

[Time: 2 ½ Hours]

[ Marks:60]

Please check whether you have got the right question paper.

- N.B:
1. All questions are compulsory
  2. Figures to the right indicate full marks
  3. Use of logarithmic table/ non programmable calculator is allowed

- Q. 1** A) Attempt **any two** of the following: (08)
- i) Describe the principle and instrumentation of particle induced X ray emission.
  - ii) Explain the method of preparation of the surface for surface analysis.
  - iii) Write a note on principle and working of Secondary Ion Mass Spectroscopy.
  - iv) Write a note applications of Low energy Ion scattering.

B) Describe the principle of Low-Energy Ion Scattering. (04)

**OR**

B) Write a note on applications of Rutherford back scattering. (04)

- Q. 2** A) Attempt **any two** of the following: (08)
- i) With the help of a neat diagram explain the instrumentation of ESR spectroscopy.
  - ii) Explain Isomer shift and quadrapole shift with reference to Mossbauer spectroscopy.
  - iii) Discuss the electrical discharge sources used in AES.
  - iv) What is Mossbauer's effect?

B) Describe the applications of AES. (04)

**OR**

B) What are the important applications of ESR? (04)

- Q. 3** A) Attempt **any two** of the following: (08)
- i) What is Chronoamperometry? Explain in detail.
  - ii) Discuss the stripping voltammetry as an anodic process.
  - iii) Distinguish between Normal and Differential Pulse Polarography.
  - iv) Describe the principle of TAST.

B) Write a note on modified electrodes in voltammetry. (04)

**OR**

B) Explain the principle and working of Chronopotentiometry. (04)

- Q. 4** A) Attempt **any two** of the following: (08)
- i) Explain the principle of photoacoustic spectroscopy.
  - ii) Explain the basic principle of circular dichroism (CD).
  - iii) How is Chemiluminescence technique used for determination of gaseous air pollutant?
  - iv) With the help of a neat diagram describe the technique of ORD.

B) Explain the principle and instrumentation of spectroelectrochemistry (04)

**OR**

B) What are Chiroptical Methods? Discuss their applications (04)

**Q. 5** Attempt **any four** of the following:

**(12)**

- i) Give the main applications of Particle induced X ray emission.
- ii) Explain the significance of surface analytical techniques.
- iii) Explain the principle of AES.
- iv) What are the applications of Mossbauer spectroscopy?
- v) Give the applications of ultramicroelectrodes.
- vi) What are the applications Chronopotentiometry?
- vii) Describe the applications of spectroelectrochemistry.
- viii) State and explain the Principle of Chemiluminescence techniques.

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