3 SEM PG (CBCS) CHM AEC 6

2024

(December)

CHEMISTRY

Paper : AEC–306

(Analytical Chemistry–II)

Full Marks : 30

Time : Two hours

The figures in the margin indicate full marks for the questions.

*Write the answers of **Unit–I** and **Unit–II** in separate books.*

UNIT–I

(Marks : 15)

1. Answer ***any four*** from the following questions : 3×4=12

   (a) What are the common adsorbents used in column chromatography ? Write the applications of adsorption chromatography. 1+2=3

(b) Briefly describe the basic working principle of gas chromatography with the help of a diagram.

(c) Write the working principle of paper chromatography. Write the applications and limitations of paper chromatography. 1+1+1=3

(d) Write the components of HPLC (High Pressure Liquid Chromatography) mentioning their functions. 2+1=3

(e) Write the basic principle of separation using Ion-exchange Chromatography with a schematic diagram.

2. Write a short note on : ***(any one)*** 3

(a) Flash chromatography

(b) Gel permeation chromatography

UNIT–II

(Marks : 15)

3. Answer ***any three*** of the following : 3×3=9

(a) Describe the *two* primary types of electron guns used in Transmission Electron Microscopy (TEM).

(b) Explain the principle of SEM with the help of a diagram.

(c) What is the major drawback of contact mode AFM ? Explain how this issue is addressed by using non-contact *or* tapping mode AFM. 1+2=3

(d) Explain the basic working principle of AFM. Name the different components involved in an AFM system. 2+1=3

(e) Describe the roles of various lenses and apertures used in TEM.

4. Answer ***any three*** of the following : 2×3=6

(a) What are the limitations of SEM ?

(b) What is the typical energy/wavelength of electrons employed in TEM ? Why is it necessary to operate at such high energies ? 1+1=2

(c) Why is it necessary to coat samples before imaging in SEM ?

(d) Write a short note on sample preparation for TEM.
