. Answer the following : **14**

- (a) Explain the principle of solid phase extraction for sample preparation.

**OR**

Discuss the importance of accelerated and microwave-assisted extraction.

- (b) Describe the equilibrium processes involved in the solvent extraction of metal chelates.

**OR**

How is Craig's counter extraction useful in extracting analytes having similar partition coefficients ?

2. Answer the following : **14**

- (a) Write a short note on counter-current chromatography.

**OR**

What are ion-exchangers ? How is separation afforded in ion-exchange chromatography for cations and anions ?

- (b) Give the significance of plate theory and Van Deemter equation in chromatography.

**OR**

State the principles of TLC and HPTLC & give their comparative assessment.

3. Answer the following : **14**

- (a) Discuss in brief modern definition of pH.

**OR**

What is pH ? Give the mechanism of pH measurement using glass electrode.

- (b) Write a note on conductance of electrolytic solutions.

**OR**

Explain various applications of conductometric titrations with appropriate examples.

4. Answer the following : 14

- (a) State the working mechanism of CO<sub>2</sub> and O<sub>2</sub> gas sensing probes. Give their application in the analysis of environmental samples.

**OR**

Explain the working mechanism of calcium ion selective electrode and give its applications.

- (b) Discuss the classification of electrodes from metal to membrane. Explain the difference between hydrophobic and micro-porous membrane.

**OR**

Describe the European, American and IUPAC concepts of sign convention for expressing the electrode potential.

5. Answer in brief : (1 mark each) 14

- (1) Give advantages and disadvantages of ion selective electrode.
  - (2) What is pre-concentration ?
  - (3) Give any two applications of fluoride ion selective electrode.
  - (4) Define : Dead time and dead volume
  - (5) What do you understand by retention factor ?
  - (6) Give an example of ion association complex.
  - (7) Give the equation of distribution ratio for a weak acid.
  - (8) What will be the values of slope factors (Nernst potential) at 25 °C ?
  - (9) What is the fundamental difference between homogeneous and heterogeneous membrane ?
  - (10) Give the equation to calculate number of theoretical plates in chromatography.
  - (11) The specific conductance of an electrolyte decreases when the equivalent conductance increases with dilution. Explain why.
  - (12) Why electroanalytical techniques are selective and not specific ?
  - (13) Give the relation between % extracted and distribution ratio.
  - (14) Explain why a glass electrode is preferred to quinhydrone electrode in measuring pH of a solution.
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