msc-II - sem-III - Oct - 2016

Analy-chem- Paper-II

Q.P. Code : **77645**

(2½ Hours) **Total Marks : 60**

Note :(1) **All questions are compulsory.**
(2) Use of log table or non programmable calculator is permitted.

1. A. Attempt **any two** of the following :-
   i) Discuss the applications of Auger electron Spectroscopy.
   ii) What is ultraviolet photoelectron spectroscopy? What information is obtained from this technique?
   iii) Draw a schematic diagram of scanning electron microscope and explain the function of each component.
   iv) Explain the basic principle and working of atomic force microscope.

   B. An Auger peak was observed at 530 ev. Estimate the difference in energy between the inner shell from which the electron was ejected and the outer shell from which the second electron fell. The binding energy of Auger electron is 582 ev. ($h = 4.1 \times 10^{-15}$ ev, $c = 3 \times 10^{8}$ ms^{-1}) 4

   OR

   B. Explain working of electron spectrometer used in ESCA, with a suitable diagram. 4

2. A. Attempt **any two** of the following :- 8
   i) Explain the principle of photo acoustic spectrometry.
   ii) Discuss the arc and spark source method, with reference to sample type and sample handling.
   iii) Describe instrumentation involved in Mossbauer's spectroscopy.
   iv) Explain inductively coupled plasma source, with suitable diagram.

   B. What are applications of Mossbauer's spectroscopy? 4

   OR

   B. Discuss the basic principles of atomic emission spectroscopy, with plasma sources. 4

3. A. Attempt **any two** of the following :- 8
   i) Explain principle and working of chronopotentiometry.
   ii) Describe the construction of disposable multilayer p-ion system used for the determination of potassium ions.
   iii) What are screen printed electrodes? Discuss their applications.
   iv) Explain the principle of TAST polarography and discuss its applications.

B. In chronopotentiometric analysis of metal ion; the transition time of 3.91 sec was observed for a 10 cm^3 solution containing 110 milimoles of metal ions. For another 10 cm^3 sample solution of same metal ion under identical conditions, the transition time was found to be 1.59 sec. Calculate the concentration of the metal ion in the second solution. 4

OR

B. Give an account of chemically modified electrodes. What is their significance? 4

4. A. Attempt **any two** of the following :- 8

i) Describe the various prisms used in polarimeter.

ii) Give an account of liquid phase chemiluminescence titration.

iii) Explain the basic principle and instrumentation in ORD.

iv) Discuss the following terms:-

a) Cotton effect.

b) Mutarotation.

B. Describe the chemiluminescence apparatus with a neat labeled diagram. 4

OR

B. Discuss the applications of CD. 4

5. A. Attempt **any four** of the following :- 12

i) What is the principle of auger electron spectroscopy?

ii) Explain the working of scanning tunneling microscope.

iii) Give the applications of spark source spectroscopy.

iv) What is Mossbauer's effect?

v) State sand equation. Explain the various terms involved in it.

vi) Discuss the applications of polarography in inorganic analysis.

vii) Explain the use of luminal in chemiluminescence method.

viii) How is chemiluminescence technique used for determination of gaseous air pollutants?
