S–3425

Sub. Code
23MBC2C1

M.Sc. DEGREE EXAMINATION, APRIL 2026

Second Semester

Biochemistry

ENZYMOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Define Apoenzyme.
2. Write about the metal ion catalysis.
3. What is electrophoresis?
4. Define isoenzymes.
5. What is steady state kinetics?
6. Write about the V_{max}.
7. Define sigmoidal kinetics.
8. What is diagnostic plot?
9. Write about the therapatic enzymes.
10. What are industrial enzymes?

Part B (5 × 5 = 25)

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

11. (a) Write short notes on acid base catalysis.

Or

(b) Explain the action of chymotrypsin.

12. (a) Write about the measurement of enzyme activity.

Or

(b) Write short notes on LDH and its importance.

13. (a) Explain about the Enzyme kinetic data analysis.

Or

(b) Write short notes on enzyme inhibition.

14. (a) Write about the enzyme multiplity and its importance.

Or

(b) Write a brief note on substrate reactions.

15. (a) Explain the properties of immobilized enzymes.

Or

(b) Write about the clinical enzymes and their importance.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss in detail on mechanisms of enzyme catalysis.

17. Write an account on isoenzymes and their separation method - special reference to LDH.

18. Elaborate on the Irreversible and reversible enzyme inhibition.

19. Explain in details on single and table displacement reactions.

20. Write an account on industrial enzymes and their applications.

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S–3426

Sub. Code
23MBC2C2

M.Sc. DEGREE EXAMINATION, APRIL 2026

Second Semester

Biochemistry

CELLULAR METABOLISM

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Explain the role of fructose-2,6-bisphosphate in glycolysis regulation.

2. What is the Pasteur effect?

3. What is ω-oxidation? Where does it mainly occur?

4. Why is β-oxidation not possible for odd-chain fatty acids directly?

5. What is gout? Name the enzyme defect associated with it.

6. Name the enzyme deficient in Lesch-Nyhan syndrome.

7. What are non-essential amino acids? Give two examples.

8. What is the biochemical defect in phenylketonuria (PKU)?

9. What is the rate-limiting enzyme in heme biosynthesis?

10. Name the enzyme responsible for opening the heme ring during degradation.

Part B (5 × 5 = 25)

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

11. (a) Discuss the regulation of glycolysis with special emphasis on phospho fructokinase-1 (PFK-1) and its allosteric effectors.

Or

(b) Describe the structure, coenzymes, and overall reaction catalyzed by the pyruvate dehydrogenase complex.

12. (a) Differentiate between α, β and ω oxidation of fatty acids. Mention their significance.

Or

(b) Outline the process of de novo synthesis of saturated fatty acids. Mention the role of fatty acid synthase complex.

13. (a) Explain the role of PRPP in nucleotide biosynthesis. What are the key enzymes regulated in this pathway?

Or

(b) Discuss Lesch-Nyhan syndrome: biochemical defect, clinical features, and its relation to purine metabolism.

14. (a) Explain the biosynthesis of non-essential amino acids with examples.

Or

(b) Discuss the role and biological significance of glutamate dehydrogenase.

15. (a) Explain the oxidation of cysteine to sulfate and interconversion of sulfur compounds.

Or

(b) Write a note on sulphotransferases and their biological roles.

Part C

(3 × 10 = 30)

Answer any **three** of the following.

16. Explain the complete pathway of glycolysis with all the enzymes involved. Differentiate between aerobic and anaerobic glycolysis and mention the energetic yield in each case.

17. Describe the complete pathway of β-oxidation of saturated fatty acids. How does it differ in odd and even carbon chain fatty acids?

18. Explain in detail the de novo synthesis of purine nucleotides. Discuss the sources of carbon and nitrogen atoms in the purine ring and mention the key regulatory steps.

19. Classify amino acids based on their catabolic fate into glucogenic and ketogenic. Explain the formation of acetate from leucine and aromatic amino acids.

20. Discuss in detail the biosynthesis and degradation of heme. Add a note on porphyrias.

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S–3427

Sub. Code
23MBC2C3

M.Sc. DEGREE EXAMINATION, APRIL 2026

Second Semester

Biochemistry

CLINICAL BIOCHEMISTRY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Comment Hemolytic disease.

2. What preservatives are commonly used for wine and why?

3. Expand HbA1c.

4. What is gestational diabetes mellitus and how is it diagnosed?

5. Define Amniocentesis.

6. Expand AST.

7. Define transferrin and ferritin.

8. Comment Hepatitis B.

9. Infer nephrotic syndrome.

10. Explain Hypogonadism.

Part B (5 × 5 = 25)

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

11. (a) Discuss the preservation method for blood, wine and CSF specimens.

Or

(b) Explain the importance of wine specimen collection in diagnosing disease.

12. (a) Describe the role of glucose testing in diagnosing and monitorig of diabetes.

Or

(b) Explain CGM principle and its use.

13. (a) Discuss the role of γ GT in dianosing liver disease.

Or

(b) Explain enzymes as therapeutic agents.

14. (a) Describe the significance of α -fetorotein.

Or

(b) Explain inflammatory markers.

15. (a) Describe diagnostic methods for disorders associated with pituitary and sex hormones.

Or

(b) Explain renal function tests

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe the importance of proper specimen collection and preservation for biochemical analysis.

17. Discuss in detail on markers of complications of diabetes mellitus.

18. Elaborately describe about new born screening for Inborn error of metabolism.

19. Describe interpreting serum protein electrophoresis.

20. Discuss about Nephrocalcinosis and Nephrolithiasis causes, pathology and symptoms.

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S–3428

Sub. Code
23MBC2E1

M.Sc. DEGREE EXAMINATION, APRIL 2026

Second Semester

Biochemistry

Elective : ENERGY AND DRUG METABOLISM

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is the Gibbs free energy change?

2. Define standard redox potential (E°').

3. What are ionophores?

4. Define P/O ratio.

5. What is Hatch-Slack pathway?

6. Define Photochemical reaction center.

7. Name the two NADH shuttle systems.

8. Mention the inhibitors of TCA cycle.

9. What is meant by hydroxylation?

10. What is APS?

Part B (5 × 5 = 25)

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

11. (a) Write short notes on oxidases and their biological role.

Or

(b) Explain energy-rich phosphate compounds with examples.

12. (a) Explain the chemiosmotic theory of oxidative phosphorylation.

Or

(b) Write a short note on inhibitors of electron transport chain.

13. (a) Explain photophosphorylation and the role of CF0-CF1 ATPase.

Or

(b) Explain non-cyclic electron transport in photosynthesis.

14. (a) Explain the interconversion of carbohydrates, fats, and proteins.

Or

(b) Explain the energetics of aerobic and anaerobic glycolysis.

15. (a) Write a short note on glutathione conjugation.

Or

(b) Explain glucuronidation and its significance.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss the thermodynamic principles governing biological systems with special reference to entropy, enthalpy, and Gibbs free energy change.

17. Describe the ATP-ADP cycle and its importance in cellular energy metabolism.

18. Discuss the mechanism of photorespiration, its regulation and physiological significance.

19. Describe the transport of extra-mitochondrial NADH, detailing the glycerophosphate and malate-aspartate shuttles.

20. Describe the mode of action of xenobiotic-metabolizing enzymes and explain the factors affecting their activities.

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S–3429

Sub. Code
23MBC2E2

M.Sc. DEGREE EXAMINATION, APRIL 2026

Second Semester

Biochemistry

Elective — NUTRITIONAL BIOCHEMISTRY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define novel foods.

2. What is lactose intolerance?

3. What are micronutrients?

4. What is protein sparing action?

5. Classify vitamins.

6. What is the role of magnesium in human nutrition?

7. Define dietary supplementation.

8. What is food fortification?

9. Define atherosclerosis.

10. What is hyperacidity?

Part B (5 × 5 = 25)

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

11. (a) Classify food groups and mention their nutritional significance.

Or

(b) Explain Specific Dynamic Action (SDA) of food.

12. (a) Explain the role of dietary fiber in human nutrition.

Or

(b) Explain essential fatty acids and their functions.

13. (a) Explain the dietary sources, functions, and deficiency of zinc.

Or

(b) Explain the biochemical functions of fat-soluble vitamins.

14. (a) Explain the causes and symptoms of vitamin A deficiency.

Or

(b) Explain the preventive measures for malnutrition.

15. (a) Explain fluid management in renal disorders.

Or

(b) Explain the aetiology and symptoms of typhoid fever.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe the nutritional requirements and biochemical changes during infancy and childhood.

17. Discuss macronutrients with reference to their sources, requirements, biological significance, deficiency, and toxicity.

18. Discuss iron metabolism, including absorption, transport, storage, functions, deficiency and toxicity.

19. Explain the etiology, clinical features, and prevention of kwashiorkor and marasmus.

20. Describe jaundice in detail, highlighting dietary modifications during different stages.

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S–3430

Sub. Code
23MBC2S1

M.Sc. DEGREE EXAMINATION, APRIL 2026

Second Semester

Biochemistry

FUNDAMENTAL OF MEDICAL LABORATORY TECHNOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Mention the precautionary measures while centrifuging the samples.

2. Name two clinic borne infection.

3. Write the working principles of water bath.

4. How to maintain the micropipettes?

5. Write two chemical preservatives.

6. Comment on sampling errors.

7. Comment on normal saline.

8. Write about quality control in clinical laboratory.

9. Comment on batch analyzer.

10. What is random access analyzer?

Part B (5 × 5 = 25)

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

11. (a) Give an account on basic laboratory principles.

Or

(b) Discuss in brief about safety measures followed in clinical laboratory.

12. (a) Add short note on types of centrifuge.

Or

(b) Write in brief about working principles of autoclave.

13. (a) Explain about collection and preservation of biological fluids.

Or

(b) Give brief note on laboratory report preparation.

14. (a) How will you prepare molar solutions?

Or

(b) Discuss in short about how far the PH of a reagent is important.

15. (a) Describe about semi auto analyzer.

Or

(b) Add a brief note on disposal methods of laboratory waste.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain in detail about code of conduct of medical laboratory personnel.

17. Write elaborate note on principle and applications of electron microscopy.

18. Discuss in detail about chemical preservatives for clinical samples.

19. Write in detail about methods of measuring liquids.

20. Write in detail about responsibilities of a technician in the maintenance of analyzer.

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S–3431

Sub. Code
23MBC4C1

M.Sc. DEGREE EXAMINATION, APRIL 2026

Fourth Semester

Biochemistry

PHARMACEUTICAL BIOCHEMISTRY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is hit identification in drug discovery?

2. List any two advantages of invitro experiments in drug discovery.

3. Define pharmacodynamics.

4. What are potential molecules?

5. Comment on agonist.

6. Define Xenobiotics.

7. Comment on chloramphenicol.

8. What is meant by selective toxicity?

9. What are clinical trials?

10. How is the safety in drug development?

Part B (5 × 5 = 25)

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

11. (a) Discuss the important target identification in drug discovery.

Or

(b) Write a short note on radiological binding assay.

12. (a) Explain the strategies used for identifying drug targets in pathogenic.

Or

(b) Discuss the role of pharmacophore modeling in virtual screening and lead identification.

13. (a) How do cytochrome P450 enzymes influence drug metabolism?

Or

(b) What are the different phases of Xenobiotic metabolism (phase I, II, III)?

14. (a) Write a note on ethical and organizational aspects in clinical trials.

Or

(b) Explain that enzymes as a drug target.

15. (a) Discuss the principles of chemotherapy.

Or

(b) Write a short note on agonist and antagonist.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe the process of lead optimization and its significance in drug development.

17. Discuss the simulation in predicting drug behaviour in the role of molecular dynamics.

18. Explain the theories of drug-receptor interaction and describe how drug efficiency and potency are determined.

19. Write a note on the chemotherapy of cancer.

20. Explain in detail about all the phase of clinical trials.

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S–3432

Sub. Code
23MBC4C2

M.Sc. DEGREE EXAMINATION, APRIL 2026

Fourth Semester

Biochemistry

BIOCHEMICAL TOXICOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Define Pose Response.
2. Write about the Hazard.
3. What are phase 1 and Phase 2 reactions?
4. What is Detoxification?
5. Define +C 50.
6. What is calcium homeostasis?
7. Define teratogenesis.
8. Write about the carcinogenesis.
9. What is protein receptor?
10. Define organ toxicity.

Part B

$(5 \times 5 = 25)$

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

11. (a) Write about the measurement of pose response.

Or

(b) Write short notes on Risk Assessment of toxicants.

12. (a) Write briefly about the metabolism.

Or

(b) Write about the detoxification process of toxicant.

13. (a) Explain about the mechanism of toxicity.

Or

(b) Write short notes on Tissue specific toxicity.

14. (a) Write about the teratogenesis.

Or

(b) Explain about the chemical carcinogenesis.

15. (a) Write briefly about the kidney Pamisyl.

Or

(b) Write about the specific protein receptors.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss in detail on Hazard and risk Assessment of Toxicants.

17. Elaborate on the phase 1 and phase 2 reactions of toxicants.

18. Discuss the invitro and invivo test system of toxicity testing.

19. Explain in detail on cellular toxicity of toxicants.

20. Discuss in detail on Multi organ toxicity and their effects.

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S–3433

Sub. Code
23MBC4E1

M.Sc. DEGREE EXAMINATION, APRIL 2026

Fourth Semester

Biochemistry

***Elective* — BIO-SAFETY, LAB SAFETY AND IPR**

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is GEAC?

2. What are GMOs?

3. What does toxicology study in the context of lab safety?

4. What is disinfection?

5. What is a patent?

6. What is industrial design?

7. What is a patent application?

8. What is a provisional patent application?

9. What is bioethics? Give one example of a bioethical issue.

10. Mention two ethical concerns regarding the environmental release of GMOs.

Part B (5 × 5 = 25)

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

11. (a) What are Biological Safety Cabinets (BSCs)? Describe their role in primary containment of biohazards.

Or

(b) What is GEAC? Explain its role in GMO applications in food and agriculture.

12. (a) Discuss the major chemical hazards encountered in laboratories and their safe handling practices.

Or

(b) Explain the risks associated with handling human or animal cells and tissues in a laboratory setting.

13. (a) What are the recent amendments to the Indian Patent Act 1970?

Or

(b) Write short notes on the patentability of microorganisms and plant varieties.

14. (a) Explain the process of patent filing in India.

Or

(b) Brief on the concept of patent infringement.

15. (a) Describe the biosynthesis of heme with a diagram.

Or

(b) What was the Human Genome Project? Discuss any two major ethical issues associated with it.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain in detail an overview of Biosafety.

17. Describe the history of Biosafety in Microbiology and Molecular Biology.

18. Define Intellectual Property Rights (IPR) and explain its different forms.

19. Explain the different types of patent applications such as provisional and complete specifications.

20. Explain the ethical controversies involved in stem cell research. Differentiate between embryonic and adult stem cell research from an ethical standpoint.

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S–3434

Sub. Code
23MBC4S1

M.Sc. DEGREE EXAMINATION, APRIL 2026

Fourth Semester

Biochemistry

DEVELOPMENTAL BIOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define stem cell.
2. What is genomic imprinting?
3. Define zygote.
4. What is the function of genes is Drosophila development?
5. What is pluripotency?
6. Define neuronal tissues.
7. What kind of organism is Dictyoslelium?
8. Define metamorphosis.
9. What is meant by cell death?
10. Define senescence.

Part B (5 × 5 = 25)

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

11. (a) Compare and contrast the processes of determination and differentiation.

Or

(b) Explain the role of transgenic organisms in studying developmental processes.

12. (a) Describe the stages of Embryogenesis.

Or

(b) Explain in detail Axis formation.

13. (a) Discuss about the applications in modern clinical science.

Or

(b) List out the difference between Embryonic and adult stem cell.

14. (a) Discuss about the organogenesis of chick.

Or

(b) Compare and contrast the mechanisms of sex determination in Drosophila and larval.

15. (a) Write a short Note on disease biomarkers and how are they classified.

Or

(b) Describe the role of transcription factors in cell fate determination.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe in detail about mutants and transgenicsin analysis in developmental biology.

17. Write a short note on fertilization and formation of zygote.

18. Give an account on transplantation of engineered cells.

19. Describe the process of all aggregation and differentiation in Dictyostelium.

20. Discuss about cellular senescence and Explain its molecular mechanism.

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