



M.Sc. III Semester Degree Examination, April/May - 2024

CHEMISTRY

Analytical Techniques

(NEP)

Time : 1 Hour

Maximum Marks : 30

SECTION - A

1. Answer **all** of the following questions. Each question carries **one** mark. **1x5=5**
- (a) Define qualitative analysis and briefly explain its significance in analytical chemistry.
 - (b) Explain the principle of precipitation titration.
 - (c) Define the principle of fluorescence spectroscopy and provide one application.
 - (d) Briefly explain the nitrogen rule in the context of mass spectrometry.
 - (e) Provide a concise definition of the principle underlying fluorescence spectroscopy.

SECTION - B

Answer **Any five** of the following questions. Each question carries **two** marks. **2x5=10**

- 2. Elaborate on the significance of sampling in analytical procedures.
- 3. Outline the principles of precipitation titration and complexometric titration.
- 4. Define Beer-Lambert's law and briefly outline its limitations.
- 5. Name two types of functional groups that can be determined using FTIR spectroscopy.
- 6. Identify and discuss one factor that can affect the fragmentation patterns in mass spectrometry.
- 7. Explain the significance of the base peak and the molecular ion peak in a mass spectrum.
- 8. Briefly explain one factor that can affect the chemical shift values.



P.T.O.

SECTION - C

Answer **Any three** of the following questions. Each question carries **five** marks. **5x3=15**

9. Discuss the applications of acid-base titrations in determining acidity and alkalinity, with a specific mention of its use in aspirin analysis.
10. Provide examples of applications for redox titrations, focusing on the determination of Fe and Vitamin C.
11. Briefly discuss applications of UV-Vis spectroscopy in determining the composition of metal-to-ligand complexes.
12. Explain the principle of FTIR spectroscopy and briefly discuss the importance of sample preparation in obtaining reliable results.
13. Determine the structure of an organic compound by interpretation of following spectral data.
MASS : m/z(% Relative Abundance); 110(0.2 M+2); 104(0.3 M+1); 108(0.6 M+); 107(1); 73(100); 63(0.144); 45(25); 27(24).
IR : Absorption : 2985-2850; 1720; 690.
¹HNMR : Absorption(multiplicity); 2.85(Triplet); 3.75(Triplet); 12.2(Singlet).
UV-Vis : No λ_{\max} above 220 nm.

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