

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**B.Ph. SEMESTER – 6 • EXAMINATION – WINTER - 2023**

**Subject Code: 2260003****Date: 07/12/2023****Subject Name: Pharmaceutical Analysis IV****Time: 02:30pm to 05:30pm****Total Marks: 80****Instructions:**

1. Attempt any five questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Discuss principle of GC. What are the requirements of mobile phase in GC? **06**  
(b) What is importance of temperature programming in GC? Discuss applications of GC and give difference between GC and GC-MS. **05**  
(c) Discuss various types of derivatization in GC. Write in detail about derivatization reaction that improves stability of molecules. **05**
- Q.2** (a) Enlist various theories of HPLC. Elaborately discuss rate theory. **06**  
(b) What is Van Deemter plot? Write applications of Van Deemter plot and differentiate normal phase and reverse phase HPLC. **05**  
(c) Draw block diagram of HPLC and discuss about stationary phase in detail. **05**
- Q.3** (a) Enlist detectors used in HPLC. Discuss about PDA detector. **06**  
(b) Write a note on LC-MS/MS. **05**  
(c) Write principle of ion-exchange chromatography and discuss stationary phase used in ion-exchange chromatography. **05**
- Q.4** (a) Define pre-conditioning. What is importance of pre-conditioning in HPTLC. Discuss sorbents used in HPTLC. **06**  
(b) Discuss basic principle and applications of Raman spectroscopy. **05**  
(c) Write principle and applications of affinity chromatography. **05**
- Q.5** (a) Discuss Bragg's law. Explain how X-ray is generated in X-ray spectroscopy. **06**  
(b) Enlist units of radioactive decay. How radioactivity is measured? **05**  
(c) Write a brief note on isotopes dilution analyses. **05**
- Q.6** (a) What are the applications of ELISA? Discuss various types of ELISA. **06**  
(b) Elaborately discuss applications of radio nuclides. **05**  
(c) What is importance of GLP? Enlist ten basic principles of GLP. **05**
- Q.7** (a) Define patent and discuss different steps involved in patent filling process. **06**  
(b) Discuss various validation parameters for analytical method validation as per ICH guideline. **05**  
(c) Discuss role of ISO 9001:2000 in quality management system. **05**

\*\*\*\*\*