Q.P. Code :05440

[Time: 2.30 Hours] **[Marks:60]**

Please check whether you have got the right question paper.

N.B: 1) All questions are compulsory.
2) Use of log table or non-programmable calculator is permitted.

1. A) Attempt **any two** of the following :- 08
   i. What is UPS? Give the information obtained from this technique.
   ii. With a suitable diagram, explain working of electron spectrometer used in ESCA.
   iii. Give the basic principle and working of atomic force microscope.
   iv. Discuss the applications of scanning probe microscopes.

   B. The work function of an instrument is 16.3 ev, when excited with radiation of wavelength 850 p.m. Calculate the kinetic energy of the electron, if the binding energy is 18 ev. ($h = 4.1x1O^{-15}$ ev, $c = 3 \times l0^{8} ms^{-1}$) 04

   OR

   B. What is auger electron? How is it produced? 04

2. Attempt **any two** of the following :- 08
   i. Give an account of the types of samples and their handling in arc source method.
   ii. Discuss applications of Mossbouer's spectroscopy, with reference to iron compounds.
   iii. Explain in detail the principles of photo acoustic spectroscopy.
   iv. With reference to electrical discharge sources, explain the basic principle of atomic emission spectroscopy.

   B. Explain inductively coupled plasma source, with suitable example. 04

   OR

   B. With respect to photo acoustic spectroscopy, explain the following
   i. Thermal diffusion length
   ii. Function of filter gas

3. A. Attempt **any two** of the following :- 08
   i. What are chemically and electocatalytically modified electrodes?
   ii. Explain the disposable multilayer p-ion systems with suitable example.
   iii. What are screen printed electrodes? Discuss their applications.
   iv. Discuss the applications of polarography in organic and inorganic analysis.

   B. In chronopotentiometry the transition time for 10 micro moles of an active. species present in 56 cm^3 solution was 2.73 sec, what will be the transition time for a solution containing 20 micromoles of the same electro-active species in 75 cm^3 of solution under identical conditions? 04

   OR

   B. Explain the term transition time in chronopotentiometry. How is it obtained? 04

4. A. Attempt **any two** of the following :- 08
   i. Describe the chemiluminescence apparatus with a neat labeled diagram.
   ii. Discuss the applications of ORD.
   iii. What are chemiluminescence titrations? Explain with suitable example.
   iv. Explain the role of luminal in chemiluminescence method.

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B. Explain the principle of chemiluminescence. 04

OR

B. What is circular dichroism? Discuss in detail. 04

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

i. What is tunneling microscope? How is it used for surface analysis?
ii. Discuss the applications of auger electron spectroscopy.
iii. Give an account of the detectors used in photo acoustic spectroscopy.
iv. Explain the applications of Mossbouer's spectroscopy.
v. What is chromoamperometry?
vi. Explain the basic principle of TAST polarography.
vii. How is chemiluminescence technique used for determination of gaseous air pollutants?
viii. Describe various prisms used in polarimetry.

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