D 13095 (Pages : 2) Name.....

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, NOVEMBER 2021

(CBCSS)

Biochemistry

BCH1C03—MICROBIOLOGY AND IMMUNOLOGY

(2019 Admission onwards)

Time : Three Hours Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend* **all** *questions in each section.*
2. *The minimum number of questions to be attended from the Section / Part shall remain the same.*
3. *The instruction if any, to attend a minimum number of questions from each sub section / sub part / sub division may be ignored.*
4. *There will be an overall ceiling for each Section / Part that is equivalent to the maximum weightage of the Section / Part.*

Part A (Short Answers)

Answer any **four.**
Weightage 2 each.

1. Identify some structural features unique to viruses.
2. What is phase contrast microscopy ?
3. How are auxotrophs different from their wild type relatives ?
4. Differentiate between antigens and immunogens.
5. Identify the primary lymphoid organs.
6. What is haemagglutination ? Comment on its application.
7. Briefly comment on the role of institutional biosafety committee.

(4 × 2 = 8 weightage)

Part B (Short Essay)

Answer any **four.**
Weightage 3 each.

8. Elaborate on the types of bacterial media.
9. Give an account of the culture methods to be followed for anaerobic bacteria.
10. How does virus attack bacteria? Explain with example.
11. Differentiate between passive and active immunity.
12. Give an account of the structural details of immunoglobins.
13. Write a short essay on antigen presentation and the role of MHC in it.
14. Discuss on the mechanisms of complement activation and their importance.

(4 × 3 = 12 weightage)

Part C (Long Essay)

Answer any **two.**
Weightage 5 each.

15. Explain in detail the bacteriological techniques for detecting water quality.
16. Give a detailed account on the cooperation between B and T cells in acquired immunity.
17. What is graft rejection? Comment on the cells involved and their mechanism of action.
18. Write an essay on the relevance of biosafety in biotechnology research.

(2 × 5 = 10 weightage)

D 13094 (Pages : 2) Name.....

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, NOVEMBER 2021

(CBCSS)

Biochemistry

BCH 1C 02—STRUCTURAL BIOLOGY, BIOINFORMATICS AND BIOSTATISTICS

(2019 Admission onwards)

Time : Three Hours Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend* **all** *questions in each section.*
2. *The minimum number of questions to be attended from the Section / Part shall remain the same.*
3. *The instruction if any, to attend a minimum number of questions from each sub section / sub part / sub division may be ignored.*
4. *There will be an overall ceiling for each Section / Part that is equivalent to the maximum weightage of the Section / Part.*

Part A (Short Answers)

Answer any **four** *questions.*
Weightage 2 *each.*

1. What are torsion angles ?
2. Explain the term "supercoiling".
3. Define Tm value.
4. Explain the chemical nature of zinc fingers.
5. Comment on the applications of data mining in bioinformatics.
6. Discuss on molecular docking.
7. What is the significance of Standard deviation ?

(4 × 2 = 8 weightage)

Part B (Short Essay)

Answer any **four** *questions.*
Weightage 3 *each.*

8. What are the features of a peptide bond ?
9. Discuss on the advantages of protein engineering.

Turn over

10. Write a short note on the structure of tRNA.
11. Discuss on the importance of crystallography in structural biology.
12. Give an outline on structural classification of Proteins database.
13. Explain the term "homology modelling".
14. Define the term 'Hypothesis'. How is Student's t test connected with it ?

(4 × 3 = 12 weightage)

Part C (Long Essay)

Answer any **two** *questions.*
Weightage 5 *each.*

15. Briefly outline the structural organisation of proteins
16. Describe the structure and conformation of nucleic acids- DNA and RNA.
17. Discuss in detail, the applications of biological databases.
18. Explain the principle and practice of the various statistical methods employed in biological research.

(2 × 5 = 10 weightage)

D 13093 (Pages : 2) Name.....

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, NOVEMBER 2021

(CBCSS)

Biochemistry

BCH IC 01—ANALYTICAL BIOCHEMISTRY AND BIO-ANALYTICAL TECHNIQUES

(2019 Admission onwards)

Time : Three Hours Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend* **all** *questions in each section.*
2. *The minimum number of questions to be attended from the Section / Part shall remain the same.*
3. *The instruction if any, to attend a minimum number of questions from each sub section / sub part / sub division may be ignored.*
4. *There will be an overall ceiling for each Section / Part that is equivalent to the maximum weightage of the Section / Part.*

Part A (Short Answers)

Answer any **four** *questions.*

Weightage 2.

1. List the types of ion exchange resins with example.
2. Define exclusion limit and void volume.
3. What are photometric detectors ?
4. Differentiate between accuracy and precision.
5. Differentiate between northern, southern and western blotting.
6. Write the principle behind the technique of affinity chromatography.
7. Define any *two* units of radioactivity.

(2 × 4 = 8 weightage)

Part B (Short Essay)

Answer any **four** *questions.*

Weightage 3.

8. Give a brief description about types of samples.
9. Explain flow cytometry.
10. Give a brief account of the working of a density gradient centrifuge.
11. Explain Radioimmunoassay and its applications.
12. Give a brief description on capillary electrophoresis.
13. List out the applications of gel filtration chromatography.
14. Write a short essay on ESR spectroscopy.

(3 × 4 = 12 weightage

Part C (Long Essay)

Answer any **two** *questions.*

Weightage 5.

15. Discuss in detail the instrumentation, working and applications of HPLC.
16. Give a detailed account of MALDI-TOF Mass Spectroscopy.
17. Discuss in detail the applications of radioactive isotopes in biological research.
18. Give a detailed account on the methods for collection and preservation of clinical samples.

(5 × 2 = 10 weightage)

D 12273 (Pages : 2) Name.....

Reg. No.....

FIRST SEMESTER P.G. DEGREE EXAMINATION, NOVEMBER 2021

(CCSS)

Biochemistry

BCH 1C 03—MICROBIOLOGY AND IMMUNOCHEMISTRY

(2019 Admissions)

Time : Three Hours Maximum : 80 Marks

Section A

Answer **all** *questions in two* **or** *three sentences.*
Each question carries 2 *marks.*

1. Give general characteristics of cyanobacteria.
2. Define burst time and burst size of phage.
3. Name a bacterial media and give its constituents.
4. Define Generation time.
5. How will you measure growth of bacteria indirectly ?
6. Mention basic approaches to food preservation.
7. Differentiate biodegradation and bioaugmentation.
8. What are bioreactors ? Give any three microbes that cause biofouling.
9. Give the sources for production of penicillin.
10. Mention role of interferon in innate immunity.
11. Draw the structure of any one of pattern recognition receptor.
12. Differentiate primary and secondary immune response.
13. Name a professional antigen presenting cell and why it is called so.
14. Why cytokines are called pro or anti-inflammatory ?
15. Give the structural significance of antigen binding groove of MHC class II.
16. Write note on TCR-CD3 complex.
17. Define affinity maturation.
18. Mention the role of recombination signal sequences.
19. Give the principle of indirect ELISA.
20. Name one systemic autoimmune disease and give role of TCR in autoimmunity.

(20 × 2 = 40 marks)

Turn over

Section B

Answer any **five** *questions.*
Each question carries 8 *marks.*

21. Describe different sterilization methods used in the laboratory.

22. Draw a growth curve of bacteria and explain how growth of bacteria is measured.

23. Explain how microbes degrade industrial wastes.

24. Illustrate the molecular mechanism of innate immune response.

25. Explain the processing and presentation of endogenous antigen by cytosolic pathway.

26. Describe genetics of immunoglobulin.

27. Elaborate the method of determination of antigen or antibody by immunohistochemistry.

(5 × 8 = 40 marks)

D 12272 (Pages : 2) Name.....

Reg. No.....

FIRST SEMESTER P.G. DEGREE EXAMINATION, NOVEMBER 2021

(CCSS)

Biochemistry

BCH 1C 02—BIOLOGICAL MACRO MOLECULES AND STRUCTURAL BIOLOGY

(2019 Admissions)

Time : Three Hours Maximum : 80 Marks

Section A

Answer **all** *questions in two* **or** *three sentences.*
Each question carries 2 *marks.*

1. Give the general structure of prostaglandins.
2. Comment on the importance of molecular chaperons.
3. State Bragg's law.
4. How are cerebrosides, globosides and gangliosides structurally different ?
5. What are the characteristics of a peptide bond ?
6. List out the different types of lasers.
7. Brief on the functions of glycolipids.
8. Give the principle of TEM.
9. Brief on the structure of chitin.
10. Give the significance of H1 histone.
11. List out the functions of glycosaminoglycans.
12. Write brief note on LINES.
13. What is Lasik ?
14. Comment on the characterization of polysaccharides isolated from biological system.
15. Give the significance of surfactants in biological system. Cite an example.
16. Give a brief description on Cot curve.

17. How are pseudogenes different from genes ?

18. Comment on the similarity and difference between starch and glycogen.

19. How are lasers important in medicine ?

20. Give the mechanism of action of one sex hormone.

(20 × 2 = 40 marks)

Section B

Answer any **five** *of the following.*
Each question carries 8 *marks.*

21. Discuss on the structural and functional aspects of hemoglobin and myoglobin.

22. Write short note on phosphatidyl derivatives.

23. Elaborate on the structure and function of tRNA.

24. Detail the structure and function of Hyaluronic acid and heparin.

25. Detail the principle and instrumentation of AFM.

26. Briefly discuss on the supercoiling of DNA and its significance.

27. How are thromboxanes synthesized ? What are its physiological functions ?

(5 × 8 = 40 marks)

D 12271 (Pages : 2) Name.....

Reg. No.....

FIRST SEMESTER P.G. DEGREE EXAMINATION, NOVEMBER 2021

(CCSS)

Biochemistry

BCH 1C 01—ANALYTICAL BIOCHEMISTRY

(2019 Admissions)

Time : Three Hours Maximum : 80 Marks

Section A

Answer **all** *questions in two* **or** *three sentences.*
Each question carries 2 marks.

1. Derivatisation of samples is carried out before some analysis. Why ?
2. What do mean by calibration. Explain with an example.
3. What is the principle of paper chromatography ?
4. How will find out the molecular weight using gel filtration.
5. State the applications of flow cytometry ?
6. Write the different methods used to detect proteins after electrophoresis.
7. What is the principle of NMR ?
8. Describe the principle of FISH.
9. Describe the principle of Northern blotting.
10. What is the principle of electrophoresis ?
11. What are the applications of MALD TOF MS ?
12. What are the hazards of radio activity ?
13. What is centrifugal force ?
14. Define Rf value in chromatography.
15. What are the advantages of gradient gels ?
16. What is the full form of CCD camera ? What is its application in histopathology ?

17. What is the principle of autoradiography ?

18. Name the components of a typical HPLC unit.

19. Define Cerenkov radiation.

20. What is the basic principle of interference microscope ?

(20 × 2 = 40 marks)

Section B

Answer any **five** *questions.*
Each question carries 8 *marks.*

21. What are the applications of radio isotopes in biology and medicine ?

22. Describe the principle and applications of Western Blotting.

23. Write an essay on ultracentrifugation.

24. Describe the design, working and applications of pH meter.

25. Describe the principle and working of compound microscope. How is it different from phase contrast microscope ?

26. Give an account of histopathological studies.

27. Explain a) IR spectra ; b) Raman spectra ; and c) Fluorescence spectra.

(5 × 8 = 40 marks)