



Balaji College of Pharmacy, Ananthapuramu

Approved by PCI, New Delhi & Affiliated to JNTU Anantapur

Rudrampeta Bypass, Sanapa Road, Ananthapuramu, Andhra Pradesh -515002

Academic Year: **2024-2025**

Class : **IV year -**

1 sem sem-VII

Program: B.Pharmacy

Name of the Course: **INSTRUMENTAL METHODS OF ANALYSIS (BP701T)**

COURSE FILE CONTENTS

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Vision

To be recognized as an Institute of excellence, imparting quality pharmacy and healthcare education, producing competent professionals with research orientation and entrepreneurial attitude, capable of meeting the demands of the Industry and serving the Society.

Mission

- M1:** To provide a conducive environment for student centric teaching - learning process to achieve academic excellence.
- M2:** To foster among students the attitude of research, innovation and entrepreneurship.
- M3:** To establish effective Industry – Institute interaction with the Pharmaceutical and Healthcare sectors.
- M4:** To inculcate ethical and moral values among students to make them responsible to meet the needs of the society.



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR, ANANTHAPURAMU

ACADEMIC CALENDAR 2024-25

B.Pharm IV Year I & II Semesters
(for 2021 admitted batch)

Description	From To	No. of weeks/days
I Semester		
Commencement of Class work	05.08.2024	-
Instruction Period for the Semester	05.08.2024 to 30.11.2024	(17 weeks)
Examinations:		
I Mid-term Examinations	26.09.2024 to 28.09.2024	(03 Days)
II Mid-term Examinations	28.11.2024 to 30.11.2024	(03 Days)
End laboratory Examinations:	02.12.2024 to 07.12.2024	(01 week)
End Theory Examinations:	09.12.2024 to 21.12.2024	(02 weeks)
Commencement of Class Work for IV Year B.Pharm II semester	23.12.2024 (Monday)	
Declaration of results for IV-I	17.01.2025	

II Semester		
Commencement of Class work	23.12.2024	-
Instruction Period for the Semester (include project work)	23.12.2024 to 19.04.2025	(17 weeks)
Examinations:		
I Mid-term Examinations	21.02.2025 to 22.02.2025	(02 Days)
II Mid-term Examinations	18.04.2025 to 19.04.2025	(02 Days)
End Theory Examinations:	21.04.2025 to 30.04.2025	(10 Days)
Project work Viva Voce Examinations:	01.05.2025 to 03.05.2025	(03 Days)
Declaration of results for IV-II	08.05.2025	

Note:

- > The Mid-term Examinations should be conducted and completed as per the schedule given.
- > For slippage of 100 instruction days in 17 weeks due to any unavoidable reasons, compensation can be made by conducting class work on second Saturdays, Sundays and other holidays, except on National Holidays and important festivals.

Digitally Signed by Eddula
Keshava Reddy

Date: 27-06-2024 17:22:04

Reason: Approved

DIRECTOR OF EVALUATION

Date: 27.06.2024



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PROGRAM: B.Pharmacy

PROGRAM EDUCATIONAL OBJECTIVES (PEO)

Fundamental Knowledge:

- To produce pharmacy graduates with strong fundamental concepts and high technical competence in pharmaceutical sciences and technology, who shall be able to use these tools in pharmaceutical industry and/or institutes wherever necessary for success.
- To provide students with a strong and well-defined concept in the various fields of pharmaceutical sciences viz., Pharmaceutics, Pharmaceutical chemistry, Pharmacology and Pharmacognosy according to the requirement of pharmaceutical industries, community and Hospital Pharmacy and also to develop a sense of teamwork and awareness amongst students towards the importance of interdisciplinary approach for developing competence in solving complex problems in the area of Pharmaceutical Sciences.

Practice and Care:

- To promote the development of trained human resource in Pharmaceutical Sciences for dissemination of quality education with highly professional and ethical attitude, strong communication skills, effective skills to work in a team with a multidisciplinary approach.
- To generate potential knowledge pools with interpersonal and collaborative skills to identify, assess and formulate problems and execute the solution in closely related pharmaceutical industries.
- To train the students to contribute towards health care system and

counseling for prophylaxis and prevention of diseases.

Life long Learning and Innovation:

- To encourage the students to participate in life-long learning process for a highly productive career and to relate the concepts of Pharmaceutical Sciences towards serving the cause of the society.
- Developing innovative ideas and approaches to enhance quality and overcome professional barriers.
- Engaging in creative thinking to envision better ways of achieving professional goals.



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PROGRAM: B. Pharmacy

PROGRAM OUTCOMES (POs)

- 1. Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.
- 2. Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.
- 3. Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
- 4. Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
- 5. Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.
- 6. Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g., health care professionals, promoters of health, educators, managers, employers, employees).
- 7. Pharmaceutical Ethics:** Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

8. **Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
9. **The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.
10. **Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
11. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

JAWAHARLALNEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

B. Pharmacy –IV YEAR I SEMESTER

BP 701T. Instrumental Methods of Analysis (Theory) Theory: 3 + 1 Hrs. /Week

1. Objectives of the subject:

Objectives: Upon completion of the course the student shall be able to

1. Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis
2. Understand the chromatographic separation and analysis of drugs.
3. Perform quantitative & qualitative analysis of drugs using various analytical instruments.

Text Books (Theory):

1. Instrumental Methods of Chemical Analysis by B.K Sharma
2. Organic spectroscopy by Y.R Sharma
3. Text book of Pharmaceutical Analysis by Kenneth A. Connors
4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
5. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
6. Organic Chemistry by I. L. Finar
7. Organic spectroscopy by William Kemp
8. Quantitative Analysis of Drugs by D. C. Garrett
9. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi
10. Spectrophotometric identification of Organic Compounds by Silverstein

2. Detailed syllabus and lecture wise schedule:

UNIT –I

UV Visible spectroscopy

Electronic transitions, chromophores, auxochromes, spectral shifts, solvent effect on absorption spectra, Beer and Lambert's law, Derivation and deviations.

Instrumentation - Sources of radiation, wavelength selectors, sample cells, detectors-

Photo tube, Photomultiplier tube, Photo voltaic cell, Silicon Photodiode.

Applications - Spectrophotometric titrations, Single component and multi component analysis

Fluorimetry

Theory, Concepts of singlet, doublet and triplet electronic states, internal and external conversions, factors affecting fluorescence, quenching, instrumentation and applications

UNIT–II

IR spectroscopy

Introduction, fundamental modes of vibrations in poly atomic molecules, sample handling, factors affecting vibrations

Instrumentation - Sources of radiation, wavelength selectors, detectors –

Golay cell, Bolometer, Thermocouple, Thermister, Pyroelectric detector and applications

Flame Photometry-Principle, interferences, instrumentation and applications

Atomic absorption spectroscopy- Principle, interferences, instrumentation and applications

Nepheloturbidometry- Principle, instrumentation and applications

UNIT–III

Introduction to chromatography

Adsorption and partition column chromatography-Methodology, advantages, disadvantages and applications.

Thin layer chromatography- Introduction, Principle, Methodology, R_f values, advantages, disadvantages and applications.

Paper chromatography-Introduction, methodology, development techniques, advantages, disadvantages and applications

Electrophoresis– Introduction, factors affecting electrophoretic mobility, Techniques of paper, gel, capillary electrophoresis, applications

UNIT–IV

Gas chromatography - Introduction, theory, instrumentation, derivatization, temperature programming, advantages, disadvantages and applications

High performance liquid chromatography (HPLC)-Introduction, theory, instrumentation, advantages and applications.

UNIT –V

Ion exchange chromatography- Introduction, classification, ion exchange resins, properties, mechanism of ion exchange process, factors affecting ion exchange, methodology and applications

Gel chromatography- Introduction, theory, instrumentation and applications

Affinity chromatography- Introduction, theory, instrumentation and applications

1. Determination of absorption maxima and effect of solvents on absorption maxima of organic compounds
2. Estimation of dextrose by colorimetry
3. Estimation of sulfanilamide by colorimetry
4. Simultaneous estimation of ibuprofen and paracetamol by UV spectroscopy
5. Assay of paracetamol by UV- Spectrophotometry
6. Estimation of quinine sulfate by fluorimetry
7. Study of quenching of fluorescence
8. Determination of sodium by flame photometry
9. Determination of potassium by flame photometry
10. Determination of chlorides and sulphates by nephelo turbidometry
11. Separation of amino acids by paper chromatography
12. Separation of sugars by thin layer chromatography
13. Separation of plant pigments by column chromatography
14. Demonstration experiment on HPLC
15. Demonstration experiment on Gas Chromatography



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LESSON PLAN

Academic Year: 2024–2025

Class: IV year I sem

Sem: VII

Program: B. Pharmacy

Name of the Course: **Instrumental Methods of Analysis (BP701T)**

Prescribed Hours: **Theory:** 3 + 1 Hrs./Week

Scheduled Date: 05/08/2024 to 23/12/2024

Reference Books:

1. Instrumental Methods of Chemical Analysis by B.K Sharma
2. Organic spectroscopy by Y.R Sharma
3. Text book of Pharmaceutical Analysis by Kenneth A. Connors
4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
5. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
6. Organic Chemistry by I. L. Finar
7. Spectrophotometric identification of Organic Compounds by Silverstein

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4.	GC & HPLC	Gas chromatography - Introduction, theory, instrumentation, derivatization, temperature programming, advantages, disadvantages and applications High performance liquid chromatography (HPLC)- Introduction, theory, instrumentation, advantages and applications.	04 04	K V LALITHA
5.	Chromatography	Ion exchange chromatography- Introduction, classification, ion exchange resins, properties, mechanism of ion exchange process, factors affecting ion exchange, methodology and applications Gel chromatography- Introduction, theory, instrumentation and applications Affinity chromatography- Introduction, theory, instrumentation and applications	03 02 02	K V LALITHA



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COURSE OUTCOMES

Academic Year: 2024–2025

Class: IV year Isem

SEM: VII

Program: B. Pharmacy

Name of the Course: **Instrumental Methods of Analysis (BP701T)**

Prescribed Hours: **Theory:** 3 + 1 Hrs./Week

Scheduled Date: 05/08/2024 to 23/12/2024

Course Outcomes

CO NO.	Course Outcome
CB701.1	To Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis
CB701.2	To impart a fundamental knowledge on the principles and instrumentation of spectroscopic and chromatographic technique
CB701.3	To Perform quantitative & qualitative analysis of drugs using various analytical instruments.
CB701.4	To Understand the chromatographic separation and analysis of drugs
CB701.5	To emphasize on theoretical and practical knowledge on modern analytical instruments that are used for drug testing

CO-PO MAPPING

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COURSE OUTCOMES

Academic Year: 2023–2024

Class: IV year Isem

SEM: VII

Program: B. Pharmacy

Name of the Course: **Instrumental Methods of Analysis Practical (BP705P)**

Prescribed Hours: **Practical:** 4Hrs./Week

Scheduled Date: 05/08/2024 to 23/12/2024

Course Outcomes

CO NO.	Course Outcome
CB701.1	Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis
CB701.2	To understand the operation of various spectroscopic instruments
CB701.3	To application of instrumental methods in qualitative and quantitative analysis of drugs
CB701.4	To Understand the chromatographic separation and analysis of chemicals and drugs
CB701.5	To emphasizes practical knowledge on modern analytical instruments that are used for drug testing.

CO-PO MAPPING

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Academic Year: 2024–2025

Class: IV year Isem

SEM: VII

Program: B. Pharmacy

Name of the Course: **Instrumental Methods of Analysis (BP701T)**

Prescribed Hours: **Theory:** 3 + 1 Hrs. /Week

Scheduled Date: 05/08/2024 to 23/12/2024

ASSIGNMENTS

ASSIGNMENT TOPIC	Course Outcome	BTL
Assignment 1		
Instrumentation Spectrofluorimetry	CB701.1 CB701.2 CB701.4	Understanding Applying
IR detectors	CB701.1 CB701.4	Understanding Applying
Instrumentation of Flame photometry	CB701.1	Analyzing
Assignment 2		
GC detectors	CB701.3 CB701.4	Remembering Understanding
Gel Chromatography	CB701.1	Analyzing

Format of the assignment:

1. Minimum& Maximum number of pages.
2. It shall be written draft copy.
3. Name and signature of the student.
4. Assignment can be a combined seminar presentation at the end of the semester.
5. Time allocated for seminar maybe 8+2Min.

Code No: BP701T

Roll.No:

BalajiCollege ofPharmacy, Ananthapuramu.

IVYear I sem B.Pharm I Mid Examinations,

Instrumental Methods of Analysis (BP701T) Sep-2024

Time:01:30Hrs Max.Marks: 30

Balaji College of Pharmacy, Ananthapuramu.B-Pharmacy IV Year -I Sem (VII SEM) R19 -I Mid Examination SEP 2024 AY: 2024-25
Name of the Subject & Code: INSTRUMENTAL METHOD OF ANALYSIS & BP701T Time: 1:30Hrs Marks:30M

Name of the Subject & Code: INSTRUMENTAL METHOD OF ANALYSIS & BT 7011						Time: 150mins		Marks: 50	
S.NO	I Answer the following questions 5 x 2=10 Marks		M	CO-A	BTL				
1.	Enlist the detectors used in UV-Visible spectroscopy?		02	01	Remembering				
2.	What is the principle involved in IR spectroscopy?		02	02	Understanding & Remembering				
3.	Differentiate chromophore and auxochrome		02	01	Understanding & Remembering				
4.	What is Nujol mull technique?		02	02	Remembering				
5.	Define Fluorescence?		02	01	Understanding & Remembering				
II. Answer any one question LONG ANSWER TYPE 1x10=10Marks									
6.	Describe in detail the principle, Instrumentation& Applications of UV-Visible spectroscopy?				10	01	Remembering		
7.	Explain the principle & fundamental vibrations of IR spectroscopy& give applications?				10	02	Remembering		
III. Answer any two questions SHORT ANSWER TYPE 2x5=10Marks									
8.	Give a detailed note on IR sampling?				05	01	Remembering		
9.	Enlist various types of nebulizer used in flame photometry and describe pneumatic nebulizer?				05	02	Understanding		
10.	Write in detail about Beer- Lamberts' law and state the mathematical expression for it?				05	01	Understanding		

Course Outcome analysis:

CO	Total CO Marks	%CO
CB701.1	19M	38%
CB701.2	14M	28%
CB701.3	15M	30%
CB701.4	07M	14%
CB701.5	0M	0%
TOTAL	50M	100%

Bloomstaxonomyanalysisforeducationalobjectives:

Taxonomy	Taxonomy Marks	%Taxonomy
Remember	25M	50%
Understand	30M	60%
Apply	0M	20%
Analyze	05M	10%
Evaluate	0M	0%
Create	05M	10%
TOTAL	50M	100%

BalajiCollege ofPharmacy, Ananthapuramu.

IVYear I sem B.Pharm II Mid Practical Examinations

Instrumental Methods of Analysis BP705P (Lab) NOV-2024

Time:3Hrs Max.Marks: 40

S.NO	ANSWER ALL QUESTIONS	MARKS	COURSE OUTCOME	BLOOMS LEVEL
I	Synopsis			
1	Write the principle involved in IR Spectroscopy? (co-1)(BTL-1)	5	C4.5.1	Remembering
2	Write the principle involved in Nephloturbidimetry? (co-2)(BTL-1)	5	C4.5.1	Remembering
II	Major Experiment			
3	To estimate the concertration of Quinine sample by Flourimetry? (co-1)(BTL-4)	15	C4.5.4	Understanding & analyzing
III	Minor Experiment			
4	Determine the percentage purity of the given paracetmol by using $E^{1\%}_{1cm}$ method? (co-1)(BTL-3)	10	C4.5.3	Understanding & analyzing
IV	Viva voce	5		

CO	Total CO Marks	%CO
CB701.1	19M	38%
CB701.2	14M	28%
CB701.3	15M	30%
CB701.4	07M	14%
CB701.5	0M	0%
TOTAL	50M	100%

Course Outcome analysis:

Bloomstaxonomy analysis for educational objectives:

Taxonomy	Taxonomy Marks	%Taxonomy
Remember	25M	50%
Understand	30M	60%
Apply	0M	20%
Analyze	05M	10%
Evaluate	0M	0%
Create	05M	10%
TOTAL	50M	100%

BalajiCollege of Pharmacy, Ananthapuramu.

B.Pharm IVYear I sem II Mid Examinations Nov-2024

Instrumental Methods of Analysis(BP701T)

Time:01:30Hrs Max.Marks: 30

Balaji College of Pharmacy, Ananthapuramu.B-Pharmacy IV Year -I Sem (VII SEM)

R19 -II Mid Examination NOVEMBER- 2024 AY: 2024-25

Name of the Subject & Code: INSTRUMENTAL METHOD OF ANALYSIS & BP701T

Time: 1:30Hrs

Marks:30M

S.NO	Answer the following questions 5 x 2=10 Marks	M	CO-A	BTL
1.	Define partition coefficient?	02	03	Remembering
2.	What is mean by reverse phase chromatography	02	04	Remembering
3.	Outline the steps involved in affinity chromatography?	02	05	Understanding
4.	What is the principle of gas chromatography	02	04	Remembering
5.	Demonstrate Rf value?	02	03	Understanding

II. Answer any one question

LONG ANSWER TYPE

1x10=10Marks

6.	List out detectors used in GC. Explain thermal conductivity detector and flame ionization detector in detail?	10	04	Remembering and Understanding
7.	Illustrate the components of affinity chromatography in detail?	10	05	Understanding

III. Answer any two questions

SHORT ANSWER TYPE

2x5=10Marks

8.	Summarize a note on various adsorbents used for thin layer chromatography?	05	03	Understanding
9.	List out and explain the HPLC columns along with their types?	05	04	Remembering and Understanding
10.	Explain various materials used for packing of column in gel permeation chromatography?	05	05	Understanding

CO	Total CO Marks	%CO
CB701.1	19M	38%
CB701.2	14M	28%
CB701.3	15M	30%
CB701.4	07M	14%
CB701.5	0M	0%
TOTAL	50M	100%

Course Outcome analysis:

Bloomstaxonomyanalysisforeducationalobjectives:

Taxonomy	Taxonomy Marks	%Taxonomy
Remember	25M	50%
Understand	30M	60%
Apply	0M	20%
Analyze	05M	10%
Evaluate	0M	0%
Create	05M	10%
TOTAL	50M	100%

BalajiCollege ofPharmacy, Ananthapuramu.

IVYear I sem B.Pharm II Mid Practical Examinations

Instrumental Methods of Analysis BP705P (Lab) NOV-2023

Time:3Hrs Max.Marks: 40

S.NO	ANSWER ALL QUESTIONS	MARKS	COURSE OUTCOME	BLOOMS LEVEL
I	Synopsis			
1	Write the principle involved in Paper chromatography? (co-3)(BTL-1)	5	C4.5.1	Remembering
2	Explain different development methods in paper chromatography? (co-3)(BTL-2)	5	C4.5.2	Remembering
II	Major Experiment			
3	Separate and identify the given paracetamol sample by TLC? (co-3)(BTL-5)	15	C4.5.3 C4.5.4	Understanding & analyzing
III	Minor Experiment			
4	Determine the absorption maxima for the given potassium permanganate sample? (co-1)(BTL-1)	10	C4.5.3 C4.5.4	Understanding & Analyzing
IV	Viva voce	5		

Course Outcome analysis:

CO	Total CO Marks	%CO
CB701.1	19M	38%
CB701.2	14M	28%
CB701.3	15M	30%
CB701.4	07M	14%
CB701.5	0M	0%
TOTAL	50M	100%

Bloomstaxonomyanalysisforeducationalobjectives:

Taxonomy	Taxonomy Marks	%Taxonomy
Remember	25M	50%
Understand	30M	60%
Apply	0M	20%
Analyze	05M	10%
Evaluate	0M	0%
Create	05M	10%
TOTAL	50M	100%



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UNIT WISE IMPORTANT QUESTIONS

Academic Year: 2023-2024

Class: IV year I sem SEM: VII

Program: B. Pharmacy

Name of the Course: **Instrumental Methods of Analysis**

Prescribed Hours: **Theory:** 3 + 1 Hrs./Week

Scheduled Date: 01/08/2023 to 22/11/2023

QUESTIONS

CHAPTER 1

UNIT-1

UV-Visible Spectroscopy

2 marks Questions:

1. What is Spectroscopy?
2. What is EMR?
3. Write the principle of UV-Visible spectroscopy?
4. State & explain Write note on?
5. What is chromophore?
6. What is Auxochrome?
7. Explain the principle involved in silicon photo diode detector?
8. What are Spectral shifts?
9. Define Beer's law?
10. What is Lambert's law?
11. Define bathochromic shift?
12. Define hypsochromic shift?
13. What is Hyperchromic shift?
14. What is Hypochromic shift?
15. Enlist different sources of UV-Visible spectroscopy?
16. Enlist the detectors used in UV-Visible spectroscopy?

17. What is Isobestic point?

5 marks Questions

18. Write note on electronic transitions in UV-Visible spectroscopy?
19. Write note on spectral shifts?
20. Write in detail about Beer- Lamberts' law and state the mathematical expression for it?
21. Write properties & add a note on detectors in UV-Visible spectroscopy?
22. Write detail applications of UV-Visible spectroscopy?
23. Write note on Instrumentation of UV-Visible spectroscopy?
24. How the solvents will effect the solvents of absorption spectra?
25. Write a note on double beam spectrophotometer?
26. Explain Beer- Lamberts' law derivation and deviations?
27. Discuss the detectors used in UV-Visible spectrometer?
28. Write a note on spectrophotometric Titrations?
29. Write a note on single component analysis?
30. Explain about multicomponent Analysis?
31. Write a note on radiation sources and filters in colorimeter or Visible spectrometer?
32. Write a note on Applications of UV-Visible spectroscopy?

Long Answer Questions

33. Write the principle, Instrumentation & Applications of UV-Visible spectroscopy?
34. Write about Double beam spectrophotometer? Give its applications?
35. Write a note Beer-Lambert's law, derivation & deviation & applications of UV-Visible spectroscopy?

Fluorimetry

2 marks Questions

1. Write the principle of Fluorimetry?
2. Define spectrofluorimetry?
3. Define Fluorescence?
4. Define Phosphorescence?
5. What is Singlet state?
6. What is doublet state?
7. What is triplet state?
8. What is quenching?
9. Enlist the different types of quenching?
10. What is self quenching?
11. Enlist the different sources of light sources in fluorescence spectrometer?

12. Enlist detectors used in fluorimeter?

Short answer Questions

13. Explain principle & theory of fluorescence?
14. Write a note on quenching & its types?
15. Explain spectrofluorimeter?
16. Write a Detail note on fluorimetry applications?
17. Explain double beam spectrofluorimeter?
18. Discuss about detectors used in fluorimetry?

Long Answer Questions

19. Write the principle & theory of Fluorimetry & its instrumentation?
20. Instrumentation of fluorimetry & its applications?
21. What is Fluorescence & Phosphorescence ? types of quenching & its Affect on fluorescence?

CHAPTER-2

Infrared Spectroscopy

2 marks Questions

1. Write about IR regions?
2. Enlist the sources of IR spectroscopy?
3. What is the principle involved in IR spectroscopy?
4. What is Nujol mull technique?
5. What is pressed pellet technique?
6. Enlist the detectors used in IR spectroscopy?
7. Which type of samples can be analysed by IR spectroscopy?

Short Answer questions

8. What is the principle involved in IR spectroscopy? Explain about fundamental vibrations ?
9. Explain about the factors affect the fundamental vibrations of IR?
10. Write a note on detectors used in IR spectroscopy?
11. Give a detailed note on IR sampling?
12. Write about the bolometer & thermo couple?
13. Discuss about the applications of IR spectroscopy?

Long answer questions

14. Write the principle & fundamental vibrations of IR spectroscopy & give applications?
15. Explain about IR sampling & detectors ?
16. Discuss about IR instrumentation & applications?

Nephelometry & Turbidimetry

2 marks questions

1. In which type of samples mainly use Nephelometry & Turbidimetry ?
2. Define Tyndall effect?
3. What is meant by Nephelometry?
4. What is meant by Turbidimetry?
5. What is the principle involved in Nephelometry?
6. What is the principle involved in Turbidimetry?
7. Enlist the light sources used in Nephelometry & Turbidimetry?
8. Enlist the detectors used in Nephelometry & Turbidimetry?
9. Give the advantages of Nephelometry & Turbidimetry?

Short Answer Questions

10. Give the reason for why turbidimetry used for determination of high concentration of substances?
11. Describe the principle involved in Nephelometry & Turbidimetry? Write about scattering in nephelometry?
12. Enlist the various components of Nephelometry & Turbidimetry, Describe the filters & monochromators?
13. Write the principle involved in Nephelometry & Turbidimetry & explain its instrumentation?

Long answer Questions

14. Describe the principle involved in Nephelometry & Turbidimetry? Write about factors affecting the Nephelometry & Turbidimetric measurements?
15. Describe the instrumentation of Nephelometry & Turbidimetry? & give applications?
16. What are the applications of Nephelometry & Turbidimetry? Write a note on advantages & disadvantages?

Flame photometry

2 marks questions

1. What is principle involved in emission spectroscopy?
2. What is the principle involved in flame photometry?
3. Enlist the various components of flame photometry?
4. Enlist the burners used in flame photometry?
5. Enlist the detectors used in flame photometry?
6. Which type of samples can be analysed by flame photometry?

Short answer questions

7. Enlist various types of nebulizer used in flame photometry and describe pneumatic nebulizer?

8. Enlist various detectors used in flame photometry and write note on barrier layer cell detector?

Long answer questions

9. Write a note on sample delivery system in flame photometry and describe pneumatic and Babington nebulizer?
10. Write an emphasis on quantitative use of flame photometry?
11. Enlist various types of burner used in flame photometry and describe total consumption burner?
12. Describe principle of automation ? write a note on premix burner?
13. Describe interference encountered during quantitative estimation by flame photometry?

Atomic absorption spectroscopy

2 marks questions

1. What is light source used in AAS?
2. What is the purpose of monochromator?
3. What is the basic of AAS?
4. What are the different types of AAS spectrometers?

Short answer questions

5. Write theory and principle of atomic absorption spectroscopy?
6. What are the types of absorption spectrometer? Describe any one in detail?
7. Enlist various types of radiation source used in atomic absorption spectroscopy and describe hollow cathode lamp?
8. Write a note on spectral interferences in atomic absorption spectroscopy?
9. Write a note on flame atomizer used in atomic absorption spectroscopy?
10. What are the applications of atomic absorption spectroscopy? Write a note on advantages of atomic absorption spectroscopy?

Long answer questions

11. Describe principle and various steps involved in atomic absorption spectroscopy?
12. What is atomizer? Describe various types of atomizer used in atomic absorption spectroscopy?
13. What are interferences in atomic absorption spectroscopy? Describe non spectral interferences?
14. Describe various components of atomic absorption spectrometer? Describe sources of radiation in atomic absorption spectroscopy?
15. What are applications of atomic absorption spectroscopy? Write a note on advantages and disadvantages of atomic absorption spectroscopy?

CHAPTER-3

Column chromatography

1. Define chromatography?
2. In chromatography separation is based on?
3. Chromatographic methods work on?
4. Define stationary phase?
5. Define mobile phase?
6. Chromatographic method classified on which basis?
7. Define partition coefficient?
8. Define retention time?
9. What is meant by normal phase?
10. What is mean by reverse phase?
11. Define flow rate?
12. Define adsorption?
13. What is mean by analyte?
14. What is mean by capillary column?
15. Define eluent?
16. Define eluate?
17. Define elution?
18. What is adsorption column chromatography?
19. What is the partition column chromatography?
20. Principle of column chromatography?

Short answer questions

21. What is adsorption column chromatography? Write principle involved in it?
22. Enlist various components of column chromatography? Write a note on column?
23. Write a note on stationary phase used in column chromatography?
24. Describe various techniques for packing of column in column chromatography?

Long answer questions

25. Describe chromatography? various steps involved in column chromatography in brief?
26. Write a note on development techniques in column chromatography?
27. Describe various factors affecting column efficiency?
28. Write applications and advantages of column chromatography?

BALAJI COLLEGE OF PHARMACY: ANANTAPUR
B.PHARMACY –IV-YEAR-I-SEM (VII SEM) - AY: 2024-2025(R19)

MID EXAMINATIONS AVERAGE MARKSAWARD LIST

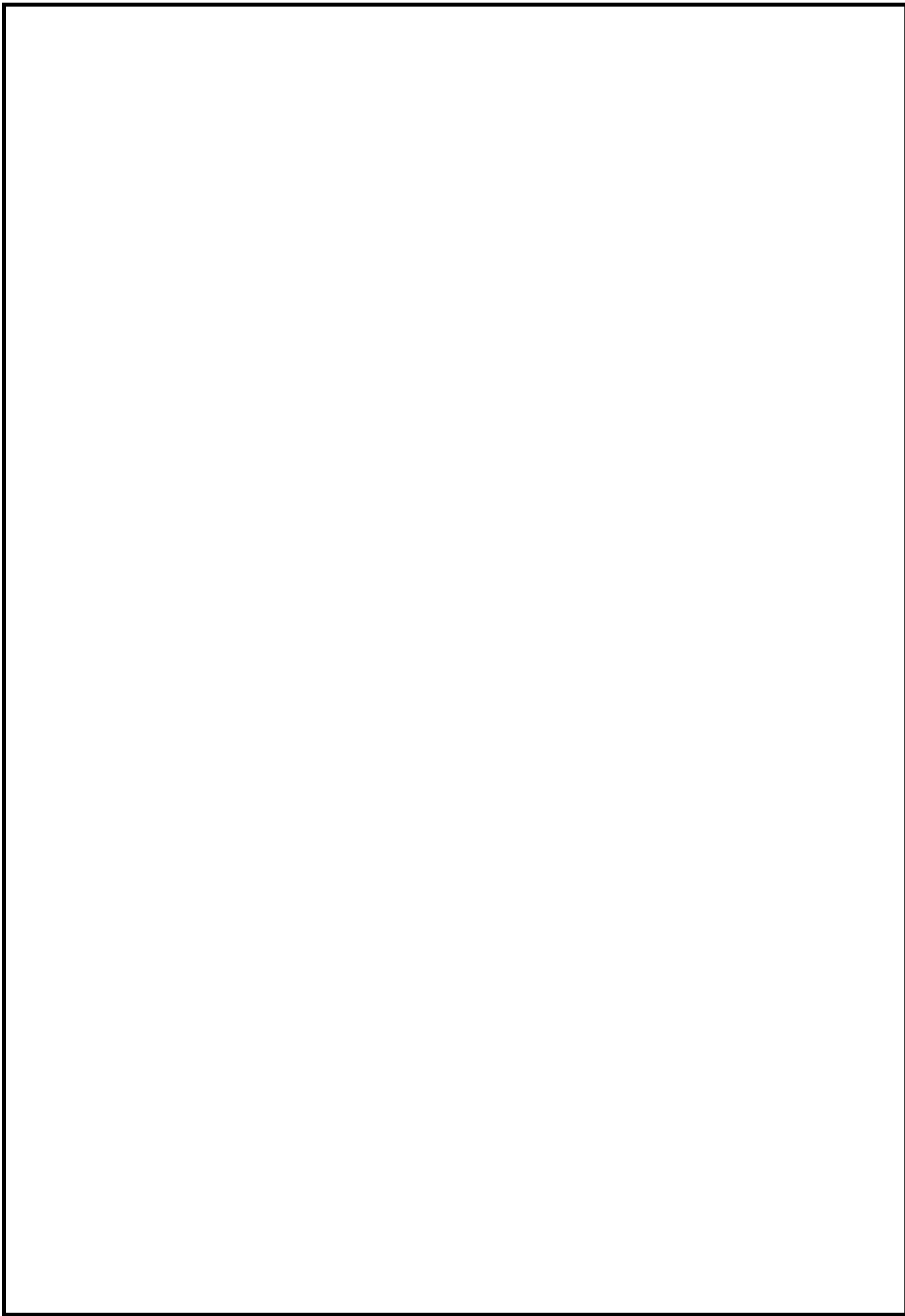
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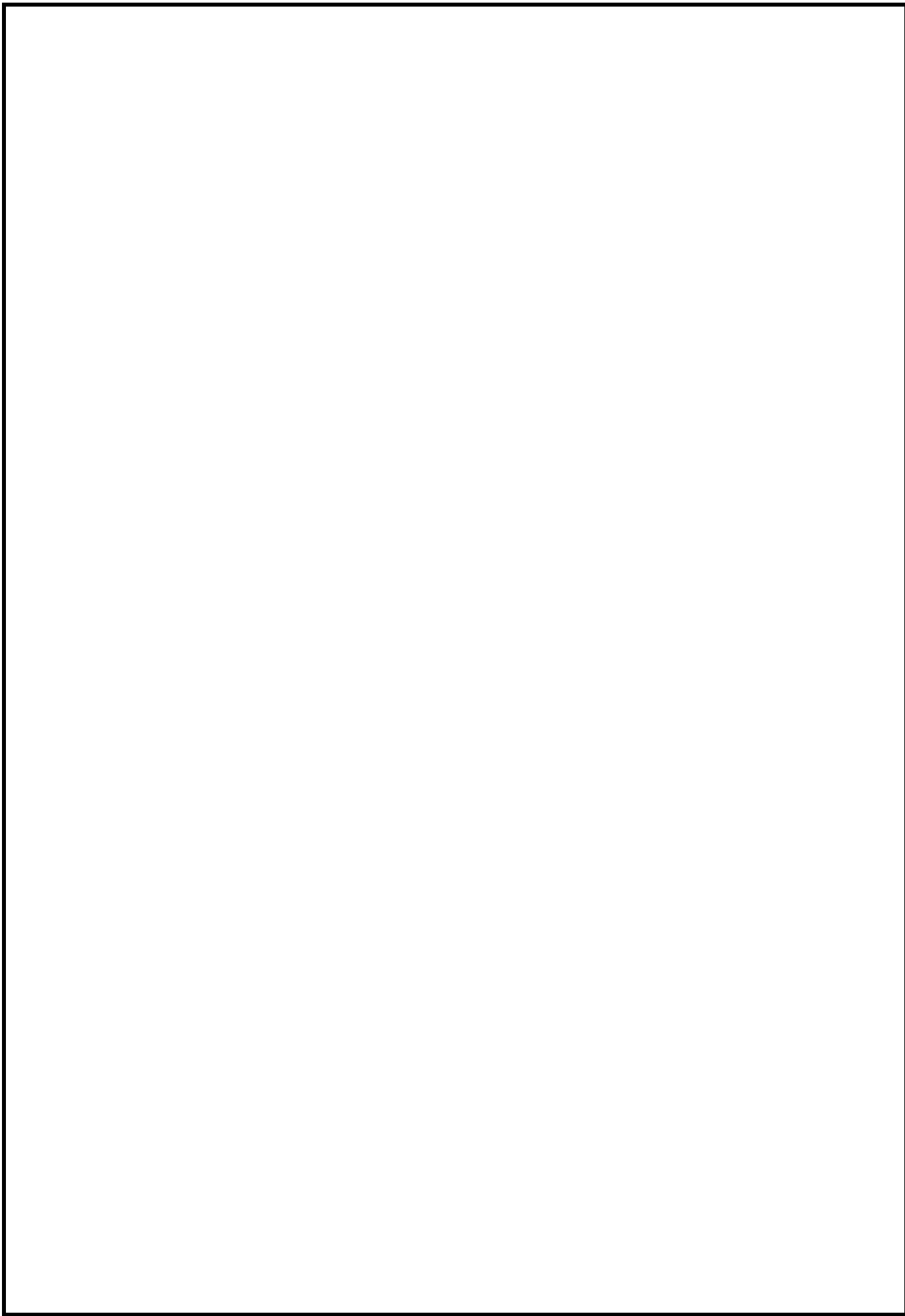
Sl No.	H.T.No	Name Of The Student	MID-I		MID-II		Avg	Continuous Mode	Total (25M)
			30M	15 M	30 M	15M			
1	21T11R0001	Ajay Kumar Madiga	24	12	25	13	13	8	21
2	21T11R0002	Ajaykumar Sanipiralla	20	10	22	11	11	10	21
3	21T11R0003	Akhila Sejala	24	12	28	14	13	10	23
4	21T11R0004	Akhila Uppara	28.5	14	27	14	14	10	24
5	21T11R0005	Anusha Chennavaram	27.5	14	24	12	13	10	23
6	21T11R0006	Arju Chalam	26	13	27.5	14	14	9	23
7	21T11R0007	Arshiya Dafedar	28.5	14	28	14	14	9	23
8	21T11R0008	Bharath Rao Sindhe	20.5	10	22.5	11	11	10	21
9	21T11R0009	Bhargav Dandina	21.5	11	27.5	14	13	10	23
10	21T11R0010	Bhargavi Gorakappa Gari	23.5	12	25	13	13	10	23
11	21T11R0011	Bhavana Malarapu	28.5	14	28	14	14	10	24
12	21T11R0012	Bhavana Vuruvakili	25	13	27	14	14	10	24
13	21T11R0013	Bhavani Derangi	27	14	27.5	14	14	10	24
14	21T11R0014	Bhumika Yerikala	27.5	14	27	14	14	9	23
15	21T11R0015	Chaithra K	21.5	11	25.5	13	12	10	22
16	21T11R0016	Chintu Naik R	23.5	12	15	8	10	9	19
17	21T11R0017	Deepika Rani Siraalla	25.5	13	26.5	13	13	10	23
18	21T11R0018	Deekshitha N	28.5	14	26.5	13	14	10	24
19	21T11R0019	Deepthi G K							
20	21T11R0020	Divya Mala Basam	25.5	13	23.5	12	13	10	23
21	21T11R0021	Divyasree Bachu	27.5	14	25.5	13	14	10	24
22	21T11R0022	Fouziya Kattubadi	28	14	27.5	14	14	10	24
23	21T11R0023	Gagana S J	28.5	14	26.5	13	14	10	24
24	21T11R0024	Ganesh Boya	21	11	17	9	10	9	19
25	21T11R0025	Geethika Karnam							
26	21T11R0026	Gousia Shaik	28.5	14	24	12	13	10	23
27	21T11R0027	Gousiya Banu Benki	28	14	28.5	14	14	10	24
28	21T11R0028	Gowthami K S	-	-	-	-	-	-	-
29	21T11R0029	Hafijabee Syed	-	-	-	-	-	-	-
30	21T11R0030	Hajira Khanam N	28	14	27	14	14	10	24
31	21T11R0031	Harika Bachu	26.5	13	26	13	13	10	23
32	21T11R0032	Harshini Islapuram	27.5	14	27	14	14	10	24
33	21T11R0033	Hijiya Bee Gagguturu	27	14	25.5	13	14	10	24
34	21T11R0034	Indira Racherla	25.5	13	26.5	13	13	10	23
35	21T11R0035	Indu Pommala	26	13	26	13	13	10	23

36	21T11R0036	Jaithrasai Gaddam	25	13	23	12	13	10	23
37	21T11R0037	Jayasree Palem	27	14	28	14	14	9	23
38	21T11R0038	Jeevan Reddy Kona	22	11	27	14	13	10	23
39	21T11R0039	Jnana Sai P	23.5	12	18	9	11	9	20
40	21T11R0040	Kamalnath Reddy Gundra	22	11	24	12	12	10	22
41	21T11R0041	Kavya Sri Janagana	26	13	23.5	12	13	10	23
42	21T11R0042	Keerthana Bokki	29	15	27	14	14	10	24
43	21T11R0043	Keerthi Godditi	26	13	27	14	14	10	24
44	21T11R0044	Keerthi Jinkala	25	13	27.5	14	14	10	24
45	21T11R0045	Kishore Babu C	24.5	12	26.5	13	13	10	23
46	21T11R0046	Kushiya Dudekula	27	14	25.5	13	14	10	24
47	21T11R0047	Lakshmi Kammara	28	14	27	14	14	10	24
48	21T11R0048	Lakshmilatha K A	27.5	14	27	14	14	10	24
49	21T11R0049	Leelavathi Chinthakayala	23.5	12	23.5	12	12	10	22
50	21T11R0050	Mahalakshmi Urapasula	28	14	28	14	14	10	24
51	21T11R0051	Mahammad Thosif Mitaigari	23.5	12	25.5	13	13	10	23
52	21T11R0052	Manjulatha Boppi	27.5	14	28	14	14	10	24
53	21T11R0053	Meghana Ganta	26.5	13	27	14	14	10	24
54	21T11R0054	Md. Masood Shaik Bashas	24	12	25	13	13	8	21
55	21T11R0055	Mohammed Akram Shaik							
56	21T11R0056	Mohammed Sami Bar Shaik	25	13	27	14	14	9	23
57	21T11R0057	Mubeen Taj Achukatla	26.5	13	26	13	13	9	22
58	21T11R0058	Muzammil Khan Patan	23.5	12	18.5	9	11	9	20
59	21T11R0059	Naga Sai Sahithi Kaipa	12	6	9.5	5	6	8	14
60	21T11R0060	Nagarjuna Jetty	24.5	12	19.5	10	11	9	20
61	21T11R0061	Naqeeba Banu Syeda	26.5	13	26	13	13	9	22
62	21T11R0062	Narendra Golla	22	11	22.5	11	11	9	20
63	21T11R0063	Naveen Kumar Mangala	27.5	14	27	14	14	9	23
64	21T11R0064	Navya K	26	13	26	13	13	10	23
65	21T11R0065	Neeha Duvvur	28	14	25	13	14	9	23
66	21T11R0066	Neha Parvez Shaik	25	13	21	11	12	9	21
67	21T11R0067	Nikhil Avinash Gurugundla							
68	21T11R0068	Noorjahan Khaji	27.5	14	25	13	14	10	24
69	21T11R0069	Pallavi Thippanna Gari	27	14	26.5	13	14	9	23
70	21T11R0070	Pavan Kumar Sake							
71	21T11R0071	Pavithra Mallireddy	24.5	12	24.5	12	12	10	22
72	21T11R0072	Pedda Ezra Pradeep Dudekula	22	11	23	12	12	9	21
73	21T11R0073	Pranitha Gunivandla	26.5	13	25	12	13	10	23

74	21T11R0074	Pujitha Mallepogula	28.5	14	26	13	14	9	23
75	21T11R0075	Raju Naik Vadithya	26	13	20	10	12	10	22
76	21T11R0076	Rakhiya Mehanoor Pathan	25.5	13	26	13	13	7	20
77	21T11R0077	Ramya Sree G	27	13	25.5	13	13	10	23
78	21T11R0078	Ramya Sree Ramavath							
79	21T11R0079	Ranjitha Bai Vadithya	24	12	24	12	12	9	21
80	21T11R0080	Sadiq Hussain Sayed	24.5	12	19	10	11	8	19
81	21T11R0081	Sai Charan B N							
82	21T11R0082	Sai Charan V N	23.5	12	25.5	13	13	10	23
83	21T11R0083	Sai Nived Talari	18	9	21	11	10	10	20
84	21T11R0084	Sai Vedamsh B R	25	13	18.5	9	11	9	20
85	21T11R0085	Sailaja Kayapati	27.5	14	27	14	14	10	24
86	21T11R0086	Sakheeb Shaik	25.5	13	25	13	13	9	22
87	21T11R0087	Sameera Firdous Kolimi	28.5	14	27.5	14	14	10	24
88	21T11R0088	Sandeep Bhushan Parsham							
89	21T11R0089	Sandhya Vanganooru	28	14	26	13	14	10	24
90	21T11R0090	Sangeetha R	28.5	14	25.5	12	13	10	23
91	21T11R0091	Sanjay Kumar Pappu	20	10	20.5	10	10	9	19
92	21T11R0092	Santhosh Vaddi							
93	21T11R0093	Sathish Kumar D	16	8	26.5	13	11	10	21
94	21T11R0094	Sharanya Sai Amberker	28.5	14	27.5	14	14	10	24
95	21T11R0095	Shiva Guvvala							
96	21T11R0096	Siddaraju T			16	8		9	17
97	21T11R0097	Sree lalitha N V	27	13.5	27	13.5	14	10	24
98	21T11R0098	Sreeja R	28	14	26	13	14	10	24
99	21T11R0099	Sunitha Bhavani Jalavadi	26	13	27.5	14	14	10	24
100	21T11R00A0	Teerthini Kuruba	25	13	25	13	13	10	23
101	21T11R00A1	Teja Kummari	26	13	26	13	13	10	23
102	21T11R00A2	Trivikram Narepalli	25	13	24	12	13	8	21
103	21T11R00A3	Vaishnavi Kodipalli	26	13	25.5	13	13	10	23
104	21T11R00A4	Varsha B	27.5	14	21	11	13	9	22
105	21T11R00A5	Vasantha Golla	28.5	14	26	13	14	10	24
106	21T11R00A6	Vasanthi Kamatham	26.5	13	25	13	13	10	23
107	21T11R00A7	Vijay Singepalli	28	14	25	13	14	10	24
108	21T11R00A8	Vinila Karnatakam	27	14	27	14	14	10	24
109	21T11R00A9	Yamini Guduru	25	13	25.5	13	13	10	23
110	21T11R00B0	Aruna Vetti							
111	21Z71R0006	T. Bala krishna	24	12	20	10	11	9	20
112	22T15R0001	A. Mehataz	25.5	13	26	13	13	10	23
113	20GT1R0045	K.Tejaswini	26	13	26	13	13	8	21

Signature of the faculty member





Code: BP701T

B Pharm IV Year I Semester (R19) Supplementary Examinations April 2025

INSTRUMENTAL METHODS OF ANALYSIS

(B Pharmacy)

Time: 3 hours

Max. Marks: 75

R19

Code: BP701T

22/04/2025

R19

PART - A
(Compulsory Question)

1. Answer the following: (10 X 02 = 20 Marks)

- Define autochrome with suitable example. 2M
- What is quenching in fluorimetry, and what are the common causes of quenching? 2M
- Discuss the role of sources of radiation in IR spectroscopy. 2M
- Describe the main components of an atomic absorption spectrometer. 2M
- What are the differences between adsorption and partition chromatography? 2M
- What are the advantages of paper chromatography? 2M
- What is R_F value? 2M
- What are some of the limitations or disadvantages of using HPLC? 2M
- What are ion exchange resins? 2M
- What is gel chromatography? 2M

PART - B
(Answer any two questions: 02 X 10 = 20 Marks)

- State and explain Beer-Lambert's Law. How do deviations from this law occur? 5M
 - Describe the main components of an atomic absorption spectrometer with the instrumentation. 5M
- Describe the methodology of TLC, including the preparation of the TLC plate, sample application, and development process. 5M
 - How do the mobile phase and column selection influence the resolution and efficiency of separation in HPLC? 5M
- What are the applications of ion exchange chromatography in pharmaceutical analysis, water purification, and other fields? 5M
 - Explain the theory behind affinity chromatography. What types of interactions are typically exploited in this technique? 5M

PART - C

(Answer any seven questions: 07 X 05 = 35 Marks)

- What are electronic transitions, and how do they relate to UV-Visible spectroscopy? 2.5M
 - Define chromophores and auxochromes and explain their role in absorption spectra. 2.5M
- Describe the different types of detectors used in IR spectroscopy, such as Golay cells, bolometers, thermocouples, thermistors, and pyroelectric detectors. 2.5M
 - Describe the instrumentation used in flame photometry. 2.5M
- Explain the basic principles of chromatography, including the concepts of adsorption and partition. 2.5M
 - What is the significance of the R_F value in TLC, and how is it calculated? 2.5M

Cont. In Page 2

