S–4216

Sub. Code
23MBC1C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Biochemistry

BASICS OF BIOCHEMISTRY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions

1. Define carbohydrates?
2. What is a starch simple definition?
3. What is lipids and its function?
4. Explain the function of fatly acid?
5. Define amino acid means
6. What is an alpha helix simple definition?
7. Describe the three types of membrane proteins?
8. What is the function of the intermediate filament.
9. Explain the structure of DNA.
10. What do you mean by cDNA?

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Discuss the structure and functions of Monosaccharides.

Or

(b) Add a note on Disaccharides definition, function.

12. (a) Explain fatty acids: Structure and properties.

Or

(b) Describe the types and functions of Glycolipids.

13. (a) Explain the secondary structure of protein.

Or

(b) Give a critical account on function of collagen.

14. (a) Briefly discuss about Membrane protein.

Or

(b) Give an idea of intrinsic protein.

15. (a) Write a detailed note on functions of Chloroplast DNA.

Or

(b) Describe key properties of DNA.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Give a detailed account of function of monosaccharides and disaccharides.

17. Describe the fatty acid: structure and properties.

18. Briefly discuss about Amino acid- Properties function, sources.

19. Describe the phospholipids-structure, type properties and function.

20. Give a detailed account of Different form of DNA A form, B form, Z form.

———————

S–4217

Sub. Code
23MBC1C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Biochemistry

BIOCHEMICAL AND MOLECULAR BIOLOGY TECHNIQUES

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions

1. Define cryopreservation
2. Write about the Fluorescence
3. What are the types of Chromatogrophy?
4. Define column Chromatography?
5. What is ISO electric Focusing?
6. What is mean by 2D PAGE?
7. Define OD value
8. Write about the trace Elements
9. Define the Units of Radioactivity
10. List out the different types of centrifuge

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Write a short on the Homogenization Technique.

Or

(b) Explain the principle and Applications of SEM.

12. (a) Write a short note on the components and applications of HPLC

Or

(b) Write short notes on perfusion Chromatography

13. (a) Explain briefly the types of Electrophoresis

Or

(b) Give short notes on capillary Electrophoresis

14. (a) Write short notes on Mass Spectroscopy

Or

(b) Give short notes on Turbidimetry

15. (a) Explain the principle and Application of Autoradiography

Or

(b) Write a short on density gradient centrifugation.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write a detailed account of principle and application of Fluorescent microscope.

17. Explain in detail the law pressure column chromatography and its applications

18. Write in detail about the Electrophoresis of Nucleic Acids and its Importance.

19. Give a detail account about the Atomic absorption spectroscopy.

20. Write a detail note on the Analytical Ultra centrifugation and its Importance.

———————

S–4218

Sub. Code
23MBC1C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Biochemistry

PHYSIOLOGY AND CELL BIOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions

1. Define Apoptosis
2. What are the phases of cell cycle?
3. Write about the fertilization
4. Define Menopceunse
5. What are the Digestive Enzymes?
6. Define CSF
7. Write a short note on Hb
8. Write about the Rhodopsin
9. Define Myosin Filaments
10. Write about the TSH.

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Write short notes on cell cycle

Or

(b) Explain briefly about the cell death Mechanism

12. (a) Give short notes on Phases of Menstrual cycle.

Or

(b) Write down the blood clothing mechanism.

13. (a) Explain briefly about the ABO blood groups.

Or

(b) Write short Notes on Alkalosis

14. (a) Explain briefly about the Electrolyte Balance.

Or

(b) Write short notes on the muscle contraction

15. (a) Explain briefly about the endocrine Hormones.

Or

(b) Write short notes on Insulin

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write in detail about the meiosis process and its importance

17. Elaborate the absorption of carbohydrase Lipids and proteins

18. Give a detail account the respiratory Gases movements and its Importance.

19. Write in detail about the theories Involved in music contraction

20. Elaborate the Thyroid Hormone and their secretions.

S–4219

Sub. Code
23MBC1E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Biochemistry

Elective: MICROBIOLOGY AND IMMUNOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions

1. Define: Nomen Culture
2. Write the Soil Microbes and its role
3. Comment on pasteurization
4. Write about termented foods
5. Define Food Poison
6. ELISA
7. Comment on Streptomycin
8. Write about the Sensitivity test
9. Define Macrophages
10. Comment on T cells

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Explain about the pure culture methods.

Or

(b) Write about the Charaka's Classification of microbes.

12. (a) Explain in detail about irradiation

Or

(b) Write short notes (i) Cheese (ii) yoghurt.

13. (a) Explain about the fungi food poisoning.

Or

(b) Write note on principle of PCR

14. (a) Write about Antiretraoviral agent

Or

(b) Describe the neutral intervention.

15. (a) Discuss in detail on antigen-anti body interactions

Or

(b) Describe about immunological techniques.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Describe in detail about the type of culture media.

17. Give an account on the food contaminations.

18. Describe on the HACCP (Hazard Count Analysis Critical Control Point)

19. Give a detailed adverse effects.

20. Describe on Structure and function of Lymphoid organs.

———————

S–4220

Sub. Code
23MBC2C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Second Semester

Biochemistry

ENZYMOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define coenzyme.

2. What is site directed mutagenesis?

3. Write down the principle of ion-exchange chromatography.

4. Comment on LDH.

5. What do you mean by un-competitive inhibition?

6. Define line weaver – Burk plot

7. Note on SDR.

8. What are allosteric enzymes?

9. List out the applications of invertase enzyme in industry.

10. Define reversible immobilization.

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Write short notes on the enzyme specificity.

Or

(b) Explain briefly about the active site.

12. (a) Discuss the technique adopted for the isolation and purification of enzymes based on solubility.

Or

(b) Note on enzyme units.

13. (a) Explain in short about reversible inhibition.

Or

(b) Write short notes on the thermodynamics of enzyme action.

14. (a) Note on allosteric enzymes using MWC and KNF models.

Or

(b) Explain double displacement reaction briefly.

15. (a) Write short notes on the entrapment and micro encapsulation of enzymes.

Or

(b) List out the advantages and disadvantages of immobilising the enzymes.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain in detail the mechanism of action of chymotrypsin.

17. Discuss elaborately about iso enzymes.

18. Describe the thermodynamics in enzyme action.

19. What is feed – back inhibition. Explain in detail.

20. Give a detailed account on designer enzymes.

———————

S–4221

Sub. Code
23MBC2C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Second Semester

Biochemistry

CELLULAR METABOLISM

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions

1. Define anaerobic glycolysis.

2. What is ketogenesis?

3. How many ATPs do me get on complete oxidation of one molecule of glucose?

4. Define omega oxidation of fatty acid.

5. Define glucogenic amino acid.

6. List out the classification of jaundice.

7. What is the degradative product of purine nucleotides.

8. Define Sanfilippo syndrome.

9. Give any two inhibition of oxidative Phosphorylation.

10. What is N-linked and O-linked glycoproteins.

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Describe the reactions of Glyoxalate cycle.

Or

(b) Explain blood glucose homeostasis and the role of hormones.

12. (a) Briefly write about cholesterol biosynthesis.

Or

(b) Describe the biosynthesis of saturated fatty acid.

13. (a) Explain Denova synthesis.

Or

(b) Write short notes on degradation pathway of purine nucleotides.

14. (a) Write short notes on biosynthesis of non-essential amino acid and their regulation.

Or

(b) Summarize the interconversion of proline to glutamate.

15. (a) Write short notes on degradation of heme.

Or

(b) Explain the oxidation and reduction of inorganic sulphur by microbes.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Describe the pyruvate dehydrogenase complex.

17. Discuss the biosynthesis of triacylglycerol and degradation.

18. Explain salvage pathway of pyrimidine.

19. Describe the degradation process of glucogenic amino acid.

20. Discuss the hunter, Sanfilippo and Maroteaux-Lamy syndrome.

———————

S–4222

Sub. Code
23MBC2C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Second Semester

Biochemistry

CLINICAL BIOCHEMISTRY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions

1. What is Sickle cell anaemia?
2. How will you preserve blood?
3. Define diabetic nephropathy.
4. What is glycated albumin?
5. Mention the clinical significance of AST.
6. Note on amino centesis.
7. What is α-fetoprotein?
8. What causes hepatitis C?
9. What is Addison's disease?
10. Define hypogonadism.

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Write short notes on blood clotting disorders.

Or

(b) Discuss briefly about amniotic fluid.

12. (a) Describe the major groups of anti-diabetic drugs.

Or

(b) What is gestational DM. Explain briefly?

13. (a) Write short notes on pre-natal testing.

Or

(b) Write short notes on myocardial infraction.

14. (a) What are inflammatory markers?

Or

(b) List out the clinical significance of acute phase proteins.

15. (a) Mention the various disorders associated with sex hormones.

Or

(b) Discuss briefly about chronic kidney disease.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss in detail regarding the preservation of biological samples.

17. Describe the pathology of diabetes mellitus.

18. Mention the post-natal testing in detail.

19. Elaborate on Hepatitis.

20. Discuss in detail about renal function test.

———————

S–4226

Sub. Code
23MBC3C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Biochemistry

INDUSTRIAL MICROBIOLOGY

(CBCS – 2023 onwards)

Time : Three Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions

1. Name some fungi involved in food industry.
2. List out microorganisms used for chemical industry.
3. What is sterilization?
4. Define culture media.
5. Define enzyme.
6. What is steam filtration?
7. Define food preservation.
8. What is cryopreservation?
9. Define biogas.
10. List the mechanism of nitrogen fixation.

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) What are the different types of Microorganisms used in Chemical Industry? Explain.

Or

(b) Write a short note on microorganisms involved in industry?

12. (a) What are the sterilization methods applied in fermentation techniques? Explain.

Or

(b) Why is fermentation necessary under anaerobic conditions?

13. (a) What is the mechanism of fermentation? Give two examples?

Or

(b) Explain the production of tetracycline and riboflavin.

14. (a) Write a short note on chemical methods used in preservation.

Or

(b) Elaborate the food bone disease. Give two examples.

15. (a) Microorganisms role in Agricultural Microbiology. Explain.

Or

(b) Explain mycorrhizae production and its applications.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the types and characteristics of microorganisms used in chemical food industry.

17. Elaborate the design, techniques operation of fermenter and its types.

18. Give an account on production of butanol, citric acid and acetone.

19. Explain the production of Beer and Malt beverages.

20. Write a note on Rhizobium production and its applications.

———————

S–4227

Sub. Code
23MBC3C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Biochemistry

MOLECULAR BIOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions

1. Define Haploid.
2. Write a short note on gene mapping.
3. Explain excision repair with an example.
4. What is mutation?
5. Define Sigma factor.
6. Define Spliceosomes.
7. What is the enzyme involved in DNA replication?
8. List four inhibitors of protein synthesis.
9. Write short note on CRISPR/Cas system.
10. What are chaperons?

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Explain the recombination mapping.

Or

(b) Explain diploid and haploid in gene mapping.

12. (a) Write a short note on DNA replication.

Or

(b) Explain Direct repair mechanism.

13. (a) Explain the role of HAT and HDAC in gene regulation.

Or

(b) Write a note Wobble hypothesis.

14. (a) List out the process of identification of protein.

Or

(b) Discuss the regulation of gene expression in prokaryotes.

15. (a) Write a note on post translational modifications of proteins.

Or

(b) Describe the protein folding process.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Explain the following – transduction, transformation and recombination.

17. Write a detail note on eukaryotic transposons and retroposons.

18. Write an account on transcription with suitable diagram.

19. Describe Lac operon in prokaryotes.

20. Discuss post translational modifications of eukaryotes.

———————

S–4228

Sub. Code
23MBC3C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Biochemistry

GENE EDITING CELL AND GENE THERAPY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions

1. Write the principle of gene editing.
2. List out the function of meganucleases.
3. What are strategies used for gene therapy?
4. Define cell targeting.
5. Define viral vector with suitable examples.
6. What is the vector used for germ line gene therapy?
7. What is the function of embryonic stem cells?
8. State the role of stem cells in gene therapy.
9. Define genetically modified stem cells.
10. Define reprogramming factors.

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Differentiate Zinc-Finger nucleases from TALEN.

Or

(b) How does homologous repair work?

12. (a) How does immunology therapy work?

Or

(b) How does transgene express in human cells?

13. (a) Write briefly on viral vector and oncolytic vector.

Or

(b) Write current strategies for suicide gene therapy for cancer.

14. (a) Differentiate the function and applications of stem cells and induced pluripotent stem cells.

Or

(b) How are stem cells used for three dimensional (3D) bioprinting?

15. (a) Write a short on challenges of pluripotent stem cells.

Or

(b) Short note on pluripotent stem cell-based cell replacement therapies.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the Non-homologous End-Joining and homology directed repair gene editing. List out the challenges and drawbacks.

17. Explain the viral and non-viral vectors used for gene therapy.

18. How does gene therapy contribute to human genetic modification? Write a note on cancer and oncolytic gene therapy.

19. Explain the regulation and ethical consideration of stem cell and gene therapy in humans.

20. Elaborate the steps, process and the application of pluripotent stem cells used for cell replacement therapy.

———————

S–4229

Sub. Code
23MBC3C4

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Biochemistry

BIOSTATISTICS AND DATA SCIENCE

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions

1. Define — Univariate data.
2. Explain qualitative classification.
3. What is range?
4. State the skewness.
5. Define the positive correlation.
6. What are the applications of statistics?
7. Explain the Q-test.
8. Write difference between positive and negative correlation.
9. What do you mean by primary purpose of scatter plot?
10. Write difference between feature and target variable in a dataset.

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Explain the survey design.

Or

(b) Draw bar diagram for the following data.

Month [2009]	January	February	March	April	May	June
No. of animals sold	2000	2010	2100	2100	2300	2030

12. (a) The mean haemoglobin level of adult human male is 157.0 g/100 ml. A sample 64 adult males living at high altitudes yielded mean blood haemoglobin content of 160 g/100 ml and a variance of 4 g/100 ml. Test the hypothesis that prolonged exposure to low, O_2 pressure at high altitudes significantly increases blood haemoglobin level.

Or

(b) Obtain the two regression equations, length (x) on weight (y) and weight (y) on length (x) from the following data on the length (x in cm) and weight (y in g) of fish.

x	5	7	3	1	9	12	8	3
y	8	9	5	4	9	13	7	9

13. (a) Define the following: (i) Statistical population (ii) Finite and infinite populations.

Or

(b) Give an account of the various methods of random sampling.

14. (a) Explain the properties of regression lines.

Or

(b) Distinguish the Correlation and regression.

15. (a) Write a short note on concept of multi-agent reinforcement learning and how it differs from single-agent reinforcement learning.

Or

(b) Describe the steps involved in the Named Entity Recognition (NER) process, including tokenization, part-of-speech tagging and entity classification.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Give detailed note on possible errors in secondary data.

17. List out the detailed methods of skewness.

18. A cross-sectional study was conducted to compare the prevalence of smoking among men and women in a particular population. Out of 200 men surveyed, 60 were found to be cricket players, while out of 300 women surveyed 40 were found to cricket players. Calculate the difference in the proportions of cricket players between men and women.

19. Write brief account on the accuracy of ANOVA test.

20. A dataset contains information on various risk factors and the presence or absence of a particular disease for 1000 patients. The dataset includes variables such as age, gender, blood pressure, cholesterol level and family history. Use a logistic regression model to predict the probability of disease presence based on these risk factors. Evaluate the performance of the model using appropriate metrics.

———————

S–4230

Sub. Code
23MBC3E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Biochemistry

Elective – MOLECULAR BASIS OF DISEASES AND THERAPEUTIC STRATEGIES

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** questions

1. List any four drugs used to treat DM.
2. Mention the guidelines to follow for dietary management of DM.
3. Define Proto-oncogenes.
4. How cancer cells differ from normal cells.
5. What is memory?
6. Define neurodegenerative diseases.
7. What is Diabetes insipidus? List the symptoms.
8. Differentiate ARF and CRF.
9. Mention the cardiac enzymes and their significance.
10. What is Hypertrophy of heart?

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Write briefly on the mechanism of blood sugar regulation.

Or

(b) Discuss the diagnostic methods to diagnose Diabetes mellitus.

12. (a) Explain the mechanism of Metastasis briefly.

Or

(b) Illustrate the pathway of tumor suppressor gene p53.

13. (a) Write an account on the causes and symptoms of Parkinson disease.

Or

(b) Describe the treatment strategies for Parkinson's disease.

14. (a) Explain Clearance test to diagnose kidney diseases.

Or

(b) What is nephrotic syndrome? Mention the causes and clinical findings.

15. (a) Discuss the treatment methods used to treat heart failure.

Or

(b) Illustrate the role of lipids and lipoproteins in cardiovascular diseases.

Part C

$(3 \times 10 = 30$

Answer any **thee** questions.

16. Discuss in detail the complications of Diabetes mellitus.

17. Elaborate on the various treatment methods used to treat cancer.

18. Describe the causes, symptoms, diagnosis and treatment for Alzheimer's disease.

19. Explain in detail the causes, symptoms, pathology and treatment for glomerulonephritis.

20. Elaborate the molecular changes associated with cardiac remodeling.
