

Total No. of Questions : 8]

SEAT No. :

PD3183

[Total No. of Pages : 2

[6477]-11

M.Sc. - I

BIOCHEMISTRY

BCH-111 : Biomolecules (Organic Chemistry of Living Beings)
(2019 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.1 and Q.5 are compulsory and carry 11 marks.*
- 2) *Attempt any two questions from Q.2 to Q.4.*
- 3) *Attempt any two questions from Q.6 to Q.8.*
- 4) *Figures to the right indicate full marks.*
- 5) *Use separate answer paper sheets for both sections.*

SECTION - I

Q1) Answer the following questions : **[11]**

- a) Explain the interaction of water with NaCl, Sodium chloride with diagram. **[3]**
- b) What are amino sugars? Write its significance. **[2]**
- c) Define the term Glycolipids with example. **[2]**
- d) Write the main functions of sphingolipids. **[2]**
- e) Define the term macromolecule with example. **[2]**

Q2) Answer the following questions : **[12]**

- a) What are disacchrides? Explain the structure of sucrose and Maltose with properties. **[6]**
- b) What are fat soluble vitamins? How are they classified? Explain significance of each. **[6]**

Q3) Attempt the following questions : **[12]**

- a) What are phospholipids? Write their significance. **[3]**
- b) Define monosacchrides. How they are classified? Give example of each class. **[4]**
- c) What are fatty acids? **[2]**
- d) Write the significance of vitamin C and Vit B₁₂. **[3]**

Q4) Attempt the following, write short notes on the following : **[12]**

- a) Polysacchrides.
- b) Molecule formation & significance.
- c) Deoxy-sugar
- d) Epimers of glucose with structures.

P.T.O.

SECTION - II

Q5) Answer the following questions : [11]

- a) What is Isoelectric pH? [3]
- b) Write the structure of aromatic amino acids. [2]
- c) Enlist the colour reactions of amino acids. [2]
- d) Define the term Rare amino acids. [2]
- e) Write the importance of sanger's sequencing method. [2]

Q6) Attempt the following : [12]

- a) What are amino acids? How they classified on the basis of 'R' group? Give examples. [6]
- b) With the help of diagram explain the primary structure of protein. [6]

Q7) Answer the following questions :

- a) Define the term Titration give of amino acid Glycine? What are its significances? Explain titration curve with the help of diagram. [4]
- b) Write the names of two non polar amino acids with structure. [2]
- c) How tertiary structure of protein is stabilized ? [3]
- d) Explain 'Biuret Reaction' of protein. [3]

Q8) Write short notes on following : [12]

- a) Ramchandran Plot
- b) Solid phase synthesis of protein
- c) Structure and function of haemoglobin
- d) β pleated sheet structure of protein



Total No. of Questions : 8]

SEAT No. :

PD3184

[Total No. of Pages : 2

[6477]-12
M.Sc. - I
BIOCHEMISTRY
BCH-112 : Physical Biochemistry
(2019 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question No 1 and 5 are compulsory.*
- 2) Attempt any two questions from Q.2 to Q.4 and any two questions from Q.6 to Q.8.*
- 3) Answer to the two sections should be written in separate answer books.*
- 4) Figures to the right side indicate full marks.*

SECTION - I

Q1) Answer the following questions. [11]

- a) What are different types of biosensors? [3]
- b) Enlist different types of electrophoresis. [4]
- c) Differentiate between partition and adsorption chromatography with examples. [4]

Q2) Attempt the following. [12]

- a) What is the difference between affinity chromatography and affinity elution? [4]
- b) Write the principle of hydrophobic interaction chromatography. [4]
- c) Discuss the application of membrane filtration using nitrocellulose and fibre glass. [4]

Q3) Answer the following questions. [12]

- a) Explain the significance of cellulose acetate electrophoresis. [4]
- b) What is the importance of dialysis in protein purification? [4]
- c) Compare and contrast Native and SDS PAGE. [4]

P.T.O.

Q4) Answer the following questions. [12]

- a) What are the factors affecting sedimentation velocity? Explain any one in detail. [4]
- b) Discuss in detail principle, working and applications of paper chromatography in separation of amino acids. [4]
- c) How will you separate proteins based on their polarity? Explain in detail the technique. [4]

SECTION - II

Q5) Answer the following questions. [11]

- a) What is the principle of Raman spectroscopy? [3]
- b) Explain any one application of atomic absorption spectroscopy. [4]
- c) What are the advantages of quadrupole in mass spectrometry? [4]

Q6) Write a short note on the following. [12]

- a) Lc-MS [4]
- b) IR [4]
- c) Mass analyzer [4]

Q7) Answer the following questions. [12]

- a) Enlist different types of ionization methods in mass spectrometry. [4]
- b) Define Optical Rotatory Dispersion. [4]
- c) What is GC-MS? Write any two applications. [4]

Q8) Answer the following questions. [12]

- a) State the working of time-of-flight analyzer. [4]
- b) How does chemical shift affect NMR? [4]
- c) Write any one application of MALDI-TOF-MS. [4]



Total No. of Questions : 8]

SEAT No. :

PD3185

[Total No. of Pages : 2

[6477]-13

M.Sc. - I

BIOCHEMISTRY

**BCH - 113 : Cell Biology and Membrane Biochemistry
(2019 Pattern) (Semester - I)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.1 and Q.5 are compulsory and carry 11 marks.*
- 2) *Attempt any two questions from Q.2 to Q.4.*
- 3) *Attempt any two questions from Q.6 to Q.8.*
- 4) *Use separate answer paper sheets for both section.*
- 5) *Figures on right hand side indicate marks.*

SECTION - I

(Cell Biology)

- Q1)** Answer the following questions. [11]
- a) What is a role of elastin? [2]
 - b) What is peroxisome ; write its function. [2]
 - c) Define the term stem cell. [2]
 - d) List any two importance of fungi. [2]
 - e) Draw and labelled the chloroplast with functions. [3]
- Q2)** Attempt the following questions. [12]
- a) Explain the meiosis with the help of diagram. Elaborate the importance of meiosis in cell division. [6]
 - b) Describe the cell cycle? How cyclin and cyclin dependent kinases regulate cell cycle? [6]
- Q3)** Answer the following questions. [12]
- a) Explain organogenesis in detail. [3]
 - b) Draw neat labelled diagram of animal cell. [3]
 - c) What are the characteristic feature of fungal cell wall? Elaborate your answer with the help of diagram. [3]
 - d) Describe the importance of subcellular fractionation. [3]
- Q4)** Write short note on the following. [12]
- a) Fibronectin
 - b) Gap junctions
 - c) Cell - cell adhesion
 - d) Significance of mitosis

P.T.O.

SECTION - II
(Membrane Biochemistry)

Q5) Answer the following questions. [11]

- a) Name any two ion translocating antibiotics. [2]
- b) Choose the correct option. [2]
 - i) The widely accepted fluid mosaic model of the cell membrane was proposed by 1) Davson and Daniel 2) Gorten and Grendel 3) Singer and Nicholson 4) J. David Robertson
 - ii) If three sodium ions are pumped out of the cell and 2 potassium ion are pumped in the cell, then how many ATP molecule are hydrolysed?
1) four 2) one 3) two 4) three
- c) Explain the term depolarization and Repolarization. [2]
- d) Discuss different types of passive transport. [5]

Q6) Write a short note on. [12]

- a) Gap Junction
- b) Ionophore
- c) Membrane associated disease

Q7) Answer the following questions. [12]

- a) How does ligand gated ion channel work? Explain with example.
- b) Discuss group translocation mechanism for transport of glucose in bacteria.
- c) Explain the process of receptor mediated endocytosis.

Q8) Answer the following questions (any four). [12]

- a) Discuss factors responsible for membrane asymmetry.
- b) Comment on the working of $\text{Na}^+ \text{K}^+$ Pump
- c) Explain the features of fluid mosaic model
- d) How does cell membrane help with osmoregulation?
- e) Explain lipid protein interaction in plasma membrane



Total No. of Questions : 4]

SEAT No. :

PD3186

[Total No. of Pages : 1

[6477]-14
First Year M.Sc.
BIOCHEMISTRY
BCH-114 : Enzymology
(2019 Pattern) (Semester - I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Question No. 1 is compulsory and carries 11 marks.
- 2) Attempt any two questions from Q.2 to Q.4.
- 3) Figures to the right indicate full marks.

Q1) Answer the following. [11]

- a) Derive Michealis-Menten equation based on equilibrium assumption. Give the significance of K_m . [3]
- b) Why side chain Ser 195 of chymotrypsin is super reactive? [4]
- c) Explain the various conditions under which the enzyme-substrate complex is stabilized to determine the mechanism of enzyme catalysis by X-ray crystallography. [4]

Q2) Write a short note on following. [12]

- a) Enzyme turnover [4]
- b) Hill constant and strength of cooperativity [4]
- c) Factors leading to rate enhancement of enzyme catalyzed reactions [4]

Q3) Answer the following. [12]

- a) How does high temperature impact most enzymes? [4]
- b) Explain the mechanism of enzyme degradation. [4]
- c) Differentiate between Monod, Wyman, Changeux model and Koshland, Nemethy, Filmer model to account the kinetic behavior of allosteric enzymes. [4]

Q4) Attempt the following. [12]

- a) What are enzymes? Why are they called biocatalyst? [4]
- b) How activity of an enzyme is regulated by irreversible changes in covalent structure? Explain with example. [4]
- c) Write the application of stopped flow technique. [4]



Total No. of Questions : 8]

SEAT No. :

PD3187

[Total No. of Pages : 3

[6477]-21

M.Sc.-I

BIOCHEMISTRY

BCH-211 : Metabolism (Reactions of Biomolecules)

(2019 Pattern) (Semester -II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.1 and Q.No.5 are compulsory.*
- 2) *Attempt any two questions from Q.No. 2 to Q.No. 4.*
- 3) *Attempt any two questions from Q.No. 6 to Q.No. 8.*
- 4) *Use separate answer sheet for both sections.*
- 5) *Neat Draw diagram wherever necessary.*

SECTION-I

(Carbohydrate and Lipid Metabolism)

Q1) a) Attempt any four of the following. **[4×2=8]**

- i) Define the term standard free energy
 - ii) What do you mean by Feeder pathway of glycolysis?
 - iii) Write the names of ketone bodies
 - iv) Write the significance of glycolysis pathway
 - v) Write structure of ATP energy rich molecule
- b) Write about Regulation of Gluconeogenesis **[3]**

Q2) Attempt the following. **[12]**

- a) With the help of diagram explain ETC with ATP synthase complex **[6]**
- b) Discuss the role of glycogenin in the synthesis of glycogen **[4]**
- c) Write the significance of Glyoxylate cycle. **[2]**

Q3) Attempt the following. **[12]**

- a) Discuss Preparatory phase of Glycolysis **[4]**
- b) What is substrate level phosphorylation? Explain with example of reaction. **[4]**
- c) Explain the Beta oxidation of fatty acid coA Palmitoyl - coA **[4]**

P.T.O.

Q4) Attempt the following. [12]

- a) How TCA cycle is regulated? [3]
- b) Explain the Glycogen entry in glycolysis with the help of all reactions[3]
- c) Draw a neat labelled diagram of and Explain carnithine shuttle. [3]
- d) With the help of diagram Elaborate the structure of fatty acid synthase complex. [3]

SECTION-II

(Amino acid and Nucleotide Metabolism)

Q5) a) Attempt any four of the following. [4×2=8]

- i) Write the significance of polyamines
- ii) What is Gout?
- iii) With Example Explain non ribosomal protein synthesis.
- iv) Define the term proteolysis
- v) Write the importants of porphyrins

Answer the following question.

- b) What is transamination? Write the reaction involving transamination and explain it. [3]

Q6) Answer the following questions. [12]

- a) How toxic ammonia is converted in the urea? Explain with diagram and reactions. [6]
- b) What is decarboxylation reaction? [2]
- c) How pyrimide nucleotide synthesis is regulated. Draw diagram. [4]

Q7) Answer the following questions. [12]

- a) With the help of reaction Elaborate the role of Enzyme ribonucleotide reductase in the formation of deoxy-ribonucleotide [6]
- b) How purine biosynthesis is regulated draw diagram. [4]
- c) Write the following conversion Histidine $\rightarrow$ Histamine [2]

Q8) Attempt the following questions. [12]

- a) What is phenyl-keto uria? Explain with reaction and characteristics [4]
- b) Write the following conversion. [4]
 - i) $UTP \rightarrow CTP$
 - ii) $IMP \rightarrow GMP$
- c) Where the degradation of Branched chain amino acid occurs? Write the reactions showing degradation of it. [4]



Total No. of Questions : 8]

SEAT No. :

PD3188

[Total No. of Pages : 2

[6477]-22

M.Sc. - I

BIOCHEMISTRY

BCH - 212 : Genetics (Chemistry of Nucleic Acids)

(2019 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.No. 1 & Q.No.5 are compulsory and carry 11 marks.*
- 2) *Attempt any two questions from Q.2 to Q.4 for Section I and from Q.6 to Q.8 for Section II.*
- 3) *Answer to both sections should be written on separate answer sheets.*
- 4) *Figures to the right indicates full marks.*

SECTION - I

(Principles of Heridity and Variations)

Q1) Answer the following. [11]

- a) What are multiple alleles? Explain ABO blood grouping. [2]
- b) Define Gene. [2]
- c) Explain denaturation of DNA. [2]
- d) Explain sex influence characters with suitable example. [2]
- e) Explain Mendel's law of Dominance. [3]

Q2) Write short notes on: [12]

- a) Recombination maps [4]
- b) Epistasis [4]
- c) Sex linkage [4]

Q3) Answer the following. [12]

- a) Explain the process of transferring fertility factor in bacteria. [4]
- b) Describe mapping of E.Coli chromosome. [4]
- c) Explain Griffith's experiment. [4]

P.T.O.

- Q4)** Answer the following. [12]
- a) Describe Watson and Crick's model of DNA. [4]
 - b) Why did Mendel choose pea plant for his experiment? Explain in detail. [4]
 - c) Differentiate between Alleles and Pseudoalleles with examples. [4]

SECTION - II
(Population Genetics)

- Q5)** Answer the following. [11]
- a) Describe any 2 Chemical mutagens. [2]
 - b) Explain the process of mutant selection. [2]
 - c) How is Thymine - Thymine dimer formed? [2]
 - d) Explain any 2 elements of population genetics. [2]
 - e) Explain bacterial transduction. [3]
- Q6)** Write short notes on : [12]
- a) Down syndrome. [4]
 - b) Bayesian theorem. [4]
 - c) Alzheimer's disease. [4]
- Q7)** Answer the following. [12]
- a) Explain different types of migration. [4]
 - b) Explain Aneuploidy with suitable examples. [4]
 - c) Describe spatial variation and genetic fitness. [4]
- Q8)** Answer the following. [12]
- a) Explain in detail Inbreeding depression. [4]
 - b) Explain Neutral evolution and balancing selection. [4]
 - c) Explain Human genetics by pedigree analysis. [4]



Total No. of Questions : 8]

SEAT No. :

[Total No. of Pages : 2

PD3189

[6477]-23

First Year M.Sc.

BIOCHEMISTRY

BCH 213 : Plant Biochemistry

(2019 Pattern) (Semester -II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer to the two sections should be written in a separate answer book.
- 2) Q.1 and Q.5 are compulsory and carry 11 marks each.
- 3) Attempt any two question from Q.2 to Q.4 and two questions from Q.6 to Q.8.
- 4) Figures to the Right indicate full marks.

SECTION-I

Q1) Answer the following questions. [11]

- a) Give the role of peroxisomes in plant cell. [3]
- b) Explain causes and types of seed dormancy. [4]
- c) Describe cyclic electron flow. [4]

Q2) Write short note on the following. [12]

- a) Conductive tissues [4]
- b) Abiotic stress [4]
- c) Plant diseases [4]

Q3) Attempt the following questions. [12]

- a) Describe with the help of neat diagram the structure of chloroplast. [4]
- b) Comment on plant pest and their management. [4]
- c) Discuss biochemical change occurring during germination. [4]

P.T.O.

- Q4)** Answer the following questions. [12]
- a) Comment on plant pathogen interactions [4]
 - b) Discuss source-sink relationship in plants [4]
 - c) What are nutraceuticals. Comment on its application [4]

SECTION-II

- Q5)** Answer the following questions. [11]
- a) Comment on application of Rubber. [3]
 - b) Explain the process of sulphur assimilation. [4]
 - c) Discuss classification of secondary metabolites. [4]

- Q6)** Write short note on the following. [12]
- a) CAM pathway [4]
 - b) Seed storage proteins [4]
 - c) Cytokinins [4]

- Q7)** Attempt the following questions. [12]
- a) Discuss Nitrogen cycle and comment on Nitrogenase [4]
 - b) Explain the importance of RuBisCo [4]
 - c) Comment on importance of phosphorus as micronutrient in plant growth [4]

- Q8)** Answer the following questions. [12]
- a) Give classification of terpenoid class of secondary metabolites [4]
 - b) Comment on application of gum, pectin. [4]
 - c) Enlist macronutrients. Add a note on function of nitrogen in plants. [4]



Total No. of Questions : 4]

SEAT No. :

PD3190

[Total No. of Pages : 2

[6477]-24

M.Sc. - I

BIOCHEMISTRY

CBOP 2 BCH - 214 (A) : Microbiology

(2019 Pattern) (Semester - II) (Elective Option - A)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Q.1 is compulsory and carry 11 marks.*
- 2) *Attempt any two questions from Q.2 to Q.4.*
- 3) *Figures to the right indicate full marks.*

Q1) Attempt the following. [11]

- a) Explain the classification of bacteriophages based on their genetic material. [2]
- b) Define media. What are different types of media? [4]
- c) Explain principle, working and applications of fluorescence microscopy.[5]

Q2) Write short note on the following. [12]

- a) Immunity.
- b) Reproduction of bacteria.
- c) Nitrogenase complex.

Q3) Answer the following. [12]

- a) Explain the difference between endotoxin and exotoxin.
- b) Write the life cycle of herpes simplex virus.
- c) Describe the types of chemical agents that control the growth of microorganisms.

P.T.O.

Q4) Answer any four of the following.

[12]

- a) Explain the types of electron microscopes.
- b) Describe continuous culture of bacteria.
- c) What are the characteristics based on which microorganisms are classified.
- d) Explain spread plate technique to isolate pure culture of bacteria.
- e) Define viroid. Write a note on diseases associated with it.



Total No. of Questions : 8]

SEAT No. :

PD3191

[Total No. of Pages : 2

[6477]-31
S.Y. M.Sc.
BIOCHEMISTRY
BCH - 311 : Molecular Biology
(2019 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.1 and Q.5 are compulsory.*
- 2) *Attempt any two questions from Q.2 to Q.4 for Section I and from Q.6 to Q.8 for Section - II.*
- 3) *Answer to the both sections should be written on separate answer sheets.*
- 4) *Figures to the right indicate full marks.*

SECTION - I

Q1) Attempt the following. [11]

- a) What are Okazaki fragments? [2]
- b) What is the role of sigma factor and Rho factor in bacterial transcription?[2]
- c) Write a role of RecA and RuvB in recombination. [2]
- d) Why is splicing necessary before translation in eukaryotes? [2]
- e) Write the mechanism of base excision repair. [3]

Q2) Describe the mechanisms of the following. [12]

- a) Prokaryotic DNA replication. [6]
- b) Eukaryotic transcription. [6]

Q3) Attempt the following. [12]

- a) Explain helicase and nuclease activities of RecBCD enzyme. [4]
- b) Explain and distinguish between prokaryotic and eukaryotic mRNA. [4]
- c) Write the mechanism of alternative splicing. [4]

P.T.O.

Q4) Write a short note on. [12]

- a) Inhibitors of transcription.
- b) Apoptosis.
- c) DNA Repair.

SECTION - II

Q5) Attempt the following. [11]

- a) What is the role of rRNA and mRNA in translation? [2]
- b) Write the names of two proteins each transported to lysosome and chloroplast. [2]
- c) Why is defence important in bacterial cells. [2]
- d) Write the need of protein degradation in cell. [2]
- e) Write all possible anticodons for the four codons of glycine : (5)'GGU, GGC, GGA, GGG. [3]

Q6) Attempt the following. [12]

- a) Describe the pathway to transport the newly synthesized protein to mitochondria. [4]
- b) What are the applications of RNAi technology? [4]
- c) Write all the modifications taking place in tRNA & rRNA before translation. [4]

Q7) Describe the mechanism of the following. [12]

- a) Inhibition of protein biosynthesis by tetracyclin and chloramphenicol.
- b) Glycosylation of protein.

Q8) Write a short note on: [12]

- a) Protein degradation.
- b) Bacterial defence mechanism.
- c) Epigenetic modification.



Total No. of Questions : 8]

SEAT No. :

[Total No. of Pages : 2

PD3192

[6477]-32

M.Sc. - II

BIOCHEMISTRY

**BCH - 312 : Immunology
(2019 Pattern) (Semester - III)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.1 and Q.5 are compulsory.*
- 2) *Attempt any two questions from Q.2 to Q.4 for Section - I and two questions from Q.6 to Q.8 for Section - II.*
- 3) *Answer to the both sections should be written on separate answer sheets.*
- 4) *Figures to the right indicate full marks.*

SECTION - I

Q1) Answer the following questions. [11]

- a) What are super antigens? Give examples. [3]
- b) Discuss the role of primary and secondary lymphoid organs in detail.[4]
- c) Describe MHC molecules in detail. [4]

Q2) Write a short note on. [12]

- a) Antibody genes and antibody engineering. [4]
- b) Types of Ig. [4]
- c) Clonal selection theory of antibody production. [4]

Q3) Answer the following questions. [12]

- a) Justify, "T cells and B cells different in their susceptibility to tolerance induction". [4]
- b) Discuss isotypes, allotypes and idiotypes with examples. [4]
- c) Describe the classical pathway of complement system. [4]

P.T.O.

- Q4)** Answer the following questions (any 4). [12]
- a) Explain the process of phagocytosis with the help of diagram. [3]
 - b) Describe the pentamer structure of IgM. [3]
 - c) Describe antigen - antibody reaction in details. [3]
 - d) Draw and explain structure of IgA dimer. [3]
 - e) Describe the structure of complement C1. [3]

SECTION - II

- Q5)** Answer the following questions. [11]
- a) Differentiate between active and passive immunity. [3]
 - b) What are autoimmune diseases? Explain in detail any one type of it. [4]
 - c) Describe the process and applications of ChIP assay. [4]

- Q6)** Write short note. [12]
- a) Types and applications of ELISA. [4]
 - b) Primary B cell immunodeficiency diseases. [4]
 - c) HIV life cycle. [4]

- Q7)** Answer the following questions. [12]
- a) What are vaccines? Explain any two types of vaccines with examples. [4]
 - b) Describe antigen presentation and processing by cytosolic pathway. [4]
 - c) What is CAR-T cell therapy? Give its application and side effects. [4]

- Q8)** Answer the following questions. (any 4). [12]
- a) Explain type IV hypersensitivity reaction with suitable example. [3]
 - b) Give any three advantages of western blotting. [3]
 - c) List out types of graft for transplantation. [3]
 - d) What are tumor antigens? Give two examples. [3]
 - e) Explain Rocket immunoelectrophoresis. [3]



Total No. of Questions : 8]

SEAT No. :

PD3193

[Total No. of Pages : 2

[6477]-33

S.Y. M.Sc.

BIOCHEMISTRY

**BCH - 313 : Recombinant DNA Technology
(2019 Pattern) (Semester - III)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Q.1 and Q.5 are compulsory and carry 11 marks.*
- 2) Attempt any two questions from Q.2 to Q.4 for section I and from Q.6 to Q.8 for section II.*
- 3) Answer to the both sections should be written on separate answer sheets.*
- 4) Figures to the right indicate full marks.*

SECTION - I

Q1) Attempt the following. [11]

- a) Write the applications of topoisomerase and ligase in recombinant DNA technology. [2]
- b) Write the advantages of gene cloning. [2]
- c) What are the methods to remove protein contamination while purifying DNA from cells. [2]
- d) What do you understand by the term isoschizomers? Write one example of it. [2]
- e) What is a genomic library and what is its significance? [3]

Q2) Attempt the following. [12]

- a) Write a brief account on blue - white screening. [4]
- b) Write a significance of M13 vectors. [3]
- c) Describe transfection method used to introduce DNA in host cell along with well labelled diagram. [5]

Q3) Attempt the following. [12]

- a) Write the significance of T7 expression system. [3]
- b) Write in brief about SV40 as vector. [3]
- c) Discuss the role of restriction enzymes in restriction mapping. Discuss the significance of double digestion in the process. [4]
- d) Explain shuttle vector with example. [2]

P.T.O.

- Q4)** Write a short note on. [12]
- a) cDNA library
 - b) Artificial chromosome
 - c) Promoter analysis

SECTION - II

- Q5)** Answer the following questions. [11]
- a) Give application of PCR in medicine. [2]
 - b) Explain the ethical implication of human genome sequencing. [4]
 - c) What is mutagenesis? Describe PCR based mutagenesis. [5]

- Q6)** Write a short note. [12]
- a) Gene transfer strategies.
 - b) Taq Man based q PCR
 - c) Genome annotations

- Q7)** Answer the following questions. [12]
- a) How can CRISPR/Cas 9 be used to perform deletion in the genome.
 - b) Elaborate on working of any gene editing technology.
 - c) Explain the concept and steps involved in pyrosequencing for gene sequencing?

- Q8)** Answer the following questions (any four). [12]
- a) Describe how will you produce recombinant proteins.
 - b) What is a reporter's assay? Explain any one.
 - c) How does oxford Nanopore technology work for sequencing genes and genomes?
 - d) Describe gene silencing method.
 - e) Explain northern blotting method.



Total No. of Questions : 8]

SEAT No. :

[Total No. of Pages : 2

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[6477]-34

S.Y. M.Sc.

BIOCHEMISTRY

**BCH-314(B) : Pharmacology and Forensic Biochemistry
(2019 Pattern) (Semester - III)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.1 and Q.5 are compulsory.*
- 2) *Attempt any two questions from Q.2 to Q.4. and two questions from Q.6 to Q.8.*
- 3) *Answer to the two sections should be written in separate answer book.*
- 4) *Figures to the right indicate full marks.*

SECTION - I

(Pharmacology)

Q1) Attempt the following questions : **[11]**

- a) Define pharmacodynamics. **[3]**
- b) Define : **[4]**
 - i) EC 50
 - ii) E_{max}
- c) What are the signs and symptoms of ADR? **[3]**

Q2) Write a short note on following : **[12]**

- a) Idiosyncratic adverse drug reactions.
- b) Pinocytosis
- c) Forces involved in drug receptor interaction.

Q3) Answer the following : **[12]**

- a) Explain the role of antagonists.
- b) Write a short account on drug development challenges.
- c) List any explain the factors affecting drug absorption.

Q4) Answer the following : **[12]**

- a) Explain Hill coefficient with its significance.
- b) Explain the mechanism of drug interaction.
- c) How are adverse drug reactions treated?

P.T.O.

SECTION - II
(Forensic Biochemistry)

Q5) Answer the following : [11]

- a) What are the allergic reactions? Give example of allergic response in humans. [3]
- b) Differentiate between Phase - I and Phase - II reactions. [4]
- c) How is Crime Scene investigated with the help of restriction enzymes? [4]

Q6) Write a short note on the following : [12]

- a) Immediate versus delayed toxicity.
- b) Draize test
- c) Idiosyncratic reactions.

Q7) Answer the following : [12]

- a) What is dose response relationship? Explain it with the example of different doses of organophosphate insecticide.
- b) What are ontogenetic Bioassays?
- c) Give molecular mechanism of Cyt-P450 monooxygenase system.

Q8) Answer the following : [12]

- a) What is epigenetic? Explain the process and consequences of epigenetic regulation of gene expression.
- b) Give schematic representation of drug distribution in the body.
- c) Illustrate three main processes of forensic toxicology analysis.



Total No. of Questions : 8]

SEAT No. :

PD3195

[Total No. of Pages : 3

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S.Y.M.Sc.

BIOCHEMISTRY

BCH-411 : Neurochemistry and Endocrinology

(2019 Pattern) (Semester - IV)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer to the two sections should be written in Separate answer books.*
- 2) Q.1 and Q.5 are compulsory.*
- 3) Attempt any two questions from Q.2 to Q.4 and two questions from Q.6 to Q.8.*
- 4) Figure to right-hand side indicates full marks.*

SECTION - I

(Neurochemistry)

Q1) Answer the following questions. **[11]**

- a) Explain the role of the thalamus in sensory processing. **[3]**
- b) Describe the mechanism of neurotransmitter synthesis. **[4]**
- c) How do NMDA receptors contribute to synaptic plasticity? **[4]**

Q2) Write a short note on following **[12]**

- a) Nerve cells and behavior
- b) Hypothalamus
- c) Circadian rhythms

P.T.O.

Q3) Answer the following questions. [12]

- a) Define the peripheral nervous system and its components. [4]
- b) What is the importance of the blood-brain barrier in protecting the CNS? [4]
- c) Describe the function of CAM kinase II in synaptic strengthening. [4]

Q4) Answer the following questions. (Any four) [12]

- a) What is the role of nitric oxide in the brain? [3]
- b) Describe the role of dopamine in motor control. [3]
- c) How do external stimuli affect neurotransmitter release? [3]
- d) Explain the concept of sensory modalities. [3]
- e) Describe the mechanisms of action of NMDA receptors in learning and memory. [3]

SECTION - II

(Endocrinology)

Q5) Answer the following questions. [11]

- a) What are secondary messengers and why are they important in hormone action? [3]
- b) Discuss the hormonal interrelationship among the thyroid, adrenal and pituitary glands. [4]
- c) What is the biosynthesis process of steroid hormones? [4]

Q6) Write a short note on following. **[12]**

- a) Gastrointestinal hormones
- b) Zinc fingers
- c) Intracellular receptors in hormone action

Q7) Answer the following questions. **[12]**

- a) What are the effects of steroid hormones on gene expression? **[4]**
- b) Discuss the role of parathyroid hormone in calcium regulation. **[4]**
- c) How do hormones influence water balance in the body? **[4]**

Q8) Answer the following questions. (Any four) **[12]**

- a) How does calcium signaling play a role in hormone action? **[3]**
- b) Describe a disorder related to thyroid hormone imbalance. **[3]**
- c) What is the role of adenylyl cyclase in hormonal regulation? **[3]**
- d) Discuss the relationship between insulin and glucagon in blood sugar control. **[3]**
- e) Explain the function and effect of oxytocin. **[3]**



Total No. of Questions : 8]

SEAT No. :

PD3196

[Total No. of Pages : 2

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M.Sc. - II

BIO-CHEMISTRY

BCH - 412 : Medical and Physiological Biochemistry

(2019 Pattern) (Semester - IV)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Use separate answer sheets for both sections.*
- 2) *Question 1 and Q.5 are compulsory.*
- 3) *Attempt any two questions from Q.No. 2 to Q.No. 4.*
- 4) *Attempt any two questions from Q.No. 6 to Q.No. 8.*
- 5) *Draw diagrams wherever necessary.*

SECTION - I

(Medical Biochemistry)

Q1) a) Attempt any four of the following. **[4×2=8]**

- i) Explain Etiology of cancer.
 - ii) List the hydrolytic enzymes present in lysosome.
 - iii) List the types of Thalassemia.
 - iv) What is apoptosis?
 - v) List the drugs that inhibit the fungal cell wall synthesis.
- b) Explain the conversion of proto oncogenes to oncogenes using diagrams, mechanisms. **[3]**

Q2) Attempt the following questions. **[12]**

- a) Write short account on 'Sickle cell anemia'. **[4]**
- b) Explain Intrinsic pathway of apoptosis. **[4]**
- c) Explain the mode of action of Tetracyclins. **[4]**

Q3) Attempt the following questions. **[12]**

- a) Write short account on 'resistance to antibiotic'. **[4]**
- b) Write about biochemical mechanism involved in the formation of tangles and plaques in Alzheimer. **[4]**
- c) With the help of diagram explain 'Malaria parasite cycle'. **[4]**

P.T.O.

Q4) Answer the following questions. [12]

- a) List the names of enzymes used in the 'Caronary heart disease'. Write clinical significance of any one enzyme. [4]
- b) Write short note on lysosomal storage diseases (LSD). [4]
- c) Discuss with the help of diagram mechanism of action of penicillin as cell wall synthesis inhibitor. [4]

SECTION - II

(Physiological Biochemistry)

Q5) a) Answer the following questions any four. [4×2=8]

- i) Write the functions of liver.
 - ii) List the disease conditions of kidney.
 - iii) Define the term respiratory acidosis.
 - iv) What is Jaundice?
 - v) List the diagnostic tests of liver function.
- b) With the help of diagram describe the absorption of carbohydrate. [3]

Q6) Answer the following questions. [12]

- a) Draw a neat labelled diagram of functional unit of kidney 'Nephron' and explain. [6]
- b) Explain the anatomy of liver. [4]
- c) List various functions of kidney. [2]

Q7) Answer the following questions. [12]

- a) Write short note on 'Metabolic alkalosis'. [4]
- b) How bilirubin is formed. Explain using diagram. [4]
- c) Explain extrinsic pathway of blood coagulation. [4]

Q8) Answer the following questions. [12]

- a) Explain Intrinsic pathway of blood coagulation. [4]
- b) Write the disease conditions of liver. [4]
- c) What is a role of pancreatic Juice in digestion of food. [4]



Total No. of Questions : 8]

SEAT No. :

[Total No. of Pages : 2

PD3197

[6477]-43

M.Sc.-II

BIOCHEMISTRY

BCH-413-(B) : Clinical Nutrition and Food Technology

(2019 Pattern) (Semester -IV)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Q No. 1 and Q No. 5 are compulsory.
- 2) Attempt any two questions from Q.2 to Q.4.
- 3) Attempt any two questions from Q.6 to Q.8.
- 4) Use separate answer sheets for both sections.
- 5) Draw diagrams wherever necessary.

SECTION-I

Clinical Nutrition

Q1) a) Answer the following questions. (any 4)

[4×2=8]

- i) Define the term malnutrition
- ii) What is albinism?
- iii) Write the important of dietary fibre in food.
- iv) Define the term food toxin with example.
- v) What is acidic and alkaline food?

b) Describe Nutritional status of 'cereals' in India.

[3]

Q2) Answer the following questions.

[12]

- a) What is Refining? Why it is require? List the nutritional changes observed in Refining food. **[4]**
- b) Write short account on 'Kwashiorkor' **[4]**
- c) Explain the term 'Food Faddism' **[4]**

P.T.O.

- Q3)** Answer the following questions. [12]
- What is weight management? Give its important. [4]
 - Describe 'Irradiation of food'. [4]
 - Write short account on 'Food Allergy'. [4]
- Q4)** Answer the following questions. [12]
- What do you mean by term fermentation? How it affects the nutritional status of food? [4]
 - Write short account on the 'Nutritional Status of Dairy Product in India'. [4]
 - Write about 'sprouting and its advantages'. [4]

SECTION-II

Food Technology

- Q5)** a) Answer the following questions any 4. [4×2=8]
- Define the food of animal origin
 - Write the significance important of AGMARK
 - Define the term antioxidants with example
 - What are natural syrups?
 - List the use of enzyme pepsin
- b) Write short account on FSSAI. [3]
- Q6)** Attempt the following questions. [12]
- What is genetically modified food? How it is helpful. Elaborate your answer [4]
 - Describe the meat Tenderization and its advantages [4]
 - List the food sweetner used in food technology [4]
- Q7)** Answer the following questions. [12]
- Write about weight and measure act. [4]
 - Write short account on food spoilage. [4]
 - What are food addtives? Explain in detail. [4]
- Q8)** Attempt the following questions. [12]
- Describe the role of stabilizers food technology. [4]
 - Explain in detail the production of starch. [4]
 - How sprouting increases the nutritional quality of food? Explain. [4]

