

***Annual Examination 2022***  
***B. Pharm 4<sup>th</sup> Year***  
***Instrumental Analysis***

**Time: 3Hrs**

**Max. Marks-80**

**Note: Attempt any five questions:**

1. Write in brief theory of gas chromatography. Explain band broadening & HETP in gas chromatography?
2. Write in detail about basic instrumentation & application of UV and visible spectrophotometry?
3. Define NMR Spectroscopy. Discuss its instrumentation & application
4. Write a note as:
  - (A) Raman Spectroscopy
  - (B) FTIR
5. (A) Describe various sample handling technique for solid sample in IR  
(B) Discuss various types of mass analyzer in mass spectroscopy
6. Write detailed note as:
  - (A) X-Ray diffraction methods.
  - (B) Fluorimetry
7. Discuss various types of pumps used in HPCL. Write in brief about trouble shooting and quantization technique in HPLC.
8. Explain simulated moving bed technology and principle of super critical fluid extraction.
9. Explain Spin, Spin coupling and Chemical shift explain Spin and Spin coupling is useful in structural elucidation?
10. Write note on:
  - (A) Different mode of electrophoresis
  - (B) Nuclear reaction and racliation