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: III YEAR II SEM

Program: B. Pharmacy

Name of the Course: **Pharmaceutical Biotechnology**

COURSE FILE CONTENTS

S.NO	CONTENT
1.	VISION AND MISSION OF INSTITUTE
2.	ACADEMIC CALENDER
3.	PROGRAM EDUCATIONAL OBJECTIVES
4.	PROGRAM OUTCOMES
5.	SYLLABUS COPY
6.	LESSON PLAN
7.	COURSE OUTCOMES
8.	CO – PO MAPPING, GAPS IDENTIFIED AND JUSTIFICATION
9.	NOTES
10.	ASSIGNMENT QUESTIONS
11.	MID QUESTION PAPERS WITH CO AND BTL ANALYSIS
12.	UNIT WISE IMPORTANT QUESTIONS
13.	PREVIOUS QUESTION PAPERS
14.	MID MARKS
15.	ATTENDENCE REGISTER
16.	SLOW LEARNERS AND ADVANCE LEARNERS

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

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

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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 where ever 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.

Lifelong 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.

File No.SCHE-JNTA/910/2024-JNTUA-EHE73

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR, ANANTHAPURAMU

ACADEMIC CALENDAR 2024-25

B.Pharm III Year I & II Semesters

(for 2022 admitted batch)

Description	From To	No. of weeks/days
I Semester		
Commencement of Class work	29.07.2024	-
Instruction Period for the Semester	29.07.2024 to 23.11.2024	(17 weeks)
Examinations:		
I Mid-term Examinations	23.09.2024 to 25.09.2024	(03 Days)
II Mid-term Examinations	25.11.2024 to 27.11.2024	(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 III Year B.Pharm II semester	**23.12.2024 (Monday)**	
Declaration of results for III-I	**18.01.2025**	

II Semester		
Commencement of Class work	23.12.2024	-
Instruction Period for the Semester	23.12.2024 to 19.04.2025	(17 weeks)
Examinations:		
I Mid-term Examinations	17.02.2025 to 19.02.2025	(03 Days)
II Mid-term Examinations	17.04.2025 to 19.04.2025	(03 Days)
End laboratory Examinations:	21.04.2025 to 26.04.2025	(01 week)
End Theory Examinations:	28.04.2025 to 09.05.2025	(02 weeks)
Commencement of Short-Term Internship/Summer vacation	12.05.2025 to 12.07.2025	(02 Months)
Commencement of Class Work for IV Year B.Pharm I semester	**14.07.2025 (Monday)**	
Declaration of results for III-II	**02.06.2025**	

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.

Date: 27.06.2024

DIRECTOR OF EVALUATION

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

Subject	PHARMACEUTICAL BIOTECHNOLOGY	Code	BP605T
Course Year	B .Pharmacy III year	Sem	II
Theory	3hrs/week	Tutorial	1hr/week
End exam	70 Marks	Internal exam	30Marks
Credits	3		

Unit I — 10 Hours

a) Brief introduction to Biotechnology with reference to Pharmaceutical Sciences.

b) Enzyme Biotechnology- Methods of enzyme immobilization and applications.

c) Biosensors- Working and applications of biosensors in Pharmaceutical Industries.

d) Brief introduction to Protein Engineering.

e) Use of microbes in industry. Production of Enzymes- General consideration - Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase.

f) Basic principles of genetic engineering.

Unit II — 10 Hours

a) Study of cloning vectors, restriction endonucleases and DNA ligase.

b) Recombinant DNA technology. Application of genetic engineering in medicine.

c) Application of r DNA technology and genetic engineering in the production of:

i) Interferon ii) Vaccines- hepatitis- B iii) Hormones-Insulin.

d) Brief introduction to PCR

Unit III — 10 Hours

Types of immunity- humoral immunity, cellular immunity

a) Structure of Immunoglobulins

b) Structure and Function of MHC

c) Hypersensitivity reactions, Immune stimulation and Immune suppressions.

d) General method of the preparation of bacterial vaccines, toxoids, viral vaccine, antitoxins, serum-immune blood derivatives and other products relative to immunity.

e) Storage conditions and stability of official vaccines

f) Hybridoma technology- Production, Purification and Applications

g) Blood products and Plasma Substituties.

Unit IV 08Hours

a) Immuno blotting techniques- ELISA, Western blotting, Southern blotting.

b) Genetic organization of Eukaryotes and Prokaryotes

c) Microbial genetics including transformation, transduction, conjugation, plasmids and transposons.

d) Introduction to Microbial biotransformation and applications.

e) Mutation: Types of mutation/mutants.

Unit V 07 Hours

a) Fermentation methods and general requirements, study of media, equipments, sterilization methods, aeration process, stirring.

b) Large scale production fermenter design and its various controls.

c) Study of the production of - penicillins, citric acid, Vitamin B12, Glutamic acid, Griseofulvin,

d) Blood Products: Collection, Processing and Storage of whole human blood, dried human plasma, plasma Substituties.

Recommended Books (Latest edition):

1. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of RecombinantDNA: ASM Press Washington D.C.
2. RA Goldshy et. al., : Kuby Immunology.
3. J.W. Goding: Monoclonal Antibodies.
4. J.M. Walker and E.B. Gingold: Molecular Biology and Biotechnology by Royal

Society of Chemistry.
5. Zaborsky: Immobilized Enzymes, CRC Press, Degraland, Ohio.
6. S.B. Primrose: Molecular Biotechnology (Second Edition) Blackwell Scientific Publication.
7. Stanbury F., P., Whitakar A., and Hall J., S., Principles of fermentation technology, 2nd edition, Aditya books Ltd., New Delhi

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LESSON PLAN

Academic Year: 2024 – 2025 Class: III Sem: II
Program: B. Pharmacy Duration of the year: 2024 - 2025

Name of the Course: **Pharmaceutical Biotechnology**

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

Scheduled Date: 29/07/2024 to 14/07/2025

Reference Books:

1. Prescott and Dunne, "Industrial Microbiology" MC Graw Hill Book Company.
2. K. Kielsliched "Biotechnology" Vol 6, Verlegchemic, Switzerland.
3. PF Standury& A. Whitaker, "Principles of fermentation Technology" Pergamon Press, Oxford. Wiseman, Handbook of enzyme biotechnology. A. 3rdEdition Elis Horwood.
4. Alexande M Moo-young, Comprehensive Biotechnology, Pergamon Press, New York.

S.No	Chapter name	Topic	No. of hours	Name of the faculty
1.	**UNIT 1**	**a) Brief introduction to Biotechnology with reference to Pharmaceutical Sciences.** **b) Enzyme Biotechnology- Methods of enzyme immobilization and applications.** **c) Biosensors- Working and applications of biosensors in Pharmaceutical Industries.** **d) Brief introduction to Protein Engineering.** **e) Use of microbes in industry. Production of Enzymes- General consideration - Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase.** **f) Basic principles of genetic engineering.**	10	Venkatesh Naik V
2.	UNIT2	**a) Study of cloning vectors, restriction endonucleases and DNA ligase.** **b) Recombinant DNA technology. Application of genetic engineering in medicine.** **c) Application of r DNA technology and genetic engineering in the production of:** **i) Interferon ii) Vaccines- hepatitis- B iii) Hormones-Insulin.** **d) Brief introduction to PCR**	10	Venkatesh Naik V
	UNIT3	Types of immunity- humoral		Venkatesh Naik V

3.		immunity, cellular immunity a) Structure of Immunoglobulins b) Structure and Function of MHC c) Hypersensitivity reactions, Immune stimulation and Immune suppressions. d) General method of the preparation of bacterial vaccines, toxoids, viral vaccine, antitoxins, serum-immune blood derivatives and other products relative to immunity. e) Storage conditions and stability of official vaccines f) Hybridoma technology-Production, Purification and Applications g) Blood products and Plasma Substituties.	10	
4.	**UNIT4**	a) Immuno blotting techniques-ELISA, Western blotting, Southern blotting. b) Genetic organization of Eukaryotes and Prokaryotes c) Microbial genetics including transformation, transduction, conjugation, plasmids and transposons. d) Introduction to Microbial biotransformation and applications.	8	Venkatesh Naik V

		e) Mutation: Types of mutation/mutants.		
5.		a) Fermentation methods and general requirements, study of media, equipments, sterilization methods, aeration process, stirring. b) Large scale production fermenter design and its various controls. c) Study of the production of - penicillins, citric acid, Vitamin B12, Glutamic acid, Griseofulvin, Blood Products: Collection, Processing and Storage of whole human blood, dried human plasma, plasma Substituties.	7	Venkatesh Naik V

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COURSE OUTCOMES

Academic Year: 2024– 2025 Class: III SEM: I

Program: B. Pharmacy Duration of the year: 2024- 2025

Name of the Course: **Pharmaceutical Biotechnology**

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

Scheduled Date: 29/07/2024 to 14/07/2025

Course Outcomes

CO NO.	Course Outcome
C3.5.4.1	Understand basic Introduction of scope, Potential and achievements in biotechnology
C3.5.4.2	Understand the New concepts of Biotechnology, Genetic engineering techniques and recombinant DNA technology.
C3.5.4.3	Study the examples of biotechnology derived products and transgenic animals, cryopreservation and germplasm storage.
C3.5.4.4	Understand and Study steps involved in monoclonal antibody production, enzyme technology and fermentation technology.

C3.5.4.5	Study of the production of - penicillins, citric acid, Vitamin B12, Glutamic acid, Griseofulvin

CO-PO MAPPING

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Academic Year: 2024 – 2025 Class: III SEM: I

Program: B. Pharmacy Duration of the year: 2024 - 2025

Name of the Course: **Pharmaceutical Biotechnology**

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

Scheduled Date: 29/07/2024 to 14/07/2025

ASSIGNMENTS

ASSIGNMENT TOPIC	Course Outcome	BTL
Assignment-1		
Principle and Procedure involving in downstream process and effluent treatment	C3.5.1	Understanding Applying
Production of monoclonal antibodies by hybridoma technique,	C3.5.2	Understanding Analyzing
standardization & storage of BCG, cholera, smallpox, polio, typhus, tetanus toxoid, immuno serum	C3.5.3	understanding Applying
Assignment-2		
Study of the production of - penicillins, citric acid, Vitamin B12, Glutamic acid, Griseofulvin	C3.5.4	Understanding& Applying
Blood Products: Collection, Processing and Storage of whole human blood, dried human plasma, plasma Substitutes	C3.4.5	Understanding & Applying

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 may be 8+2 Min.

BALAJI COLLEGE OF PHARMACY

B.PHARMACY II YEAR I SEMESTER (R19) I MID EXAMINATION FEB. 2025

SUB: PHARMACEUTICAL BIOTECHNOLOGY-II(BP605T) Time:120min Max Marks:30M

I. ANSWER ALL QUESTIONS (5x2=10m)	MARKS	*CO-A*	BTL
1. Define biotechnology? How is it used in environmental monitoring?	02	CO605.1	Remembering
2. Define cloning & give an example various vectors types?	02	CO605.1	Remembering
3. Define enzyme immobilizaton & Write its application?	02	CO605.2	Remembering
4. What are DNA Ligases and write various types of it ?	02	CO605.2	Remembering
5. What is PCR and Mention its applications types?	02	CO605.2	Remembering
II. ANSWER ANY TWO QUESTIONS (5x2=10m)	MARKS	*CO-A*	BTL
6. Explain about various types of Biosensors with neat labelled diagram and its application?	05	CO605.1	Evaluating
7. Describe the production of Mono-Clonal Antibodies by Hybridoma Technology?	05	CO605.2	Understanding
8. Discuss about protein engineering?	05	CO605.2	Remembering
II. ANSWER ANY ONE QUESTIONS (10x1=10m)	MARKS	*CO-A*	BTL
9. Write the simple steps involved in the construction RDNA Technology in the production of Human Insulin with a neat labelled diagram?	10	CO605.2	Understanding
10. a) Write the Structure and function of MHC? b) Explain the method of preparation of Diphtheria Toxoid?	10	CO605.3	Remembering

I. ANSWER ALL QUESTIONS (5x2=10m)	MARKS	*CO-A*	BTL
1. Define fermenter and write its parts?	02	CO605.3	Remembering
2. What is biotransformation? Mention its types?	02	CO605.4	Remembering
3. Explain Western Blotting?	02	CO605.3	Remembering
4. Write a note on ELISA?	02	CO605.4	Remembering
5. What is mutation and mention types of mutations?	02	CO605.4	Remembering
II. ANSWER ANY TWO QUESTIONS (5x2=10m)	MARKS	*CO-A*	BTL
8 .Define Blood products? Write in brief the collection, processing and storage of whole human blood?	05	CO605.5	Evaluating
9. Write a short note on different types of mutation?	05	CO605.4	Understanding
10. Define fermenter? Draw a neat labelled diagram of it?	05	CO605.5	Remembering
II. ANSWER ANY ONE QUESTIONS (10x1=10m)	MARKS	*CO-A*	BTL
6. What is Immunoblotting technique? Write a note on ELISA, Western Blotting, and Southern Blotting?	10	CO605.3	Understanding
7. With the help of neat flow sheet, describe the production of Penicillin and citric acid by fermentation process?	10	CO605.5	Remembering

BALAJI COLLEGE OF PHARMACY

B.PHARMACY II YEAR I SEMESTER (R19) II MID EXAMINATION APRIL 2025

SUB: PHARMACEUTICAL BIOTECHNOLOGY (BP605T) Time: 120min Max Marks:30M

Course Outcome analysis:

CO	**Total CO Marks**	**%CO**
C2.4.1	19M	38%
C2.4.2	14M	28%
C2.4.3	15M	30%
C2.4.4	07M	14%
C2.4.5	0M	0%
TOTAL	50M	100%

Blooms taxonomy analysis for educational objectives:

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

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UNIT WISE IMPORTANT QUESTIONS

Academic Year: 2024 – 2025 Class: III SEM: II

Program: B. Pharmacy

Name of the Course: **Pharmaceutical Biotechnology**

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

Scheduled Date: 29/07/2024 to 14/07/2025

UNIT 1

Essay question

1) Describe the enzyme immobilization techniques.
2) Discuss the immobilization methods for enzymes
3) What are biosensors? Explain the types with pharmaceutical applications.
4) What are biosensors? Write its principle and its functions.
5) .Write in detail three different vectors used in genetic engineering
6) Explain in detail about protein engineering
7) Write about production of enzymes
8) Explain in detail about principles of genetic engineering.
9) Explain the profile of Streptokinase
10) Write in brief on application of genetic engineering in pharmaceutical biotechnology

Short question

1) Explain immobilization of bacteria
2) Define microbial transformation. Write the types of reactions mediated by microorganisms

3) Define enzyme immobilization and write its advantages over isolated enzymes.
4) What is R-DNA technology
5) Mention the applications of bioinformatics.
6) Mention the application of genetic engineering
7) Write advantages and disadvantages of enzyme immobilization
8) Mention the applications of proteomics
9) Mention the application of genomics.

Very short questions:

1) Define biotechnology
2) proteomics
3) genomics
4) enzyme immobilization
5) microbial transformation
6) biosensor

UNIT II

Essay questions

1) Explain the steps involved in R-DNA technology
2) Explain the collection of Catgut
3) Explain the principle and procedure involving in downstream process
4) Write about processing and storage of Catgut.
5) What are restriction endonucleases? Discuss on various types of restriction endonucleases with suitable examples.
6) Write a note on production and applications of Amylase/ Catalase/ Peroxidase/ Lipase/ Protease/ Penicillinase
7) What is the general method of preparation of the vaccine
8) Discuss on the various steps involved in the industrial production of HBV

9) Discuss on the various steps involved in the industrial production of Interferons.
10) Discuss on the various steps involved in the industrial production of Insulin

Short questions

1) Define vector? Give the properties of an ideal vector with neat labelled diagram
2) Write a note on endonucleases
3) Write a note on DNA ligase
4) Write a note on vectors
5) Elaborate about PCR
6) Define vaccines
7) Types of vaccines
8) Storage of vaccines
9) Application of genetic engineering

Very short questions:

1) Define vaccine
2) Define endonuclease
3) Functions of DNA ligase
4) Functions of endonuclease
5) What are the different chains of insulin

UNIT III

Essay questions

1) Write a note on Blood products and Plasma Substitutes
2) Write a note on structure and function of MHC
3) Discuss in detail humoral and cellular immunity.
4) Discuss in detail hypersensitivity reactions
5) Explain the types of hypersensitivity reactions
6) Write in detail on preparation and standardization of BCG vaccine.
7) Explain Hybridoma technology with Production, Purification and Applications.

Short questions

1) Describe active and passive immunity
2)) Explain the collection of blood from humans
3) Explain the preparation of any one living bacterial suspension type vaccine
4) Define entrapment and encapsulation.
5) What are anticoagulants
6) Write about Humoral immunity
7) Write about cell mediated immunity
8) What are the antigen-antibody reactions
9) Write in brief on hypersensitivity

Very short questions

1) Types of hypersensitivity reaction
2) Elaborate BCG
3) Types of vaccine
4) Examples of live bacterial suspension vaccine
5) Examples of coagulants and anticoagulants

UNIT IV

Essay questions

1)explain in detail about conjugation
2) illustrate in detail about eukaryotic genetic organization
3) illustrate in detail about prokaryotic genetic organization
4) define mutation. Mention its types
5) explain in detail about transformation
6) explain about transduction
7) write about ELISA
8) explain in detail about southern blotting techniques

Short questions

1)elaborate ELISA
2) types of mutation

3) define plasmid.

4) examples of plamids

5) write about western blot technique

6) write about transponos

Very short questions

1) Define point mutation
2) Spontaneous mutation
3) Full form of ELISA
4) Who invented western blot technique
5) Advantages of southern blot technique

UNIT V

Essay questions

1) Discuss on the various steps involved in the industrial production of Vit-B-12.

2)Discuss on the various steps involved in the industrial production of Glutamic acid.

3)Explain the processing and storage of whole human blood and human normal immunoglobulin injection

4)) Describe the various types of fermentations

5) Explain about Plasma substitutes

6) Explain the optimization of fermentation process

7) Explain the fermentation and purification of the following. (i) Alcohol (ii) Acetone (iii) Streptomycin (iv) Riboflavin

8) Explain the fermentation and purification of the following. (i) Erythromycin (ii) Cyanocobalamin (iii) Citric acid (iv) Glutamic acid

Short questions

1) define fermentation

2 examples of media in fermentation

3)what are the equipments used in fermentation

4) examples of media used in fermentation

5) short note on aeration of fermentation

6) what are the different blood products

7) storage conditions of blood products

8) write a short note on plasma substitutes

Very short questions:

1) Define antibiotics
2) What is the first antibiotic identified
3) Uses of penicillin
4) Advantages of fermentation
5) Differentiate between serum and plasma

Code: BP605T

R19

B.Pharm III Year II Semester (R19) Regular & Supplementary Examinations May 2025

PHARMACEUTICAL BIOTECHNOLOGY

(B.Pharmacy)

Time: 3 hours

Max. Marks: 75

PART – A

(Compulsory Question)

*****

1		Answer the following: (10 X 02 = 20 Marks)	
	(a)	How are biosensors important in pharmaceutical industry? Give its two applications.	2M
	(b)	Define biological catalysts with example.	2M
	(c)	Define vectors use d in recombinant DNA technology with example.	2M
	(d)	Name the three important steps in PCR along with their required temperatures.	2M
	(e)	Briefly explain what is anaphylactic shock.	2M
	(f)	Define vaccines. Give an example of oral vaccine.	2M
	(g)	Give two basic differences between prokaryotic and eukaryotic cells.	2M
	(h)	Name the four different types of mutations. What is penicilloic acid?	2M
	(i)	Define Fermentation.	2M
	(j)	What is the medical use of dextran? Write down its microbial source.	2M

PART – B

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

2		What are immunoglobulins? Name their different types.	10M
3		Write short note on: (i) DNA ligase. (ii) Plasmid.	10M
4	(a)	Give differences between western and southern blotting.	5M
	(b)	Write down the source and importance of vitamin B12.	5M

PART – C

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

5	(a)	Mention two important contribution of biotechnology towards pharmaceutical industry.	2M
	(b)	How is enzyme immobilisation important in medical and pharmaceutical fields?	3M
6	(a)	What are the properties to be a good vector in RDT?	3M
	(b)	Define interferons.	2M
7	(a)	Describe hypersensitivity reaction.	2M
	(b)	Define missense mutation.	3M
8	(a)	Elaborate the difference between transformation and transduction.	2M
	(b)	Define transposons.	3M
9	(a)	Write the therapeutic importance of clavulanic acid.	3M
	(b)	Define lophotrichous flagella.	2M
10	(a)	What is RT PCR?	4M
	(b)	How many strands will be synthesised after 10 cycles of PCR?	1M
11	(a)	Mention the difference between vaccine and toxoid.	3M
	(b)	Which immunoglobulin is abundant in mother's milk?	2M
12		Explain the process of fermentation. Importance of fermentation in pharmaceutical industry.	5M
13	(a)	Explain different types of vaccines with examples.	3M
	(b)	Give differences between live attenuated and inactivated vaccines.	2M

*****

BALAJI COLLEGE OF PHARMACY :: ANANTAPUR
B.PHARMACY – II-YEAR-I-SEM-2023-2024 (R19)
REG THEORY MID EXAMINATIONS AVERAGE MARKS AWARD LIST
Name of the Sub:PBIOTECHNONOLGY Sub. Code:BP605T
(Theory) Lab code:

Sl No.	H.T.No	Name Of The Student	MID-I		MID-II		Avg (15M)	Continuous Mode (10 M)	Total (25M)
			FOR 30 M	FOR 15 M	FOR 30 M	FOR 15 M			
1.	22T11R0001	Abhi Ravi Gari	22	11	24	12	12	9	21
2.	22T11R0002	Aditya Dasa	22	11	24	12	12	10	22
3.	22T11R0003	Afreen Taj K S	26	13	26	13	13	9	22
4.	22T11R0004	Ajay Kumar Chakali							
5.	22T11R0005	Aliya Tabassum L S	25	13	28	14	14	9	23
6.	22T11R0006	Anitha Kunchapu	26	13	28	14	14	10	24
7.	22T11R0007	Anitha Narappala	26	13	26	13	13	10	23
8.	22T11R0008	Anjulatha Kondagogula							
9.	22T11R0009	Anuradha P H	26	13	26	13	13	9	23
10.	22T11R0010	Arjun Uppara	28	14	28	14	14	10	24
11.	22T11R0011	Arshiya Banu C	26	13	28	14	14	10	24
12.	22T11R0012	Atiya Khanam Mohammad	28	13	28	14	14	9	23
13.	22T11R0013	Avinash Sajjanagandla	28	13	24	12	12	10	23
14.	22T11R0014	Bhavana Kodathala	26	13	26	13	13	9	22
15.	22T11R0015	Bhavya Spandana Pulla	28	13	27	14	14	10	24
16.	22T11R0016	Bhavya Sree C	26	13	28	14	14	10	24
17.	22T11R0017	Bheemeswari Kondapuram	28	14	28	14	14	9	23
18.	22T11R0018	Bhumika Chakali	26	13	28	14	14	9	23
19.	22T11R0019	Chandana Bandeeppagari	28	14	28	14	14	10	24
20.	22T11R0020	Deepika Varikuti	26	13	27	14	14	9	23
21.	22T11R0021	Dhanusha Prodduturu	26	13	26	13	13	10	23
22.	22T11R0022	Dinesh Kumar Manchala	28	14	27	14	14	10	24
23.	22T11R0023	Divya Bayamutaka	28	14	27	14	14	10	24
24.	22T11R0024	Divya Sree Charugundla	25	13	28	14	14	10	24
25.	22T11R0025	Faseeha Shaik	28	14	27	14	14	10	24
26.	22T11R0026	Gnapika Pendem	27	14	27	14	14	10	24

27.	22T11R0027	Gowri Muguda	26	13	26	13	13	9	22
28.	22T11R0028	Harathi Valipi	27	14	27	14	14	10	24
29.	22T11R0029	Hemanth Kumar Indla							
30.	22T11R0030	Jagan Mohan Naik Bhukya	26	13	26	13	13	9	22
31.	22T11R0031	Jahnavi Bestha							
32.	22T11R0032	Jaswanth Reddy Reddyvari							
33.	22T11R0033	Jayalakshmi Shivanna Gari	28	14	27	14	14	9	23
34.	22T11R0034	Jyothsna Moola	26	13	26	13	13	9	23
35.	22T11R0035	Kalpana Puttha	26	13	27	14	14	10	24
36.	22T11R0036	Kranthi Yeggidi	28	14	26	13	13	9	23
37.	22T11R0037	Krishna Veni G	26	13	26	13	13	9	22
38.	22T11R0038	Kulsum Patan	28	14	29	14	14	9	23
39.	22T11R0039	Lakshmi Korrapati	26	13	26	13	13	9	22
40.	22T11R0040	Lakshmipriya Belle	28	14	28	14	14	9	23
41.	22T11R0041	Lalitha Digivindla Chakala	26	13	27	13	13	9	22
42.	22T11R0042	Likhitha Alugunti	27	14	22	11	11	10	23
43.	22T11R0043	Madhu Pikkili							
44.	22T11R0044	Mahammad Shakeer Gosaripalli	26	13	29	14	14	10	24
45.	22T11R0045	Mahesh Khamithkar	29	15	29	14	14	10	24
46.	22T11R0046	Manoj Kumar Avvari	26	13	28	14	14	9	23
47.	22T11R0047	Meghamala Ventrukulappa Gari	26	13	27	14	14	9	23
48.	22T11R0048	Meghana Jangam	26	13	26	13	13	10	23
49.	22T11R0049	Mohammed Kaif N	26	13	24	12	12	9	22
50.	22T11R0050	Mounika Chinna Gowni	28	14	27	14	14	10	24
51.	22T11R0051	Mounika Goddumuri	24	12	24	12	12	10	22
52.	22T11R0052	Muskan Silar	26	13	27	14	14	10	24
53.	22T11R0053	Nagarjuna Thummasi	26	13	24	12	12	9	22
54.	22T11R0054	Nageswari Bayappagari	22	11	26	13	13	8	20
55.	22T11R0055	Nandini Ediga	26	12	26	13	13	10	23
56.	22T11R0056	Nandini Sake	24	7	24	12	12	10	19
57.	22T11R0057	Navaneetha Sunkara	28	14	26	13	13	10	24
58.	22T11R0058	Navanitha Ponthati	26	13	26	13	13	9	22
59.	22T11R0059	Naveen Raju Chakali	25	13	23	12	12	8	20

60.	22T11R0060	Navya Muktham	26	13	24	12	12	9	22
61.	22T11R0061	Navya Nandini Matam	26	13	24	12	12	9	22
62.	22T11R0062	Nikhila Thalari	18	9	25	13	13	9	20
63.	22T11R0063	Pallavi Beldon	26	13	26	13	13	10	23
64.	22T11R0064	Pallavi Jasthi	23	12	24	12	12	9	21
65.	22T11R0065	Pallavi Nagadani	26	13				10	17
66.	22T11R0066	Peddi Reddy Guda	22	11	26	13	13	10	22
67.	22T11R0067	Prasanthi Kathe	26	13	24	12	12	9	22
68.	22T11R0068	Pravallika Neeruganti	26	13	26	13	13	9	22
69.	22T11R0069	Priyanka I	21	11	19	10	10	9	19
70.	22T11R0070	Reena Vade Muthana	26	13	26	13	13	10	23
71.	22T11R0071	Rozina Tabassum Dilkush							
72.	22T11R0072	Rukmini Paruchuri	21	11	28	14	14	9	22
73.	22T11R0073	Rupaamrutha Rallacheni	28	14	28	14	14	9	23
74.	22T11R0074	Sabiha Thaslim Haji Achula							
75.	22T11R0075	Sadikha Shaik	26	13	28	14	14	9	23
76.	22T11R0076	Sahitha Neeruganti	23	12	24	12	12	9	21
77.	22T11R0077	Sai Mounika Chinthamanu	26	13	26	13	13	10	23
78.	22T11R0078	Sai Mukthi Malyavantham	26	13	24	12	12	9	22
79.	22T11R0079	Samanthakamani Velpula	26	13	24	12	12	10	23
80.	22T11R0080	Samarasimha Valmiki	29	15	24	12	12	9	23
81.	22T11R0081	Sangeetha Dasari	27	13	26	13	13	9	22
82.	22T11R0082	Saniya Ruhi Shaik	26	13	29	14	14	9	23
83.	22T11R0083	Shahin Begum T M	22	11	27	14	14	9	21
84.	22T11R0084	Shahira Alisher	17	9	26	13	13	9	19
85.	22T11R0085	Shamiulla Shaik	27	14	28	14	14	9	23
86.	22T11R0086	Shilpa K A	18	9	26	13	13	9	20
87.	22T11R0087	Shirisha Billa	28	14	29	14	14	9	23
88.	22T11R0088	Shiva Sai Boggula	14	7	19	9	9	9	17
89.	22T11R0089	Siddesh Yanjarappa Gari	24	12	26	12	12	9	22
90.	22T11R0090	Simhadri Nallolla	23	12	26	12	12	9	21
91.	22T11R0091	Sireesha Kamsala	16	8	16	8	8	9	17

92.	22T11R0092	Snehalatha Talari	26	13	27	14	14	9	22
93.	22T11R0093	Soundarya Rajappagari	25	13	23	13	13	8	21
94.	22T11R0094	Sravani Siriyapu Reddy	24	12	27	14	14	9	22
95.	22T11R0095	Sri Lakshmi Kurupati	28	14	27	14	14	10	24
96.	22T11R0096	Suchitra Sagabala			26	13	13	10	17
97.	22T11R0097	Sumalatha Yerasi	26	13	26	13	13	8	21
98.	22T11R0098	Suneetha Kappala	26	13	25	13	13	8	21
99.	22T11R0099	Swetha Neelam	26	13	25	13	13	8	21
100.	22T11R00A1	Tanuja Busetty	26	13	26	13	13	9	22
101.	22T11R00A2	Tejasri Challa	26	13	28	14	14	9	23
102.	22T11R00A3	Tejaswini T	24	12	25	13	13	9	22
103.	22T11R00A4	Uma Maheswara S Manikanta S	8	4	23	12	12	9	16
104.	22T11R00A5	Vasanthi Bandi	25	13	26	13	13	8	21
105.	22T11R00A6	Vasundara Vadde	26	13	26	13	13	9	22
106.	22T11R00A7	Venkat Nikheyth Reddi C	24	12	24	12	12	8	20
107.	22T11R00A8	Vishala Jenne	28	14	26	13	13	8	22
108.	22T11R00A9	Vishnuvardhan Reddy Lingala	26	13	27	13	13	9	23
109.	22T11R00B0	Yogananda N	23	12	25	13	13	9	21
110.	23T15R001	A.Anjali	28	14	26	13	13	9	23
111.	21KM1R0015	T.Manikumar	11	6		3	3	10	13
112.	219N1R0071	T.HARITHA	26	13	26	13	13	9	22

Signature of the faculty member