

UTTAR PRADESH RAJARSHI TANDON OPEN UNIVERSITY
SHANTIPURAM, SECTOR-F, PHAPHAMAU, PRAYAGRAJ-2110021
ASSIGNMENT PAPER

Session: 2025-26	Max. Marks: 30
Program Name: M.Sc.- Biochemistry	
Course Code: PGBCH-101N	Course Name: Cell biology and biomolecules

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1	Sketch the prokaryotic and eukaryotic cells. Mention the important differences between these two cells.	2
2	Writes notes of following: (a) Endoplasmic reticulum: structure and function. (b) Chloroplasts and their importance	2
3	Describe the structure and function of haemoglobin.	2
4	Explain the changes in properties of DNA after denaturation.	2
5	Explain the structure of double stranded DNA.	2
6	Draw the structure of t-RNA and describe its functions.	2
SECTION -B		6*3=18 marks
	Long answer type question (approx. 500 -800 words)	Marks
7	Define the role of mitochondria. How does it play role in energy generation.	6
8	What are disaccharides? Discuss the energy production in human body.	6
9	Define Enzymes and enumerate their general properties.	6

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Session: 2025-26	Max. Marks: 30
Program Name: M.Sc.- Biochemistry	
Course Code: PGBCH-102N	Course Name: Analytical biochemistry

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1	What do you understand by Visible and UV Spectroscopy?	2
2	Write down different types of centrifugation techniques?	2
3	Discuss the principle behind X-ray diffraction and NMR.	2
4	Write short note on the given techniques- a) Agarose gel electrophoresis b) 2D gel electrophoresis.	2
5	Q5. Briefly explain the following- a) Atomic adsorption b) Origin of spectra and electronic transition	2
6	Briefly explain the principle and instrumentation of high-performance liquid chromatography (HPLC).	2
SECTION -B		6*3=18 marks
	Long answer type question (approx. 500 -800 words)	Marks
7	What is the fundamental principle behind native PAGE, and how does it differ from SDS-PAGE in terms of the samples it can analyze?	6
8	Explain the principle and instrumentation of high-performance liquid chromatography (HPLC).	6
9	Explain the difference between scanning electron microscopy (SEM) and transmission electron microscopy (TEM).	6

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ASSIGNMENT PAPER

Session: 2025-26	Max. Marks: 30
Program Name: M.Sc.- Biochemistry	
Course Code: PGBCH-103N	Course Name: Bioenergetics and metabolism

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1	Discuss the concept of free energy and how it is different from standard free energy?	2
2	What is the relationship between equilibrium constant and standard free energy change?	2
3	Write a short note on photosynthetic light reactions?	2
4	What do you understand by phosphorylation?	2
5	Write short notes on- a-Isozymes b-Abzymes	2
6	Differentiate between Coenzymes and cofactors.	2
SECTION -B		6*3=18 marks
	Long answer type question (approx. 500 -800 words)	Marks
7	How do you calculate ΔG for the given reaction?	6
8	What is the role of prosthetic group in enzymes? How do prosthetic groups differ from coenzyme?	6
9	What is the importance of the light reaction in photosynthesis? What are the two main products of photosynthetic light reactions? How many ATP are produced in light reaction?	6

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Session: 2025-26	Max. Marks: 30
Program Name: M.Sc.- Biochemistry	
Course Code: PGBCH-106N	Course Name: Nutrition and Physiology

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1	What is Basal Metabolic Rate (BMR)? what are the factors affecting BMR?	2
2	What is malnutrition? How do you describe human needs?	2
3	How do you describe micronutrients and macronutrients? Pls name them and discuss.	2
4	What are the deficiency diseases associated with vitamins? Name them and discuss.	2
5	Write down the composition and parts of alimentary canal?	2
6	What role does minerals play in metabolism? Write in detail.	2
SECTION -B		6*3=18 marks
	Long answer type question (approx. 500 -800 words)	Marks
7	Write down essential fatty acids and why are they crucial for human health?	6
8	Describe the process of blood coagulation.	6
9	How do you describe the mechanism of breathing and its regulation?	6

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Session: 2025-26	Max. Marks: 30
Program Name: M.Sc.- Biochemistry	
Course Code: PGBCH-107 N	Course Name: Bio Statistics

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1	Write the short notes on analysis of variance and co-variance.	2
2	Write the principle of sampling.	2
3	Define the objectives of research.	2
4	What do you understand by research and scientific methods?	2
5	Define the central tendency.	2
6	What do you mean by research methods? Define the historical research methodology?	2
SECTION -B		6*3=18 marks
	Long answer type question (approx. 500 -800 words)	Marks
7	Comparison of Chi-Square Test with Normal Test.	6
8	Write short note on: a) Degree of freedom. b) Level of significance. c) Type I and Type II error.	6
9	What do you mean by the hypothesis in research methodology, Define the limitation of tests of hypothesis?	6

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Session: 2025-26	Max. Marks: 30
Program Name: M.Sc.- Biochemistry	
Course Code: PGBCH-108 N	Course Name: CLINICAL BIOCHEMISTRY

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1	What are the electrolytes? Discuss its role in metabolism.	2
2	Enumerate proteins of the innate immune system and discuss their role in diagnosis.	2
3	Discuss liver functions tests and their importance.	2
4	Describe important electrolytes and their biological functions. How does their importance lead to disease state?	2
5	Describe inborn errors of metabolism.	2
6	What are biological buffers and how does it help in acid base balance?	2
SECTION -B		6*3=18 marks
	Long answer type question (approx. 500 -800 words)	Marks
7	What are the proteins? Explain their structures with their functions.	6
8	What are the hormones? Write various roles of different hormones in animal systems with examples.	6
9	What are the different roles of biochemistry in laboratory? Explain pH control of respiration and metabolic process.	6

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Session: 2025-26	Max. Marks: 30
Program Name: M.Sc.- Biochemistry	
Course Code: PGBR-01	Course Name: Basics in research

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1	Write down the meaning and objective of research.	2
2	Discuss the need for reviewing literature in brief. What are the types of literature review?	2
3	What do you understand by google scholar, science direct?	2
4	What do you understand by google Scopus, web of science?	2
5	write short notes on the following- a) Journal abstracts b) SciFinder	2
6	Write short notes on the following- a) Citation index b) Peer review and revision.	2
SECTION -B		6*3=18 marks
	Long answer type question (approx. 500 -800 words)	Marks
7	Discuss in detail about the intellectual property and intellectual property rights (IPR).	6
8	write short notes on the following- a) Citation index b) Peer review and revision.	6
9	What are the various kinds of report writing in academics and research. Explain in detail.	6

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Session: 2025-26	Max. Marks: 30
Program Name: M.Sc.- Biochemistry	
Course Code: PGRT-03	Course Name: Basic research tools

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1	Write down the types and methods of data collection.	2
2	What are the different types of sample design?	2
3	What do you understand by data presentation?	2
4	Briefly describe errors in hypothesis testing.	2
5	Discuss the application of ICT in research.	2
6	Discuss the application of MS office in research.	2
SECTION -B		6*3=18 marks
	Long answer type question (approx. 500 -800 words)	Marks
7	Discuss sample designing detail. What are the characteristics of a good sample design?	6
8	What is research hypothesis and formulation of hypothesis. Discuss the concept of hypothesis testing.	6
9	What do you understand by Data classification and tabulation?	6

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ASSIGNMENT QUESTION PAPER

Session: 2025-26	Max. Marks: 30
Program Name: M.Sc.- Biochemistry	
Course Code: PGBCH-111	Course Name: Enzymology and Enzyme Technology

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1	What are the methods involved in enzyme immobilization? Briefly explain.	2
2	Write short note on- a) Catalytic antibodies b) Cofactors c) Ribozymes d) Enzyme specificity	2
3	Discuss the Criteria for enzyme homogeneity?	2
4	What do you understand by electrophoretic technique for enzyme purification? Write the principle behind this method.	2
5	Briefly explain- a) Suicide inhibitors b) Artificial enzymes	2
6	What are allosteric enzymes? Briefly explain its mechanism of action.	2
SECTION -B		6*3=18 marks
	Long answer type question (approx. 500 -800 words)	Marks
7	What is the Michaelis-Menten equation, its significance in enzymology, and how does it explain the relationship between substrate concentration and enzymatic reaction rate?	6
8	How is centrifugation used in enzyme study and production, particularly in isolation, purification, and analysis?	6
9	Discuss classification of enzymes and their properties.	6

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ASSIGNMENT QUESTION PAPER

Session: 2025-26	Max. Marks: 30
Program Name: M.Sc.- Biochemistry	
Course Code: PGBCH-112	Course Name: Immunology

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1	Explain the structure and functions of antibody.	2
2	Describe the types of common vaccines for human.	2
3	Explain the Antigens processing and presentation	2
4	What do you understand by clonal selection theory?	2
5	Write the notes maturation and selection of T cells	2
6	Explain the acquired immunodeficiency.	2
SECTION -B		6*3=18 marks
	Long answer type question (approx. 500 -800 words)	Marks
7	Describe the types of immunity- innate, acquired, adaptive and cellular immunity.	6
8	Describe the architecture of immune system.	6
9	Write the short notes on the following. a) Natural killer cells (NK cells) b) Vaccines c) Adaptive and cellular immunity	6

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ASSIGNMENT QUESTION PAPER

Session: 2025-26	Max. Marks: 30
Program Name: M.Sc.- Biochemistry	
Course Code: PGBCH-113	Course Name: Basic Biotechnology

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1	Explain the role of biotechnology to improve yield and nutritional values of crops.	2
2	Briefly explain- a-Gene therapy b-Hybridoma technology	2
3	What do you understand by plant tissue culture? What are the steps involved in plant tissue culture. What are its applications?	2
4	Briefly explain the concept of recombinant DNA technology (RDT).	2
5	Write short note on the below mentioned techniques – a- Biotransformation b-Metabolic engineering for metabolite over production	2
6	Write a note on gene transfer method in plants.	2
SECTION -B		6*3=18 marks
	Long answer type question (approx. 500 -800 words)	Marks
7	Give an account of immunological techniques involved in medical biotechnology.	6
8	Briefly describe GM (Genetically modified) foods and the risk associated with these GM foods.	6
9	Discuss about the scope and importance of biotechnology.	6

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ASSIGNMENT QUESTION PAPER

Session: 2025-26	Max. Marks: 30
Program Name: M.Sc.- Biochemistry	
Course Code: PGBCH-116N	Course Name: Bio-safety and IPR

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1	Explain benefits of transgenic to human health, society and the environment.	2
2	Explain gene flow in natural and artificial ecologies.	2
3	Explain radiation safety.	2
4	Explain Cartagena protocol on biosafety.	2
5	Explain convention on biological diversity.	2
6	Write short notes on the following. a) Antibiotic resistance. b) Gene flow	2
SECTION -B		6*3=18 marks
	Long answer type question (approx. 500 -800 words)	Marks
7	What do you mean by patent, intellectual property right (IPR) and international agreement?	6
8	Write short notes on the following a) Eco-labeling b) Ecomark c) GMO	6
9	Describe genetically modified foods (GMF).	6

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ASSIGNMENT QUESTION PAPER

Session: 2025-26	Max. Marks: 30
Program Name: M.Sc.- Biochemistry	
Course Code: PGBCH-117N	Course Name: Environmental Toxicology and Occupational Health Hazardous

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1	Explain mineral toxicity?	2
2	Discuss the internal poisoning?	2
3	Discuss the pesticide and automobile emission.	2
4	Discuss the accidental poisoning?	2
5	Explain renal toxicity?	2
6	Write shote notes on- a) Acute exposure b) Chronic exposure	2
SECTION -B		6*3=18 marks
	Long answer type question (approx. 500 -800 words)	Marks
7	Discuss the laws and regulations governing toxicants.	6
8	Discuss carcinogenesis and types of carcinogens.	6
9	Discuss the history and scope of toxicology.	6

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ASSIGNMENT QUESTION PAPER

Session: 2025-26	Max. Marks: 30
Program Name: M.Sc.- Biochemistry	
Course Code: PGBCH-118N	Course Name: Genetic Engineering

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1	Discuss the applications of transgenic plants.	2
2	What do you understand by gene expression in Eukaryotes?	2
3	What do you know by gene expression in prokaryotes?	2
4	Explain uses of monoclonal antibodies.	2
5	Explain DNA fingerprinting.?	2
6	Write short notes on the following a) c-DNA library b) Gilbert sequencing	2
SECTION -B		6*3=18 marks
	Long answer type question (approx. 500 -800 words)	Marks
7	Discuss real time PCR in detail.	6
8	Write short notes on- a) M13 Phage b) pUC8 c) pBR322	6
9	Discuss the synthesis of c-DNA from m RNA.	6

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ASSIGNMENT QUESTION PAPER

Session: 2025-26	Max. Marks: 30
Program Name: M.Sc.- Biochemistry	
Course Code: PGBCH-120N	Course Name: Microbiology and Toxicology

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1	Write the about microbial growth.	2
2	Write short notes on a) Conjugation, b) Transduction, c) Recombination	2
3	How do you differentiate between synchronous growth and continuous culture?	2
4	Discuss the Environmental Xenobiotic.	2
5	What do you know by Denaturing Gradient Gel Electrophoresis (DGGE)?	2
6	Explain the significance of major histo-compatibility complex (MHC)	2
		6*3=18 marks
	Long answer type question (approx. 500 -800 words)	Marks
7	What are antimicrobial agents?	6
8	Discuss about the Penicillins and Cephalosporins What do you mean sterilization? Write the theory and practice of sterilization.	6
9	Write the general characteristics of primary domains and of taxonomic groups belonging to Bacteria.	6

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ASSIGNMENT QUESTION PAPER

Session: 2025-26	Max. Marks: 30
Program Name: M.Sc.- Biochemistry	
Course Code: PGBCH-121N	Course Name: Industrial Biotechnology

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1	Write short notes on the following. a) filtration b) liquid-liquid extraction	2
2	Write a short note on bioreactor.	2
3	Describe whole cell immobilization.	2
4	Write short notes on the following. a) Sterilization. b) Pasteurization	2
5	What are the roles of micro elements in industrial process?	2
6	Write a short note on enzymes used in baking and pharmaceutical industry.	2
SECTION -B		6*3=18 marks
	Long answer type question (approx. 500 -800 words)	Marks
7	Write short notes on the following. a) Fermentation. b) Centrifugation c) Chromatography	6
8	Describe different enzymes with their general properties.	6
9	What do you mean by fermentation? Describe different types of fermentation process.	6

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ASSIGNMENT QUESTION PAPER

Session: 2025-26	Max. Marks: 30
Program Name: M.Sc.- Biochemistry	
Course Code: PGBCH-122N	Course Name: Bioinformatics

SECTION -A		2*6=12 marks
Q. No.	Short answer type question (approx. 200 -300 words)	Marks
1	Explain the protein 3D structure and its data base.	2
2	Explain the classification scheme of biological databases.	2
3	Describe the methods involved in phylogeny.	2
4	Discuss the recourses of EMBL.	2
5	What do you understand by MSA (multiple sequence alignment)?	2
6	Explain the protein data bank.	2
SECTION -B		6*3=18 marks
	Long answer type question (approx. 500 -800 words)	Marks
7	Describe the aim of bioinformatics and its scopes.	6
8	Discuss the importance of bioinformatics studies in modern biology.	6
9	Write short notes on the following. (a) SCOP (b) BLAST (c) NCBI	6

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ASSIGNMENT QUESTION PAPER (2025-20256)

M.Sc. (Statistics/Computer Science/Mathematics/ Bio chemistry/ Environmental Science)

III Semester

Subject: Statistics/Computer Science/ Mathematics/ Bio chemistry/ Environmental Science

Subject Code: M.Sc. (CS)/ M.Sc. (Statistics)/M.Sc. (Mathematics)/M.Sc.(Environmental Science)

Subject Title: Entrepreneurship development

Course Code: PGED-02

Maximum Marks:

30

Section- A

Note: Long Answer Questions. Answer should be given in 800 to 1000 words each. Answer all questions. All questions are compulsory.(Six marks each)

Maximum Marks:

18

1. Explain various type of entrepreneurship.
2. What are the needs and Objectives of Entrepreneurship Development Programs.
Explain eight stages of Entrepreneurship Development Cycle.
3. Explain any four all India Financial Institutions who aid to entrepreneur.

Section- B

Note: Short Answer Questions. Answer should be given in 200 to 300 words each. Answer all questions. All questions are compulsory. (Two marks each)

Maximum Marks: 12

1. What is entrepreneurship?What are the main characteristics of an entrepreneur to do entrepreneurship?
2. Differentiate between Entrepreneur, Intrapreneur & Manager.
3. What are the problems faced by women entrepreneurs in doing business?
4. Explain the characteristics of projects with various types of project?
5. Highlight the need of technology for entrepreneurs.
6. What is the various assistance of financial Institutions to entrepreneurs?