

Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :2

P1504

[5224] - 101

M.Sc.

BIOCHEMISTRY

BCH - 170: Biomolecules

(2013 Pattern) (Credit system) (Semester - I)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Answer to both section should be written on separate answer sheets.*
- 2) Question 4 and Q.8 are compulsory.*
- 3) Attempt any two questions from Q1 to Q3 and any two from Q5 to Q7.*
- 4) Figures to the right indicate full marks.*

Biomolecules - I

Q1) Answer the following.

- a) What are macromolecules? Explain their monomeric units. [3]
- b) What are deoxy sugars? Describe with an example. [3]
- c) Write note on biological significance of carbohydrates. [4]

Q2) Answer the following.

- a) What are LDL? Explain in short. [2]
- b) Write an account on water soluble vitamins. [4]
- c) Describe interaction of biomolecules in aqueous system. [4]

Q3) Answer the following

- a) What are disaccharides? Explain with examples and biological role. [3]
- b) Describe general reactions of carbohydrates. [5]
- c) Explain lysosomes in short. [2]

P.T.O.

Q4) Answer any one of following. [5]

- a) What are lipids? Classify with suitable example.
- b) Describe fat soluble vitamins in detail.

Biomolecules - II

Q5) Answer the following:

- a) Amino acids act as builter ion. Explain. [3]
- b) Explain the importance of hydrogen bond in stabilizing the secondary and tertiary structure of protein. [3]
- c) Write note on tertiary structure of proteins with reference to unfolding / refolding experiment. [4]

Q6) Answer the following:

- a) What are the different structural levels of protein. [2]
- b) Explain the classification of amino acids. [4]
- c) Write note on super secondary structure of protein. [4]

Q7) Answer the following:

- a) Distinguish between α - helical and β -sheet structure of proteins. [5]
- b) Elaborate the importance of primary structure. [3]
- c) Define peptide bond. [2]

Q8) Answer any one of the following: [5]

- a) Write note on quaternary structure of proteins.
- b) Explain peptide synthesis.



Total No. of Questions : 8]

SEAT No. :

P1505

[5224]-102

[Total No. of Pages : 2

M.Sc.

BIOCHEMISTRY

BCH - 171 : Enzymology and Biophysical Techniques

(2013 Pattern) (Semester - I) (Credit System)

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *Answer to both the sections should be written on separate sheets.*
- 2) *Question no. 4 and 8 are compulsory.*
- 3) *Attempt any two questions from Q. 1 to Q. 3 and any two from Q. 5 to Q. 7.*
- 4) *Figures to the right indicate full marks.*

SECTION - I

(Enzymology)

Q1) Answer the following:

- a) Define apoenzyme and holoenzyme. [2]
- b) What is the effect of change in substrate concentration on enzyme catalyzed reaction. [4]
- c) Experimentally how it is proved that enzyme catalyzed reaction goes via double displacement mechanisms. [4]

Q2) Attempt the following:

- a) What is the effect of competitive, non-competitive and uncompetitive inhibitors on Lineweaver-Burk plot? [3]
- b) Explain the regulation of metabolic pathways by covalent modification of enzymes. [3]
- c) What do you understand by zymogens? What is the importance of the zymogens. [4]

Q3) Answer the following:

- a) Explain in brief the role of the three amino-acid residues in the catalytic triad of chymotrypsin. [2]
- b) What is mean by saturation kinetics? [3]
- c) Discuss ubiquitin mediated protein degradation. [5]

P.T.O.

Q4) Attempt any one of the following:

- a) Describe the allosteric behavior of phosphofructokinase. [5]
- b) How do the difference in specificity of chymotrypsin & other related protease arise. [5]

SECTION - II

(Biophysical Techniques)

Q5) Attempt the following:

- a) What is the principle of electrophoresis. [2]
- b) Write a note on DNA cellulose chromatography. [4]
- c) Describe the principle and applications of HPLC. [4]

Q6) Attempt the following:

- a) Describe any one application of size exclusion chromatography. [3]
- b) Write a note on southern transfer. [3]
- c) In what important properties, the sephadex and sephacryl gels differ from each other. [4]

Q7) Answer the following:

- a) Why is it important to prepare a standard curve for quantitative analysis by spectrophotometer? [2]
- b) How are proteins eluted from affinity chromatography? [3]
- c) Describe the principle and method of ion. Exchange chromatography. [5]

Q8) Attempt any one of the following:

- a) What is reverse dialysis? Give its significance. [5]
- b) Describe the principle, method and applications of hydroxyapetite chromatography. [5]



Total No. of Questions : 8]

SEAT No. :

P1506

[5224]-103

[Total No. of Pages : 2

M.Sc.

BIOCHEMISTRY

**BCH-172 : Microbiology and Cell Biology
(2013 Pattern) (Semester - I) (Credit System)**

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *Answer to both the section should be written on separate answer sheets.*
- 2) *Question No. 4 and 8 are compulsory.*
- 3) *Attempt any two questions from Q.1 to Q.3 and any two from Q.5 to Q.7.*
- 4) *Figures to the right indicate full marks.*

SECTION-I

(Microbiology)

Q1) Answer the following.

- a) Explain the principle of gram staining. [2]
- b) What do you understand by growth curve. [5]
- c) Why oxygen is toxic to anaerobic bacteria. [3]

Q2) Answer the following.

- a) Give the classification of Viruse. [3]
- b) Explain the structure and arrangement of flagella. [4]
- c) Give the characteristic of an ideal antimicrobial agents. [3]

Q3) Attempt the following.

- a) Define the term toxin. [2]
- b) What are different chemical and physical agents for control of micro-organism. [4]
- c) Explain symbiotic and non-symbiotic nitrogen fixation. [4]

Q4) Answer any one of the following.

- a) Discuss the oxygen and temperature requirement for growth of bacteria. [5]
- b) Name the different sterilization techniques used. Why moist heat is more effective than dry heat during sterilization. [5]

P.T.O.

SECTION-II

(Cell Biology)

Q5) Answer the following.

- a) Enlist the differences between prokaryotic and eukaryotic cells? [3]
- b) Describe structure and function of plasma membrane. [3]
- c) Write note on different phases of mitosis. [4]

Q6) Answer the following.

- a) Write note on cytoskeleton and its components. [5]
- b) Explain in brief about spermatogenesis and oogenesis with an illustration. [3]
- c) Why are mitochondria termed as the “power house” of cell? [2]

Q7) Answer the following:

- a) Differentiate between active and passive transport. [2]
- b) Write note on differential centrifugation. [3]
- c) What is stem cell and what are the major types of stem cells. [5]

Q8) Answer any one:

- a) Define term cell cycle. Elaborate on difference between mitosis and meiosis. [5]
- b) Write note on fungi & its biological importance. [5]



Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :2

P1507

[5224] - 201

M.Sc.

BIOCHEMISTRY

BCH - 270: Bioenergetics and Metabolism

(2013 Pattern) (Credits System) (Semester - II)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *Answer to both the sections should be written on separate answer sheet.*
- 2) *Question No.4 and 8 are compulsory.*
- 3) *Attempt any two questions from Q.1 to Q.3 and any two from Q.5 to Q.7.*
- 4) *Figures to the right indicate full marks.*

SECTION - I

Bioenergetics and Metabolism - I

Q1) Answer the following.

- a) What is the fate of pyruvate in anaerobic condition. [2]
- b) Give the biosynthesis of triglycerides in detail. [3]
- c) Discuss beta oxidation of odd number carbon atoms. [5]

Q2) Attempt the following.

- a) List out the irreversible reaction in glycolysis. [2]
- b) Show the entry of sugars other than glucose into glycolysis and give their Significance. [5]
- c) Give an account of glycogen storage diseases. [3]

Q3) Answer the following.

- a) Define gluconeogenesis. List out the gluconeogenic precursors. [3]
- b) Elaborate on the pathway that leads to formation of glucuronate and ascorbic acid. [3]
- c) "Although O_2 is not involved in any step of TCA cycle yet the cycle is aerobic". Explain. [4]

P.T.O.

Q4) Answer any one of the following.

- a) Tabulate the glycogen storage disease with details of defective enzymes and clinical features [5]
- b) Explain all the reactions involved in the conversion of lactic to glucose. [5]

SECTION - II

(Metabolism)

Q5) Answer the following

- a) Write note on urea cycle. [4]
- b) Give role of tetrahydrofolate in amino acid biosynthesis. [3]
- c) Explain role of nucleolids coenzyme in biosynthesis of nucleosides. [3]

Q6) Answer the following

- a) What is role of amino acid in GABA synthesis. [2]
- b) What is de novo pathway? Explain with by thymine and cytacine biosynthesis. [4]
- c) Explain role of PRPP in nucleotide biosynthesis [4]

Q7) Answer the following.

- a) What in transamination? Explain. [2]
- b) What in gout? Explain in detail. [3]
- c) Describe non-ribosomal Protein biosynthesis [5]

Q8) Answer any one of the following. [5]

- a) Write note on purine biosynthesis
- b) Write note on inborn error of metabolism.



Total No. of Questions : 8]

SEAT No. :

P1508

[5224]-202

[Total No. of Pages : 2

M.Sc.

BIOCHEMISTRY

**BCH - 271 : Techniques in Characterization of Biomolecules
(2013 Pattern) (Semester - II) (Credit Systems)**

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) Answer to both section should be written on separate answer sheet.*
- 2) Question No. 4 and 8 are compulsory.*
- 3) Attempt any two questions from Q.1 to Q.3 and any two from Q.5 to Q.7.*
- 4) Figures to the right indicate full marks.*

SECTION-I

Biophysical Methods

Q1) Answer the following.

- a) What is sedimentation velocity. [2]
- b) Describe any one application of ultra centrifugation. [3]
- c) Explain partial specific volume and the diffusion coefficient. [5]

Q2) Attempt the following.

- a) Write a note on interaction of radiation with matter. [2]
- b) Explain the factors that governs the choice of emitter emulsion and isotope.
Add note on resolution. [5]
- c) Write a note on Ostwald's capillary viscometer. [3]

Q3) Answer the following.

- a) Explain stripping film method of auto radiography. [3]
- b) Give the theory and application of X-ray. [5]
- c) Give the principle of liquid scintillation counter. [2]

P.T.O.

Q4) Answer any one of the following.

- a) How will you prove by sedimentation that DNA is single stranded break. [5]
- b) Define sedimentation coefficient. Explain the effect of shape on it. [5]

SECTION-II

Structure Determination of Biomolecules

Q5) Answer the following.

- a) Explain the theory of fluorescence. [2]
- b) Give the steps involved in sample preparation of MALDI. [4]
- c) Why emission occurs at longer wavelength than absorption? Explain the quantum yield. [4]

Q6) Attempt the following.

- a) What is meant by chemical shift in NMR. [2]
- b) Give the advantage of LCMS over GCMS. [4]
- c) Give the principle of ESR and properties of ESR spectra. [4]

Q7) Answer the following.

- a) What is bioluminescence. [2]
- b) Explain transducer system suitable for development of the biosensors. [4]
- c) Discuss the equipment used in circular Dichroism. [4]

Q8) Answer any one of the following.

- a) Magnet is the heart of NMR. Explain why? [5]
- b) Give the principle, working and application of ORD. [5]



Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :3

P1510

[5224] - 203

M.Sc.

BIOCHEMISTRY

BCH-273: Membrane Biochemistry and Genetics

(2013 Pattern) (Semester - II) (Credit System)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *Answers to both sections should be written on separate answer sheets.*
- 2) *Question No. 4 and 8 are compulsory.*
- 3) *Attempt any two questions from Q1 to Q3 and any two from Q5 to Q7.*
- 4) *Figures to the right indicate full marks.*

SECTION - I

(Membrane Biochemistry)

Q1) Answer the following :

- a) Explain with example modes of peneration of antimicrobial agents. [3]
- b) Explain sodium potassium channels. [3]
- c) Explain various nodes used for explaining membrane structure. [4]

Q2) Answer the following :

- a) What is ADP - ATP exchanger system. [2]
- b) Write note on receptor mediated endocytosis. [3]
- c) Explain ABC transporters and their role. [5]

P.T.O.

- Q3)** Answer the following : [10]
- a) Write note on gramicidin. [2]
 - b) Give role of temperature in maintaining fluidity of membrane. [4]
 - c) What is Uniport Antiport Symport mechanism. [4]

- Q4)** Attempt any one of the following : [5]
- a) What are different types of membrane models. Explain.
 - b) What is calcium pump. Give its significance.

SECTION - II

(Genetics)

- Q5)** Answer the following :
- a) Write short note on complementation test. [3]
 - b) Define mutagen and explain different types of mutagens. [3]
 - c) Write note on bacterial conjugation. [4]

- Q6)** Answer the following :
- a) Explain B - form of DNA. [3]
 - b) Write note on Mfr strains. [3]
 - c) Write note on genetic mutations. [4]

Q7) Answer the following :

- a) Explain genetic code in degenerate. **[3]**
- b) Explain duplication with reference to globin gene families. **[3]**
- c) Discuss experimental evidence that proved DNA as genetic material in virus. **[4]**

Q8) Explain any one in detail : **[5]**

- a) Write note on mutant isolation & selection.
- b) Explain Mendelian laws of inheritance with examples.



Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :4

P1509

[5224] - 204

M.Sc.

BIOCHEMISTRY

BCH-272: Biostatistics Computer and Bioinformatics

(2013 Pattern) (Semester - II) (Credit System)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *Answer to both the section should be written on separate answer sheets.*
- 2) *Question No. 4 and 8 are compulsory.*
- 3) *Attempt any two questions from Q. 1 to Q. 3 and any two from Q. 5 to Q.7.*
- 4) *Figures to the right indicate full marks.*
- 5) *Supplementary will be provided for checking P - values.*
- 6) *Graph paper will be provided.*

SECTION - I

Biostatistics and Computers

Q1) Answer the following :

- a) Calculate the geometric mean of the following. [3]

Variable	12	13	14	15	16	17
Frequency	4	7	12	15	6	2

- b) Find the cumulative and relative frequency of the following data. [5]

No. of Pods.	No. of Plants
10 - 20	6
21 - 30	25
31 - 40	15
41 - 50	20
51 - 60	10

- c) Give importance of biostatistics with reference to biochemistry. [2]

P.T.O.

Q2) Attempt the following :

- a) Find out the median from the following data. **[2]**

Number of plants → 39, 33, 42, 40, 37, 12, 20, 80, 19, 10.

- b) Draw the histogram of the following data and mention its distribution shape. **[4]**

No. of Pods.	No. of Plants
0 - 6	4
6 - 12	8
12 - 18	15
18 - 24	20
24 - 30	12

- c) Calculate the standard deviation and standard error of data on waxy endospermic plants recorded in maize. **[4]**

Waxy endo spermic plants	7	8	9	10	11	13
No. of plants	13	13	18	17	15	16

Q3) Answer the following :

- a) Draw a percentage bar diagram and a pie diagram of the following data relating to the areas under cultivation of different crops in Maharashtra in the year 2012 - 2013. **[5]**

Crops	Wheat	Bajra	Rice	Jowar	Maize
Area in thousand hectars	3123	2572	324	350	600

- b) The following data represents the number of productive tillers per plant of a wheat variety. Calculate the mean number of tillers per plants. [2]

Number of productive tillers = 9, 8, 20, 25, 18, 99, 7, 2, 70.

- c) An average of 10 litre of milk is given by a buffalo every day. Assuming this to be a poisson distribution. What is the probability that exactly 6, 7, 8 and 9 litre of milk is given per day by the buffalo? [3]

Q4) Answer any one of the following :

- a) What is an operator? Explain the arithmetic, relational, logical and assignment operator in 'C' language. [5]
- b) Define the terms Hardware and software and give the difference between hardware and software. [5]

SECTION - II

(Bioinformatics)

Q5) Answer the following :

- a) Distinguish between orthologous and paralogous genes. [2]
- b) State the salient features of any protein 3D structure visualization software. [4]
- c) What is dynamic programming? Explain [4]

Q6) Attempt the following :

- a) What do you mean by global and local alignment. [3]
- b) Explain BLAST and FASTA. [5]
- c) Write a note on Homology. [2]

Q7) Answer the following :

- a) Explain PAM matrices. **[3]**
- b) With respect to the Gen Bank, explain the need of curation and annotation of databases. **[3]**
- c) What is Needleman and Wunsch algorithm? Explain. **[4]**

Q8) Answer any one of the following :

- a) What are protein sequence database? Explain the major protein databases in detail. **[5]**
- b) Explain how sequence data is generated for expressed sequence Tags database division of NCBI. **[5]**



Total No. of Questions :6]

SEAT No. :

[Total No. of Pages :2

P1511

[5224] - 301

M.Sc.

BIOCHEMISTRY

BCH - 370: Molecular Biology

(2013 Pattern) (Credit system) (Semester - III)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) neat diagrams must be drawn wherever necessary.*
- 2) Figures to the right indicate full marks.*
- 3) Solve any three questions from Q1 to Q4.*
- 4) Question 5 and 6 are compulsory.*

Q1) Explain the following.

- a) Role of ligase and topoisomerase. **[2]**
- b) Mechanism of Base excision repair system. **[3]**
- c) Role of RecA and RuvB involved in recombination. **[2]**
- d) RNA editing? **[3]**

Q2) Answer the following.

- a) Explain role and significance of t-RNA in translation. **[3]**
- b) Give the significance of 3' polyA tailing. **[3]**
- c) Explain alternative splicing. **[4]**

Q3) Answer the following

- a) Write note on bacterial transposable element. **[3]**
- b) Give mechanism and significance of DNA methylation. **[3]**
- c) Write note role of DNA polymerase in replication. **[4]**

P.T.O.

Q4) Answer the following.

- a) What are LINE? Give example. [2]
- b) Give significance of protein targeting. [3]
- c) What is replication fork? [2]
- d) Write note on inhibitors of protein synthesis. [3]

Q5) Attempt any 2.

- a) MRNA differs functionally in prokaryotes and eukaryotes. Explain. [5]
- b) Write note on mitochondrial transportation of protein. [5]
- c) What are retrotransposons. Give mechanism of their transposition. [5]

Q6) Attempt any 2.

- a) Explain targeting of protein to mitochondria and Endoplasmic reticulum. [5]
- b) What are retrovirus? Explain HIN1 in detail. [5]
- c) Proteins are modified before targeting or transportation. Explain. [5]



Total No. of Questions :8]

SEAT No. :

P1512

[5224]-302

[Total No. of Pages : 2

M.Sc.

BIOCHEMISTRY

**BCH - 371 : Medical Biochemistry and Immunology
(2013 Pattern) (Credit System) (Semester - III)**

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *Neat labelled diagrams must be drawn wherever necessary.*
- 2) *Figures to the right indicate full marks.*
- 3) *Question 4 & 8 are compulsory.*
- 4) *Solve any two questions from Q.No.1 to 3 and any two questions from Q.No.5 to 7.*

SECTION-I

(Medical Biochemistry)

Q1) Answer the following:

- a) Give any two basic approaches by WHO for control of cancer. [2]
- b) Discuss the mechanism of action of streptomycin and Tetracycline.[4]
- c) Elaborate on the role of isoenzymes in the diagnosis of heart diseases.[4]

Q2) Answer the following:

- a) Name any two causes of hemoglobinopathier. [2]
- b) Discuss the mode of transport of drugs in bacterial cell. [4]
- c) Explain the role of hydrolytic enzymes of lysosomes. [4]

Q3) Answer the following:

- a) Write the normal composition of CSF and list out two abnormal components that are seen in CSF during pathological conditions. [4]
- b) Define the term analgesics. Give their mechanism of action with suitable examples. [4]
- c) Define carcinogeon. [2]

P.T.O.

Q4) Attempt any one of the following. [5]

- a) Explain molecular genetics of cancer.
- b) Elaborate on causative agents that lead to carcinogenesis.

SECTION-II

(Immunology)

Q5) Answer the following:

- a) Explain graft rejection. [2]
- b) Give the structure of antibody and list out the types of antibodies with their features. [4]
- c) Compare ELISA with RIA. [4]

Q6) Answer the following

- a) What are interferons. [2]
- b) Explain antigen- Antibody reaction in detail. [4]
- c) Where do T cells and B cells mature in the body? How are they responsible for desired immune response of the host system. [4]

Q7) Answer the following

- a) What is autoimmune disease. [2]
- b) Describe MHC molecules in detail. [4]
- c) Explain complement system. [4]

Q8) Answer any one of the following: [5]

- a) Explain blood group substances
- b) Compare and contrast cell mediated immunity with humoral immunity.



Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :3

P1513

[5224] - 303

M.Sc.

BIOCHEMISTRY

**BCH-372: Neurochemistry and Biochemistry of Specialized Tissues
(2013 Pattern) (Credit System) (Semester - III)**

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *Answers to the two sections should be written in separate answer books.*
- 2) *Question no 4 and 8 are compulsory.*
- 3) *Attempt any two questions from Q. 1 to Q.3 and any two questions from Q.5 to Q.7.*
- 4) *Figures to the right side indicate full marks.*

SECTION-I

(Neurochemistry)

Q1) Answer the following:

- a) What are the specificity and selectivity of AMPA glutamate receptor? [2]
- b) Describe the role of biomolecules involved in circadian rhythms. [4]
- c) Explain the functional summary of the autonomic nervous system. [4]

Q2) Attempt the following:

- a) Describe the different ways to classify sensory receptors. [3]
- b) What is the blood-brain barrier, and what is its clinical importance? [3]
- c) Describe the effect of any two neurotransmitters. [4]

Q3) Answer the following:

- a) Write a note on Cerebrospinal fluid. [2]
- b) What is the myelin sheath? How is it produced in the CNS? What role does it play propagating an action potential? [3]
- c) Describe the organization of the nervous system. [5]

P.T.O.

Q4) Attempt any one of the following:

- a) Explain the steps involved in the synthesis and storage of any two neurotransmitters. [5]
- b) Name the parts of CNS which constitute brain stem. What are the general functions of nervous system? [5]

SECTION-II

(Biochemistry of Specialized Tissues)

Q5) Answer the following

- a) How can proton flow across a membrane drive mechanical rotation of flagellum? [2]
- b) Describe the steps between the times an impulse reaches the terminal knob of a pre-synaptic neuron and an action potential is initiated in a post synaptic cell. [4]
- c) How does the motion of the hair bundle create a change in membrane potential in inner ear? [4]

Q6) Attempt the following

- a) List the three layers of the eye and the main functions of each layer. [3]
- b) Write a note on creation and propagation of nerve impulses. [3]
- c) Describe the sequence of events in which a molecule that comes in contact with mucus of the epithelium initiates an action potential. [4]

Q7) Answer the following:

- a) What are nerve toxins? Explain with example. [2]
- b) Write short note on primary events in visual excitation. [3]
- c) Describe the structure, properties and function of microtubule. [5]

Q8) Attempt any one of the following:

- a) Describe briefly major aspects of the structure, properties, locations and functions of each of the following proteins of skeletal muscle: Actin, Myosin, Titin, Nebulin, Troponin. **[5]**
- b) Discuss the classification of neuron on the basis of their morphology, function and by the neurotransmitter released. **[5]**

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Total No. of Questions : 8]

SEAT No. :

[Total No. of Pages : 2

P1514

[5224] - 304

M.Sc.

BIOCHEMISTRY

**BCH : 373 - Toxicology and Plant Biochemistry
(2013 Pattern) (Semester - III) (Credit System)**

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *Answer to both the sections should be written on separate sheets.*
- 2) *Question No. 4 and 8 are compulsory.*
- 3) *Attempt any two questions from Q.1 to Q.3 and any two from Q.5 to Q.7.*
- 4) *Figures to the right indicate full marks.*

SECTION - I

(Toxicology)

Q1) Answer the following:

- a) Write the principle of toxicology. [2]
- b) Explain local verses systemic toxicity. [4]
- c) Explain AIMS Test. [4]

Q2) Answer the following:

- a) Give the classification of toxic agents. [2]
- b) What are the toxic effects of DDT? Explain the pathogenesis of these effects. [4]
- c) Explain with suitable example the process of bioactivation. [4]

Q3) Answer the following:

- a) What are animal and plant toxins. [2]
- b) Write a note on Teratology and reproduction. [4]
- c) Explain the component of cytochrome P450 monooxygenase system. [4]

P.T.O.

Q4) Answer any one of the following: [5]

- a) Biologic diversity plays an important role in selective toxicity of toxicants. Explain.
- b) Distinguish between:
 - i) immediate and delayed toxicity.
 - ii) Venomous and poisonous animals.

SECTION - II
(Plant Biochemistry)

Q5) Answer the following:

- a) What is plant breeding. [2]
- b) Explain Hillreaction. [4]
- c) Explain the role of calcium in plant growth. [4]

Q6) Attempt the following:

- a) What are plant hormones auxin important for? [2]
- b) Comment on cyclic and noncyclic electron flow in photosynthetic system. [4]
- c) Explain the role of rhizobium in nitrogen fixation. [4]

Q7) Answer the following:

- a) Give the schematic representation of nitrogen cycle. [2]
- b) Explain the isolation of protoplast. [4]
- c) Give the biosynthesis of starch. [4]

Q8) Answer any one of the following: [5]

- a) Explain the oxygenase activity of Rubisco.
- b) Explain the role of nitrogen on plant nutrient.



Total No. of Questions : 8]

SEAT No. :

P1515

[5224]-401

[Total No. of Pages : 2

M.Sc.

BIOCHEMISTRY

**BCH - 470 : Physiological Biochemistry and Endocrinology
(2013 Pattern) (Semester - IV) (Credit System)**

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *Answer to both the sections should be written on separate sheets.*
- 2) *Question no. 4 and 8 are compulsory.*
- 3) *Attempt any two questions from Q. 1 to Q. 3 and any two from Q. 5 to Q. 7.*
- 4) *Figures to the right indicate full marks.*

SECTION - I

Physiological Biochemistry

Q1) Answer the following:

- a) Write the anatomy of liver. [3]
- b) Explain the diagnostic tests of kidney. [3]
- c) What is the role of pepsin? Why is it secreted in an inactive form. [4]

Q2) Attempt the following:

- a) What are the major parts of a nephron. [2]
- b) Write the principles of gaseous exchange during respiration. [4]
- c) What are the digestive functions of the components of pancreatic juice. [4]

Q3) Answer the following:

- a) What is the major chemical difference between plasma and glomerular filtration. [3]
- b) How are the major salivary glands distinguished on the basis of location? [3]
- c) Explain any four functions of the liver. [4]

Q4) Attempt any one of the following:

- a) Define acidosis & alkalosis. Distinguish among respiratory and metabolic acidosis & alkalosis. [5]
- b) Describe the overall processes of digestive system. [5]

P.T.O.

SECTION - II

Endocrinology

Q5) Attempt the following:

- a) What are target cells of hormones? [2]
- b) Give the classification of anterior pituitary hormones. [4]
- c) Write short notes on adenylyl cyclase and its significance. [4]

Q6) Answer the following:

- a) What is the function of thyroglobulin? [2]
- b) Explain the difference between T_3 and T_4 . [3]
- c) What are secondary messengers and explain their role? [5]

Q7) Attempt the following:

- a) Explain the role of glucagon in carbohydrate metabolism. [3]
- b) What is ACTH? What happens if ACTH levels increases? [3]
- c) Write a note on “Hormonal Inter - relationship” with example. [4]

Q8) Answer any one of the following:

- a) What are hormones? Give their classification based on
 - i) Their chemical properties
 - ii) Secretion by different cells
 - iii) Mode of action. [5]
- b) Describe the factors involved in the regulation of synthesis of mineralocorticoids. [5]



Total No. of Questions : 8]

SEAT No. :

P1516

[5224]-402

[Total No. of Pages : 2

M.Sc.

BIOCHEMISTRY

**BCH - 471: Fermentation Technology and Tissue Culture
(2013 Pattern) (Semester - IV) (Credit System)**

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *Answer to both the section should be written on separate answer sheet.*
- 2) *Question No 4 and 8 are compulsory.*
- 3) *Attempt any two questions from Q1 to Q3 and any two question from Q5 to Q7.*
- 4) *Figures to the right indicate full marks.*

SECTION-I

Fermentation Technology

Q1) Answer the following.

- a) Enlist the various method of feedback control. [2]
- b) What is the effect of oxygen supply on product formation. [4]
- c) What are the different methods of preservation of industrially important micro- organism. [4]

Q2) Attempt the following.

- a) Explain barch culture. [2]
- b) Give the method for development of inoculum for yeast processes. [4]
- c) How micro-organism are isolated by enrichment culture techniques. [4]

Q3) Answer the following.

- a) What are anti foam. [2]
- b) Discuss biological method for effluent treatment. [4]
- c) How pencillin is manufactured by fermentation process. [4]

Q4) Attempt any one of the following. [5]

- a) Explain media optimization in delact.
- b) Give the different methods for product recovery.

P.T.O.

SECTION-II

Q5) Answer the following.

- a) What are cell repositories? Explain preservation of cell lines. [3]
- b) What is transformed cell lines? Give the characteristics of such cell lines.[3]
- c) What are secondary metabolites? Give the techniques of enhancing their production. [4]

Q6) Attempt the following.

- a) Write different steps involved in establishment of callus culture. [3]
- b) What are growth promoting substance? Explain their role in plant tissue culture. [3]
- c) Write role of following components in media. [4]
 - i) Serum
 - ii) Tryptophan
 - iii) Biotin
 - iv) Insulin.

Q7) Answer the following.

- a) Give an detail account for sterilization in plant tissue culture. [3]
- b) What are somaclonal variation. Explain their significance. [3]
- c) What do you mean by “contact inhibition? How it affects cell lines. [4]

Q8) Answer any one of following. [5]

- a) Define protoplast culture. Give protoplast of isolation and culture of protoplast.
- b) Define “primary culture” and “cell lines”. Explain maintenance of cell line.



Total No. of Questions :8]

SEAT No. :

P1517

[5224]-403

[Total No. of Pages : 2

M.Sc.

BIOCHEMISTRY

BCH - 472 : Genetic Engineering

(2013 Pattern) (Credit System) (Semester - IV)

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *Neat labelled diagrams must be drawn wherever necessary.*
- 2) *Solve section I and section II on separate answer books.*
- 3) *Solve any two from question 1 to Q.3 and any two from Q.5 to Q.7 Question 4 and Q.8 are compulsory.*

SECTION-I

Q1) Answer the following:

- a) What is transfection? [2]
- b) Write note on mammalian viral vectors. [4]
- c) Explain process of DNA footprinting. [4]

Q2) Answer the following:

- a) What are endonucleases? [2]
- b) Write note on lambda phage vector. What are its advantages over plasmid vector. [4]
- c) What are cosmids? Give its application in genetic engineering. [4]

Q3) Answer the following:

- a) What are cosmids? [2]
- b) Explain what is pyrosequencing? [4]
- c) Explain selection of transformants using x-gal medium and lac Z gene.[4]

P.T.O.

Q4) Explain in detail.

- a) Write about various ways to modify cut ends generated during cleavage by restriction enzyme. [5]

OR

- b) Write note on RNAi technology and give its applications. [5]

SECTION-II

Q5) Answer the following:

- a) What are cry proteins? [2]
b) Explain procedure of PCR and enlist its different types. [4]
c) Explain pesticide resistance with suitable example. [4]

Q6) Answer the following

- a) Give any two examples of recombinant vaccines. [2]
b) What is RNAi technology? Give its applications. [4]
c) Write short note on applications of genome annotation technique. [4]

Q7) Answer the following

- a) What are recombinant hormones? [2]
b) Explain the method of introducing mutations based on oligonucleotides. [4]
c) Give applications of genetic engineering in agriculture. [4]

Q8) Explain in detail.

- a) What is protein engineering? Write note on its applications. [5]

OR

- b) What is genomics? Explain study of transcriptome and proteome. [5]



Total No. of Questions :8]

SEAT No. :

[Total No. of Pages :2

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[5224] - 404

M.Sc.

BIOCHEMISTRY

BCH-473: Clinical Nutrition and Food Technology

(2013 Pattern) (Semester - IV) (Credit System) (Optional Course)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *Answer to both the sections should be written on separate answer sheet.*
- 2) *Question No. 4 & 8 are compulsory.*
- 3) *Attempt any two questions from Q.1 to Q.3 and two questions from Q.5 to Q.7.*
- 4) *Figures to the right indicate full marks.*

SECTION - I

(Clinical Nutrition)

Q1) Answer the following :

- a) What is acidic and alkaline food. [2]
- b) Describe the effect of food quality on mental development. [3]
- c) Describe the factors affecting digestion and absorption of food. [5]

Q2) Attempt the following:

- a) What is food toxin. [2]
- b) Explain the effect of exercise on metabolic adaptation. [5]
- c) Describe the effect of alcohol on each organ in brief. [3]

Q3) Answer the following:

- a) Explain the effect of cooking on nutritional quality of food. [3]
- b) What are the inborn errors of metabolism? Explain the management of any two inborn errors. [5]
- c) Enlist the organ affected by alcohol consumption. [2]

P.T.O.

Q4) Attempt any one of the following : **[5]**

- a) Explain the difference between natural and genetically modified food.
- b) Describe the effects of irradiation, cooking, refining sprouting and fermentation on nutritional quality of food.

SECTION - II

(Food Technology)

Q5) Answer the following:

- a) Give the food of animal and plant origin. **[4]**
- b) How will you monitor food quality. **[3]**
- c) Note on single cell proteins. **[3]**

Q6) Attempt the following:

- a) What do you mean by synthetic syrups. **[2]**
- b) What are the different enzyme used for food analysis. **[4]**
- c) How will you manufacture natural and synthetic sweeteners. **[4]**

Q7) Answer the following:

- a) Give the principle of food preservation. **[2]**
- b) Describe the different methods of starch production. **[4]**
- c) Explain about the enzymes used in meat tenderization. **[4]**

Q8) Answer any one of the following: **[5]**

- a) Give the methods for modifying food genetically.
- b) Explain the enzymes used in fruit juice technology.

