

IMA- Question Bank for Test – 1

Portions:

Unit-I

- Beer-Lambert's law, limitations, derivation of the law from first principles
- Applications of Beer-Lambert's law to single component and multi-component measurements
- Principle and instrumentation of UV-vis spectroscopy
- Estimation of inorganic ions such as Fe, Ni and Nitrite using Beer-Lambert's Law
- Principle and instrumentation of Infrared spectroscopy
- Electromagnetic radiation – regions and properties, interaction of photons with matter
- Woodward-Fischer rules for the calculation of absorption maxima

Unit-V

- Chromatographic methods – principles, types, improving the resolution of separation
- HPLC
- GC
- Estimation of organic compounds by HPLC and GC

Part A (2 mark questions)

1. Give the relationship between wavelength and energy of electromagnetic radiation.
2. Convert the following:
 - (a) 20% transmittance into absorbance scale.
 - (b) 1.4 absorbance into % transmittance scale.
3. Convert the wave number 3500 cm^{-1} to wavelength in \AA .
4. Discuss few applications of UV and Visible spectrophotometry.
5. Calculate the absorptivity of a compound with molecular weight 144, if 10^{-5} (g/ml) of solution exhibits an absorbance of 0.4, when the optical path is 1 cm.
6. Give the spectral range of of UV-vis spectrometers.
7. What are the main parts of a spectrometer?
8. What are the light sources used in UV-vis spectroscopy?
9. What are the radiation sources involved IR spectroscopy?
- 10.
11. What standard is used to check the correctness of IR instrument?
12. What standard is used to check the correctness of HPLC instrument?
13. Enlist the typical carrier gases used in GC.
14. Differentiate between isocratic and gradient elution in HPLC.

Dr. M. Subramanian, Associate Professor, Chemical Engineering, SSN College of Engineering, Chennai.

15. What are the detectors used in HPLC?
16. What are the types of columns used in GC?
17. What are the detectors used in GC?
18. How is the presence of a component identified in GC?
19. How is the concentration of a sample quantified with HPLC?
20. What are the methods by which the resolution of peaks in GC and HPLC can be improved?
21. Mention the typical solvents used in HPLC.

Part B (16 marks questions)

Explain with a schematic, the principle, applications, instrumentation and typical output of: (i) UV-vis spectroscopy, (ii) IR spectroscopy, (iii) HPLC, (iv) GC

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