Seat No._____

# MAY - 2017
# MSC0C204 (Sem - II)

**Time : 3 Hrs.** **Analytical Chemistry** **Total Marks : 70**

Instruction : (1) All Questions are Compulsory.
(2) Figures to the right indicate total marks of the Questions.

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 co-efficient 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 extraction of biological sample ?

2. Answer any two of the following. 14

(a) What is chromatography ? Discuss its principle and explain its classification.

(b) State the principles of TLC and HPTLC and compare their salient features.

(c) What are ion-exchangers ? Discuss the separation process and application of ion-exchange chromatography for cations and anions ?

(d) How is Van Deemter equation useful in explaining band broadening in chromatography? Explain each term involved in the equation.

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 $P^H$ measurements.

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

(d) Explain modern definition of $P^H$ 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 $CO_2$ and $O_2$ gas sensing probes along with their application in the analysis of environmental sample.

(d) Illustrate different application 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.

(1) What is the shape of spot in HPTLC ?

(3) Define retention time 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 $P^H$ measurement.

(13) Give two characteristics of reference electrode.

(14) Explain asymmetric potential.