



PRACTICE SET FOR SUBJECTIVE QUESTIONS
End Semester (7thSemester) Examination

Program: B. Pharm

Subject: Instrumental Method of Analysis

Subject Code: BP705T

Course Outcome (CO)

On the successful completion of the Course, students will be able to:-

CO1: Analyze the interaction of matter with electromagnetic radiations and its applications in drug analysis.

CO2: Perform quantitative & qualitative analysis of drugs using various analytical instruments.

CO3: Apply core principles and instrumentation of IR spectroscopy, flame photometry, atomic absorption Spectroscopy and nepheloturbidometry to analyze samples, interpret vibrational and emission behaviors, and resolve analytical challenges in pharmaceutical and environmental contexts.

CO4: Understand and explain key chromatographic and electrophoretic techniques including column, thin layer, paper chromatography, and gel/capillary electrophoresis to separate and analyze compounds, evaluate methodology and performance factors, and interpret results for pharmaceutical and biomedical applications.

CO5: Understand, operate, and evaluate chromatographic techniques ion exchange, gel filtration, and affinity chromatography

Unit I

S No.	Questions	CO	Bloom's Taxonomy Level
Section II		Questions for 5 marks	
1.	Define fluorescence and distinguish it from phosphorescence. Describe the process of internal conversion in a fluorescent molecule.	CO1	Remember
2.	What is the effect of solvent polarity on UV absorption spectra?	CO1	Understand
3.	Discuss the derivation of Beer-Lambert's Law and explain its assumptions.	CO1	Understand
4.	Define chromophore and auxochrome with examples.	CO1	Remember
5.	Explain how a photomultiplier tube works in detecting light signals.	CO1	Remember
6.	Explain the difference between singlet and triplet states in terms of electron spin.	CO1	Understand
7.	Explain the role of auxochromes in modifying absorption spectra.	CO1	Understand
Section III		Questions for 10 marks	
8.	Compare the spectral shifts caused by chromophores and auxochromes. How do their structural differences influence absorption maxima?	CO1	Analyze
9.	Illustrate the use of fluorimetry to detect trace amounts of a biomolecule in a sample?	CO1	Evaluation
10.	Analyze the factors that lead to fluorescence quenching in biological samples.	CO1	Analyze

Unit II

S No.	Questions	CO	Bloom's Taxonomy Level
Section II		Questions for 5 marks	
11.	Define infrared spectroscopy and state its typical wavelength range. Give its principle.	CO2	Remember
12.	Explain the difference between stretching and bending vibrations in molecules.	CO2	Remember
13.	Discuss the applications of flame photometry.	CO2	Remember
14.	List and describe the essential components of a nepheloturbidometer also include a labeled diagram.	CO2	Remember
15.	Explain the principle of flame photometry. How does it differ from atomic absorption spectroscopy?	CO2	Understand
16.	Describe how sample handling methods differ for solids, liquids, and gases in IR spectroscopy.	CO2	Understand
17.	Describe the components of a flame photometer and their functions. Include a labeled diagram.	CO2	Understand
Section III		Questions for 10 marks	
18.	Analyze the fundamental vibrational modes in polyatomic molecules. How do stretching and bending vibrations differ, and what factors influence their frequencies?	CO2	Analyze
19.	Compare different types of burners used in flame photometry. How do they influence sensitivity and reproducibility?	CO2	Evaluation
20.	Critically evaluate the instrumentation of a typical IR spectrometer by assessing the effectiveness and limitations of each component from source to detector. Support your evaluation with a labeled diagram and justify your conclusions.	CO2	Evaluation

Unit III			
S No.	Questions	CO	Bloom's Taxonomy Level
Section II		Questions for 5 marks	
21.	Explain the difference between adsorption and partition chromatography.	CO3	Understand
22.	Define electrophoresis and explain the factors affecting electrophoretic mobility.	CO3	Remember
23.	Discuss the principle of thin layer chromatography.	CO3	Remember
24.	Define chromatography and explain its significance in analytical chemistry.	CO3	Understand
25.	Explain the methodology of paper chromatography and its development techniques.	CO3	Understand
26.	How is paper chromatography applied in the separation of amino acids?	CO3	Remember
27.	How does electrophoretic mobility depend on charge and size of molecules?	CO3	Remember
Section III		Questions for 10 marks	
28.	Compare the advantages and disadvantages of paper chromatography with TLC.	CO3	Evaluate
29.	Explain partition column chromatography in detail. Analyze and illustrate its advantages and disadvantages with adsorption chromatography, and provide examples of its applications.	CO3	Analyze
30.	Compare paper, gel, and capillary electrophoresis techniques in terms of resolution, speed, and application scope.	CO3	Evaluate
Unit IV			
S No.	Questions	CO	Bloom's Taxonomy Level
Section II		Questions for 5 marks	
31.	What is derivatization in gas chromatography? Explain its purpose, types, and how it enhances the analysis of non-volatile or thermally unstable compounds.	CO4	Understand
32.	Discuss the types of columns used in GC (packed vs. capillary). How do column dimensions and stationary phase properties affect resolution?	CO4	Understand
33.	Discuss the concept of temperature programming in GC. How does it improve resolution and analysis time for complex mixtures?	CO4	Remember
34.	Describe the instrumentation of a gas chromatograph.	CO4	Understand
35.	Discuss the limitations of GC in analyzing thermally labile or non-volatile compounds.	CO4	Remember
36.	Discuss the advantages of HPLC over other chromatographic methods.	CO4	Remember
37.	Describe the instrumentation of an HPLC system.	CO4	Understand
Section III		Questions for 10 marks	
38.	Define HPLC and explain its theoretical foundation. How does it differ from traditional liquid chromatography in terms of pressure, resolution, and speed?	CO4	Analyze

39.	Evaluate the advantages and disadvantages of gas chromatography. In what types of analyses is GC preferred over other chromatographic techniques?	CO4	Evaluate
40.	Explain the applications of gas chromatography in pharmaceutical, environmental, and forensic analysis. Provide specific examples for each field.	CO4	Analyze
Unit V			
S No.	Questions	CO	Bloom's Taxonomy Level
Section II		Questions for 5 marks	
41.	Define ion exchange chromatography and explain its basic principle.	CO5	Understand
42.	What are ion exchange resins? Describe their structure and composition.	CO5	Remember
43.	Discuss the advantages and limitations of gel chromatography.	CO5	Remember
44.	What is gel chromatography? Explain its principle based on molecular size.	CO5	Remember
45.	How is gel chromatography used in the separation of proteins and nucleic acids?	CO5	Understand
46.	Define affinity chromatography and explain its principle based on biological specificity.	CO5	Understand
47.	Describe the applications of affinity chromatography in biotechnology, including purification of enzymes, antibodies, and recombinant proteins.	CO5	Remember
Section III		Questions for 10 marks	
48.	Analyze and illustrate the mechanism of ion exchange in detail. How do factors like pH, ionic strength, and temperature affect the efficiency of separation?	CO5	Analyze
49.	Evaluate the advantages and limitations of ion exchange chromatography in pharmaceutical and environmental analysis.	CO5	Evaluation
50.	Compare gel filtration and gel permeation chromatography. Highlight their differences in terms of stationary phase, sample type, and application scope.	CO5	Evaluation

Summary Sheet		
CO Wise		
CO	Q. No	Marks
CO1	1,2,3,4,5,6,7,8,9,10	65
CO2	11,12,13,14,15,16,17,18,19,20	65
CO3	21,22,23,24,25,26,27,28,29,30	65
CO4	31,32,33,34,35,36,37,38,39,40	65
CO5	41,42,43,44,45,46,47,48,49,50	65
Total		325
Unit Wise		
Unit	Q. No	Marks
Unit 1	1,2,3,4,5,6,7,8,9,10	65
Unit 2	11,12,13,14,15,16,17,18,19,20	65
Unit 3	21,22,23,24,25,26,27,28,29,30	65
Unit 4	31,32,33,34,35,36,37,38,39,40	65
Unit 5	41,42,43,44,45,46,47,48,49,50	65
Total		325
BTL	Q. No	
LOT	1,2,3,4,5,6,7, 11,12,13,14,15,16,17, 21,22,23,24,25,26,27, 31,32,33,34,35,36,37,41,42,43,44,45,46,47.	175
HOT	8,9,10, 18,19,20, 28,29,30, 38,39,40, 48,49,50	150
Total		325

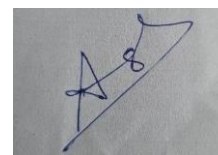
Note: All questions from **Section II** will be considered as **LOT**.

All questions from **Section III** will be considered as **HOT**.



Ankeeta Kumari Pandey

Prepared By:



Anurag Das

Reviewed By:

Disclaimer: -This is a Practice Set. The Question in End term examination will differ from the Practice Set.
This Practice Set is meant for practice only.