

Total No. of Questions : 8]

SEAT No. :

PE-5315

[Total No. of Pages : 2

[6511]-101
First Year M.Sc.
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. No. 1 and Q. No. 5 are compulsory and carry 11 marks..*
- 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 sheets for both sections.*
- 5) *Figures on right hand side indicates marks.*

SECTION - I

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

- a) Explain the Ionisation of water molecule. **[3]**
- b) Write the significance of de-oxy sugars. **[2]**
- c) Define the term Monomeric units with example. **[2]**
- d) Write the deficiency symptoms of Vitamin K. **[2]**
- e) What are fat soluble vitamins? Give examples. **[2]**

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

- a) What are Lipoproteins? How are they classify? Write the significance of each class of lipoproteins. **[6]**
- b) What are Monosaccharides? How are they classify? Explain classification with structures. **[6]**

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

- a) What are Coenzyme? Elaborates its functions with examples. **[4]**
- b) Elaborate the term Epimers with respect to glucose. **[3]**
- c) What are Phospholipids? Explain its significances. **[3]**
- d) Write the deficiency symptoms of Vitamin C. **[2]**

P.T.O.

- Q4)** Attempt the following questions : [12]
- a) What are Disaccharides? Explain the structure of Maltose and Sucrose. [4]
 - b) Write the classification of polysaccharides with examples and importances. [4]
 - c) Define the term fatty acids with example. [2]
 - d) Elaborate the significance of deoxy sugar with example. [2]

SECTION - II

- Q5)** Answer the following questions : [11]
- a) Explain the 'Zwitterion' formation with respect to amino acids. [3]
 - b) Write the structure of branched chain amino acids. [2]
 - c) Give biological importances of proteins. [2]
 - d) What are the Globular proteins? Give example. [2]
 - e) Write the structure of any one Rare amino acid. [2]
- Q6)** Attempt the following questions : [12]
- a) Define the term amino acids. Discuss the classification of amino acid on the basis of 'R' group. [6]
 - b) Explain the secondary structure of proteins, β pleated streets and α helix with the help of diagram. [6]
- Q7)** Answer the following questions : [12]
- a) What is titration curve of amino acid? How it is performed? Explain the significance of it. [4]
 - b) Write the significance of fibrous proteins. [2]
 - c) What are super-secondary structures of protein? Elaborate its role in structures. [3]
 - d) Explain the structure of myoglobin with diagram. [3]
- Q8)** Answer the following : [12]
- a) With the help of diagram elaborate 'Ramchandran plot'. [4]
 - b) What is solid phase synthesis of protein? Elaborate the synthesis reactions. [4]
 - c) Explain Ninhydrin Reaction of amino acid. [4]



Total No. of Questions : 8]

SEAT No. :

PE-5316

[Total No. of Pages : 2

[6511]-102
First Year M.Sc.
BIOCHEMISTRY
BCH-112 : Physical Biochemistry
(2019 Pattern) (Semester - I)

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.No. 2 to Q.No.4 and two questions from Q.No.6 to Q.No.8.*
- 3) *Answers to the two sections should be written in two separate answer books.*
- 4) *Figure to the right side indicate full marks.*

SECTION - I

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

- a) What is difference between affinity chromatography and affinity elution? **[3]**
- b) Enlist different types of electrophoresis. **[4]**
- c) Discuss the application of membrane filtration using nitrocellulose and fibre glass. **[4]**

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

- a) Hydrophobic interaction chromatography **[4]**
- b) Biosensor **[4]**
- c) Dialysis **[4]**

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

- a) What are the factors affecting sedimentation velocity? Explain any one in detail. **[4]**
- b) How will you separate proteins based on their polarity? Explain in detail the technique. **[4]**
- c) Compare and Contrast Native and SDS PAGE. **[4]**

P.T.O.

- Q4)** Answer the following questions. [12]
- a) Discuss the principle and applications of molecular sieve chromatography. [4]
 - b) Explain the significance of cellulose acetate electrophoresis. [4]
 - c) Discuss in detail principle, working and applications of paper chromatography in separation of amino acids. [4]

SECTION - II

- Q5)** Answer the following questions. [11]
- a) What are the advantages of quadrupole in mass spectrometry? [3]
 - b) What is the principle of Raman Spectroscopy? [4]
 - c) Explain any one application of atomic absorption spectroscopy. [4]
- Q6)** Write short note on the following. [12]
- a) Atomic Emission Spectroscopy [4]
 - b) CD [4]
 - c) Mass Analyzer [4]
- Q7)** Answer the following questions. [12]
- a) How does chemical shift affect NMR? [4]
 - b) State the working of time-of-flight analyzer. [4]
 - c) What are the components of MS? [4]
- Q8)** Answer the following questions. [12]
- a) Explain the use of IR spectroscopy. [4]
 - b) Write any two applications of UV-VIS spectroscopy. [4]
 - c) Explain any one use of FTIR in biochemistry. [4]



Total No. of Questions : 8]

SEAT No. :

PE-5317

[Total No. of Pages : 2

[6511]-103

First Year M.Sc.

BIOCHEMISTRY

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

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.No.1 & Q.No.5 are compulsory & carry 11 marks.*
- 2) *Attempt any two questions from Q.2 to Q.4 for Section - I & 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 side indicates full marks.*

SECTION - I

[Cell Biology]

Q1) Answer the following: [11]

- a) List the biomedical importance of Fungi. [2]
- b) With the help of diagram describe the structure of chloroplast. [3]
- c) What is Gap junction? [2]
- d) List the functions of peroxisomes. [2]
- e) Define the term stem cell. [2]

Q2) Answer the following questions: [12]

- a) Explain cell adhesion with types of cell adhesion molecules. [6]
- b) Outline the stages of Mitosis with the help of diagram and describe its importance in cell division. [6]

Q3) Answer the following: [12]

- a) What is Cytoskeleton? List it's components. [3]
- b) Describe the role of Fibronectin and Elastin. [2]
- c) With the help of diagram describe the structure of plant cell. [3]
- d) How cyclin and cyclin dependent kinases regulate cell cycle? [2]
- e) Define the term Organogenesis. [2]

P.T.O.

- Q4)** Answer the following questions: [12]
- a) Write the significances of Meiosis. [2]
 - b) What is subcellular fractionation. [2]
 - c) Draw a neat labelled diagram of animal cell. [3]
 - d) List the types of gap functions found in biological system. [2]
 - e) With the help of diagram describe the characteristic feature of fungi cell wall. [3]

SECTION - II

[Membrane Biochemistry]

- Q5)** Answer the following questions: [11]
- a) What is the difference between active and passive transport? [2]
 - b) Define Endocytosis. [2]
 - c) In what way are membrane proteins asymmetrical? [2]
 - d) ATP-ADP exchanger system. [5]
- Q6)** Write short note on: [12]
- a) Osmoregulation
 - b) Valinomycin - a transport antibiotic
 - c) Phosphotransferase system
- Q7)** Answer the following questions: [12]
- a) What is receptor mediated endocytosis LDL transport?
 - b) Discuss the four major components of the cell membrane.
 - c) Explain in detail Fluorescence recovery after photobleaching FRAP technique of membrane dynamics.
- Q8)** Answer the following questions (any four): [12]
- a) Comment on any two membrane associated diseases.
 - b) Differentiate between simple diffusion and facilitated diffusion.
 - c) What is the mechanism of voltage gated ion channel? What triggers voltage gated ion channels?
 - d) How do macromolecules and toxins get transported across biological membrane?
 - e) Comment on uniport, symport and antiport.



Total No. of Questions : 4]

SEAT No.:

PE-5318

[Total No. of Pages : 2

[6511]-104
First Year M.Sc.
BIOCHEMISTRY
BCH-114 : Enzymology
(2019 Pattern) (Semester - I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Q.No.1 is compulsory and carries 11 marks.*
- 2) *Attempt any two questions from Q.No.2 to Q.No.4*
- 3) *Figure to right side indicate marks.*

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

- a) Define the terms: K_m , K_{cat} , turnover number and state their significance. **[3]**
- b) Describe any one theoretical model that has been used to describe conformational changes in controlling the activities of enzymes. **[4]**
- c) What is the correlation between the rate of turnover of structure and function of an enzyme? **[4]**

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

- a) Chemical modification enzymes **[4]**
- b) Acid-base and covalent catalysis **[4]**
- c) Ubiquitin **[4]**

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

- a) What is the effect of low or high pH on enzyme activity? **[4]**
- b) How to determine the pre-steady state kinetics using stopped flow technique? **[4]**
- c) What do you understand by zymogens? What is the importance of the zymogens? **[4]**

P.T.O.

Q4) Attempt the following: [12]

- a) Enzymes are specific in their choice of reactants. Give two different types of reactants. [4]
- b) Describe the various method used for determination of active site. [4]
- c) Give one example of each of the following: [4]
 - i) Enzyme modulated by reversible covalent modification
 - ii) Zymogen
 - iii) Metalloenzyme



Total No. of Questions : 8]

SEAT No.:

PE-5319

[Total No. of Pages : 3

[6511]-201

First Year M.Sc.

BIOCHEMISTRY

BCH-211 : Metabolism (Reactions of Biomolecules)

(2019 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question No.1 and Q.No.5 are compulsory.
- 2) Attempt any two questions from Q.No.2 to Q.No.4
- 3) Attempt any two question from Q.No.6 to Q.No.8.
- 4) Use separate answer sheets for sections.
- 5) Figure to right side indicate marks.
- 6) Neat labelled diagram must be drawn wherever necessary.

SECTION - I

(Carbohydrate and Lipid Metabolism)

Q1) a) Attempt any four questions: **[4×2=8]**

- i) List the energy rich compounds in the body.
 - ii) What are ketone bodies?
 - iii) Define the term Entropy and Enthalpy.
 - iv) List the inhibitors of electron transport chain. (ETC).
 - v) Write significance of alternate pathway of carbohydrate metabolism.
- b) Explain Glycogen breakdown and entry in glycolysis. **[3]**

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

- a) Explain the pyruvate dehydrogenase complex enzyme with reaction. **[4]**
- b) Write the energetics when one molecule of glucose undergo complete oxidation. **[4]**
- c) What is pentose phosphate pathway? Write the significance of PPP. **[4]**

P.T.O.

Q3) Attempt the following questions: [12]

- a) Write about the oxidation of fatty and palmitoyl-CoA with energetics. [6]
- b) Explain 'Q' cycle in oxidative phosphorylation. [4]
- c) Define the term free energy and standard free energy. [2]

Q4) Attempt the following questions: [12]

- a) What is substrate level phosphorylation? Explain with example and reaction. [3]
- b) Why TCA cycle is called [Amphibolic] cycle? [2]
- c) What are significance of glyoxylate cycle. [3]
- d) How Gluconeogenesis is regulated? [4]

SECTION - II

(Amino acid and nucleotide Metabolism)

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

- i) Define proteolysis.
- ii) Write the conversion of histidine → histamine.
- iii) Define the term salvage pathway.
- iv) What is Gout?
- v) What is Maple syrup urine disease?
- b) Elaborate the function of Ribonucleotide Reductase Enzyme. [3]

Q6) Attempt the following question: [12]

- i) Describe urea cycle with the help of diagram. [6]
- ii) How pyrimidine nucleotide biosynthesis is regulated in the body, write flow chart and describe it. [4]
- iii) Write the following reaction. [2]



Q7) Attempt the following question: [12]

- i) What is Transamination? Explain with the help of reaction. [4]
- ii) Explain salvage pathway of pyrimidine nucleotide synthesis. [4]
- iii) What is phenylketonuria explain with the help of reaction. [4]

Q8) Attempt the following: [12]

- i) Explain the role of Tetrahydrofolate in the conversion of serine to glycine with the help of reaction. [4]
- ii) Write the conversion of [4]
Ribose-5-phosphate $\rightarrow$ 5 PRPP (5-phosphoribosyl pyrophosphate)
- iii) Write the following conversions. [4]
 - a) IMP $\rightarrow$ GMP
 - b) Chorismate $\rightarrow$ Phenyl alanine.



Total No. of Questions : 8]

SEAT No. :

PE-5320

[Total No. of Pages : 2

[6511]-202
First Year M.Sc.
BIOCHEMISTRY
BCH-212 : Genetics
(2019 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.No.1 & Q.No.5 are compulsory & carry 11 marks.*
- 2) *Attempt any two questions from Q.2 to Q.4 for Section - I & 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 indicates full marks.*

SECTION - I

[Principles of Heredity and Variations)

Q1) Answer the following: [11]

- a) Define alleles. Give example. [2]
- b) What is epistatic gene? [2]
- c) Define Genotype & Phenotype with examples. [2]
- d) What are multiple alleles? Give example. [2]
- e) Explain Mendel's law of independent assortment. [3]

Q2) Write short notes on: [12]

- a) Hfr mapping [4]
- b) Crossing over [4]
- c) Plasmid [4]

Q3) Answer the following: [12]

- a) Explain supplementary gene interaction and complementary gene interactions with suitable examples. [4]
- b) Differentiate between different forms of DNA. [4]
- c) Explain Hershey and Chase experiment to prove DNA as genetic material. [4]

P.T.O.

- Q4) Answer the following:** [12]
- a) Describe with example incomplete dominance and co-dominance. [4]
 - b) Describe Homologous Recombination. [4]
 - c) Describe in detail structure of RNA. [4]

SECTION - II
[Population Genetics]

- Q5) Answer the following:** [11]
- a) What are mutagens? Give examples. [2]
 - b) Define auxotrophs with examples. [2]
 - c) What is aneuploidy? [2]
 - d) What do you mean by population genetics? [2]
 - e) Explain the Bacterial transformation. [3]
- Q6) Write short notes on:** [12]
- a) Human teratogenesis [4]
 - b) Bottleneck population. [4]
 - c) Fisher's theorem. [4]
- Q7) Answer the following:** [12]
- a) Describe genetic drift and genetic variation. [4]
 - b) Describe the factors affecting Hardy-Weinberg equilibrium. [4]
 - c) Describe any two genetic disorders. [4]
- Q8) Answer the following:** [12]
- a) Explain clinical genetics. [4]
 - b) Explain Trisomy with examples. [4]
 - c) Describe different types of gene origin mutations. [4]



Total No. of Questions : 8]

SEAT No. :

PE-5321

[Total No. of Pages : 2

[6511]-203
First Year M.Sc.
BIOCHEMISTRY
BCH-213 : Plant Biochemistry
(2019 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.No.1 and Q.No. 5 are compulsory and carry 11 marks each.*
- 2) *Attempt any two questions from Q.No. 2 to Q.No.4 and two questions from Q.No.6 to Q.No.8.*
- 3) *Answers to the two sections should be written in two separate answer books.*
- 4) *Figure to the right indicate full marks.*

SECTION - I

Q1) Answer the following: [11]

- a) What is a light harvesting complex? [3]
- b) Describe any three biochemical changes in fruit ripening. [4]
- c) Discuss any two plants pests with symptoms & treatment. [4]

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

- a) Nutraceutical values of plant [4]
- b) Biotic stress [4]
- c) Photosystem [4]

Q3) Attempt the following questions. [12]

- a) Explain plant communication. [4]
- b) Draw the structure of chloroplast and indicate the location of dark and light reaction. [4]
- c) Comment on source-sink relationship in plants. [4]

Q4) Attempt the following questions. [12]

- a) Describe conductive tissues of plants. [4]
- b) Explain any two examples of pharmaceutical products derived from plants. [4]
- c) Explain types of seed dormancy. [4]

P.T.O.

SECTION - II

- Q5)** Answer the following questions. [11]
- a) Explain Senescence [3]
 - b) Explain the role of Magnesium in plant metabolism. [4]
 - c) Explain the importance of gibberellin as a plant hormone. [4]
- Q6)** Write short note on the following. [12]
- a) Nitrogen cycle [4]
 - b) RuBisCo [4]
 - c) Photo respiration and its adaptation [4]
- Q7)** Attempt the following questions. [12]
- a) Enlist micronutrient in plant nutrition. Give excess and deficiency disorders of any two. [4]
 - b) Discuss characteristics of seed storage proteins. [4]
 - c) Give role of Auxin in plant growth and development. [4]
- Q8)** Answer the following questions. [12]
- a) Discuss on commercial applications of secondary metabolites. [4]
 - b) Give role of macronutrients in plant. [4]
 - c) What is Biological Nitrogen Fixation. [4]



Total No. of Questions : 4]

SEAT No. :

PE-5322

[Total No. of Pages : 1

[6511]-204

First Year M.Sc.

BIOCHEMISTRY

BCH-214 (A): Microbiology

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

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 morphology. [02]
- b) Explain principle and working of phase contrast microscopy. [04]
- c) Explain dry heat and moist heat sterilization methods with its applications. [05]

Q2) Write short note on the following [12]

- a) Animal viruses.
- b) Nitrogen cycle.
- c) Electron microscopy.

Q3) Answer the following. [12]

- a) What is pure culture? Explain the streak plate technique to isolate pure cultures.
- b) What is the difference between prokaryotic and eukaryotic cell?
- c) What are the different phases of normal growth curve of bacteria?

Q4) Answer **any four** of the following. [12]

- a) Explain lytic cycle of bacteriophages.
- b) Give the protocol of Gram staining of bacteria.
- c) With well labelled diagram explain structure of bacteria.
- d) Explain mechanism of action of endotoxins.
- e) Explain antibiotics that inhibit growth of infectious agents.



Total No. of Questions : 8]

SEAT No. :

PE-5323

[Total No. of Pages : 2

[6511]-301

S.Y. M.Sc.

BIOCHEMISTRY

BCH-311 : Molecular Biology

(2019 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question No.1 and Question No.5 is compulsory.
- 2) Attempt any two questions from Q.No. 2 to Q.No.4 for Section-I and from Q.No.6 to Q.No.8 for Section-II.
- 3) Answer to the both section should be written on separate answer sheets.
- 4) Figures to the right indicate full mark.

SECTION - I

Q1) Answer the following: [11]

- a) Define Exon and Intron. [2]
- b) Give the function of DNA polymerase I. [2]
- c) Differentiate between prokaryotic and Eukaryotic promoters. [2]
- d) What is S' capping? [2]
- e) Describe the role of ligase and topoisomerase enzymes. [3]

Q2) Answer the following: [12]

- a) How are Okazaki fragments formed? [4]
- b) Explain the mechanism of mismatch repair. [4]
- c) Describe the inhibitors of transcriptions. [4]

Q3) Write short notes on: [12]

- a) P53. [4]
- b) Transposable elements. [4]
- c) DNA repair genes. [4]

P.T.O.

- Q4)** Answer the following: [12]
- a) Explain Alternative splicing and self splicing. [4]
 - b) Describe the process of Prokaryotic Transcription. [4]
 - c) Describe RNA editing. [4]

SECTION - II

- Q5)** Answer the following: [11]
- a) What are ribosomes? [2]
 - b) Write the significance of RNA. [2]
 - c) What is the function of rRNA in Translation? [2]
 - d) What is role of EF-Tu in E-coli during translation? [2]
 - e) Explain Shine - Dalgarno sequence. [3]

- Q6)** Write short notes on: [12]
- a) Inhibitors of Translation. [4]
 - b) CRISPR - Cas9. [4]
 - c) Protein targeting. [4]

- Q7)** Answer the following: [12]
- a) Explain the mechanism of synthesis of aminoacyl tRNA. [4]
 - b) Explain in detail post translation modifications. [4]
 - c) Describe the pathway taken by protein described for lysosomes. [4]

- Q8)** Answer the following: [12]
- a) Describe the process of termination of Translation in Prokaryotes. [4]
 - b) Describe ubiquitin dependent pathway for protein degradation. [4]
 - c) Describe the mechanism of protein targeting to Mitochondria and Nucleus. [4]



Total No. of Questions : 8]

SEAT No. :

PE-5324

[Total No. of Pages : 2

[6511]-302
S.Y. M.Sc.
BIOCHEMISTRY
BCH-312 : Immunology
(2019 Pattern) (Semester - III)

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.No. 2 to Q.No.4 and two questions from Q.No.6 to Q.No.8.*
- 3) *Answers to the two sections should be written in two separate answer books.*
- 4) *Figure to the right indicate full marks.*

SECTION - I

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

- i) Define the term Antigen.
 - ii) Write the role of Cytokines.
 - iii) Write the functions of Bone Marrow.
 - iv) What are 'Payer Patches'?
 - v) What do you mean by primary Immune Response?
- b) With the help of diagram explain monoclonal antibodies. **[3]**

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

- a) Explain classical pathway of complement system.
- b) Write about 'Anatomical Barrier' involved in innate immune response.
- c) Write short account on 'Spleen'.

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

- a) Write about Class I MHC molecule structure with diagram.
- b) Explain Toll-Like Receptors (TLR's).
- c) Write a short note on types of Immunoglobulin's.

P.T.O.

Q4) Attempt the following questions. **[12]**

- a) What are constant and variable regions of antibody?
- b) Explain complete and incomplete Adjuvants.
- c) Explain types of T cells and how they are mature in the thymus?

SECTION - II

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

- i) Define the term Vaccine.
- ii) What is Active and Passive Immunity?
- iii) What do you mean by Tumor Antigen?
- iv) List advantages of FISH techniques.
- v) Define the term Auto-Immune disorders.

b) Write short account on 'Graft Rejection'. **[3]**

Q6) Answer the following questions. **[12]**

- a) What is Interferon? Give its significances.
- b) Draw the structure of HIV virus.
- c) Discuss different types of 'Vaccines' with examples.

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

- a) Define the term Hypersensitivity Reaction? Explain Type I Hypersensitivity with example.
- b) Explain the principle and procedure of Immunoelectrophoresis.
- c) Discuss the presentation of non-peptide antigen.

Q8) Attempt the following questions. **[12]**

- a) Discuss primary B-cell Immuno-deficiency disease.
- b) What is ELISA? Discuss types of ELISA with diagram.
- c) What is antigen presentation and processing by endocytic pathway?



Total No. of Questions : 8]

SEAT No. :

PE-5325

[Total No. of Pages : 2

[6511]-303
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.No.1 and Q.No. 5 are compulsory carry 11 marks each.*
- 2) *Attempt any two questions from Q.No. 2 to Q.No.4 and two questions from Q.No.6 to Q.No.8.*
- 3) *Answers to the two sections should be written in separate answer books.*
- 4) *Figure to the right side indicate full marks.*

SECTION - I

Q1) Answer the following questions: [11]

- a) Explain Plasmid vector PBR-322. [3]
- b) Explain the process of DNA foot printing. [4]
- c) Discuss cosmids with example. [4]

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

- a) Ti plasmid [4]
- b) Construction of cDNA library [4]
- c) Lambda phage vector [4]

Q3) Attempt the following. [12]

- a) Give the protocol to purify DNA from plant material. Write the role of each chemical used. [4]
- b) Explain DNA modifying enzymes used in RDT. [4]
- c) Explain the characteristics of a good vector. [4]

Q4) Attempt any three of the following questions. [12]

- a) Explain Chip-seq assay. [4]
- b) Explain the production of recombinant Insulin. [4]

P.T.O.

- c) Describe the construction of genomic DNA library and its significance. [4]
- d) Write a note on identification of recombinants. [4]

SECTION - II

Q5) Answer the following questions. [12]

- a) Write a note on miRNA. [4]
- b) Explain RT-PCR and its applications. [4]
- c) Write a note on CRISPR/Cas 9. [4]

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

- a) Northern blotting [4]
- b) Reporter gene [4]
- c) Proteome [4]

Q7) Answer the following questions. [12]

- a) Explain the need of studying transcriptome. [4]
- b) Give the applications of recombinant proteins with example. [4]
- c) Discuss Zinc finger nucleases. [4]

Q8) Answer the following questions. [12]

- a) Explain genome annotations. [4]
- b) Describe Pyrosequencing [4]
- c) Discuss GUS assay. [4]



Total No. of Questions : 8]

SEAT No. :

PE-5326

[Total No. of Pages : 2

[6511]-305

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.No.1 & Q.No.5 are compulsory.
- 2) Use separate answer sheets for both sections.
- 3) Attempt any two questions from Q.2 to Q.4.
- 4) Attempt any two questions from Q.6 to Q.8.
- 5) Figures to the right hand side indicates full marks.

SECTION - I

[Pharmacology]

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

- i) What is Adverse Drug Reaction (ADR)?
- ii) Define the term pharmacokinetic study of drug.
- iii) Define the agonists.
- iv) List various challenges during drug development.
- v) Define the term Pharmacogenomics.

b) Write the importance of biochemistry in pharmacology. **[3]**

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

- a) Explain classification of ADR.
- b) Explain various types of unwanted effects shown by drugs.
- c) Write short note on 'Antagonist'.

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

- a) How drugs are classified on the basis of their effects?
- b) Define the following:
 - i) Bioavailability
 - ii) Half life ($t_{1/2}$)
- c) What is drug absorption? Explain passive diffusion.

P.T.O.

Q4) Answer the following questions: [12]

- a) Write about interaction of receptors with drug. Elaborate with the help of diagram.
- b) Elaborate phase II biotransformation reactions.
- c) What is Hill coefficient?

SECTION - II

[Forensic Biochemistry]

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

- i) Define the plant toxin.
 - ii) What is reversible toxicity?
 - iii) Define the term Allergic reactions.
 - iv) What is carbamates toxicity?
 - v) Define the term Dose response.
- b) How dermal irritation test is performed? [3]

Q6) Answer the following questions: [12]

- a) Explain cytochrome p-450 system. [4]
- b) Write short note on Mutagenicity. [4]
- c) Explain Idiosyncratic reactions with example. [4]

Q7) Answer the following questions: [12]

- a) Write the detail account on chronic exposure.
- b) Explain dose response relationship between different doses organophosphate insecticide.
- c) What is Draize test?

Q8) Answer the following questions: [12]

- a) Define the following terms:
 - i) Sub acute toxicity
 - ii) Acute lethality
- b) Explain importance of enzymes in forensic biochemistry.
- c) Define and explain apparent volume of distribution (aVd).



Total No. of Questions : 8]

SEAT No.:

PE-5327

[Total No. of Pages : 3

[6511]-401

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

SECTION - I

(Neurochemistry)

Q1) Answer the following questions: [11]

- a) Define the role of receptors in neurotransmission. [3]
- b) Explain the mechanisms of short-term memory. [4]
- c) Describe the types of sensory modalities. [4]

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

- a) Circadian rhythms
- b) Brain and behavior
- c) Thalamus

Q3) Answer the following questions: [12]

- a) Describe the synthesis and action of acetylcholine. [4]
- b) What are the major functions of the autonomic nervous system? [4]
- c) Describe the anatomical organization of the central nervous system. [4]

P.T.O.

- Q4)** Attempt the following questions (Any four): [12]
- a) What are the components of cerebrospinal fluid? [3]
 - b) Write a note on peripheral nervous system. [3]
 - c) What is the function of protein kinase in synaptic plasticity? [3]
 - d) Explain the role of receptors in perceptions of sensations. [3]
 - e) What is the mechanism of neurotransmitter reuptake? [3]

SECTION - II

(Endocrinology)

- Q5)** Answer the following questions: [11]
- a) What are the main classes of hormones based on their chemical structure? [3]
 - b) Explain the mechanism of hormone secretion. [4]
 - c) How do hormones from the pancreas regulate blood glucose levels? [4]
- Q6)** Write a short note on following: [12]
- a) Hypothalamic-pituitary axis.
 - b) Adrenal hormones
 - c) EGF
- Q7)** Answer the following questions: [12]
- a) What are secondary messengers, and why are they important in hormone action? [4]
 - b) Describe the mechanism of action of insulin on target cells. [4]
 - c) What is diabetes mellitus, and how does it relate to hormone dysfunction? [4]
- Q8)** Attempt the following questions (Any four): [12]
- a) Explain the effects of testosterone on male reproductive health. [3]
 - b) How does growth hormone deficiency impact growth and development? [4]

- c) Describe the effect of LH and FSH on target cells. [3]
- d) Explain the effect of thyroid hormone. [3]
- e) Discuss the hormonal interrelationship among the thyroid, adrenal and pituitary glands. [3]



Total No. of Questions : 8]

SEAT No. :

PE-5328

[Total No. of Pages : 2

[6511]-402

S.Y. M.Sc.

BIOCHEMISTRY

BCH-412 : Medical and Physiological Biochemistry

(2019 Pattern) (Semester - IV)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Use separate answer paper sheets for both sections.*
- 2) *Question 1 and question 5 are compulsory.*
- 3) *Attempt any two Q. from Q.No.2 to Q.No. 4.*
- 4) *Attempt any two Q. 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) Define the term Necrosis.
 - ii) Define the term Haemoglobinopathy.
 - iii) List the agents responsible for cancer.
 - iv) List the enzymes present in lysosomes.
 - v) Define apoptosis.
- b) With the help of diagram explain the mechanism of antibiotics that inhibits the translation process. **[3]**

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

- a) Why lysosomes are termed as a suicidal bags of cells? **[4]**
- b) Explain the extrinsic apoptosis pathway. **[4]**
- c) What is sickle cell anemia? Explain. **[4]**

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

- a) Explain plaques and tangles formed in 'Alzheimer disease'. **[4]**
- b) Describe the bacterial resistance mechanism against tetracyclins. **[4]**
- c) Describe any one drug that work as an 'antifungal' agent. **[4]**

P.T.O.

- Q4)** Answer the following questions. [12]
- a) Write short account on lysosomal storage diseases. [4]
 - b) List the enzymes used in study of Ischemic heart disease, write their significance. [4]
 - c) How proto oncogenes are converted to oncogenes? [4]
- Q5)** a) Attempt any four of the following: [4×2=8]
- i) Define the term alkalosis.
 - ii) What are the diagnostic test used to assess liver function.
 - iii) List the various functions of kidney.
 - iv) Define the term metabolic acidosis.
 - v) Write the role of platelets in blood clotting.
 - vi) What do you mean by the term 'Inborn errors of metabolism'.
- b) What is Fibrinolysis? Explain. [3]
- Q6)** Attempt the following questions. [12]
- a) List various disease condition of kidney and make a note on dialysis. [4]
 - b) How Bilirubin is formed? Explain using diagram. [4]
 - c) Add a short note on 'Respiratory Acidosis'. [4]
- Q7)** Attempt the following questions: [12]
- a) Explain Extrinsic pathway of blood coagulation. [4]
 - b) Elaborate the role of pancreatic juice in digestion. [4]
 - c) What is Jaundice? Elaborate different types of it. [4]
- Q8)** Attempt the following questions: [12]
- a) Explain intrinsic pathway of blood coagulation. [4]
 - b) Draw a diagram of 'Nephron a functional unit of kidney and explain its structure. [4]
 - c) Elaborate the various parts of Gastro-intestinal tract using diagram. [4]



Total No. of Questions : 8]

SEAT No. :

[Total No. of Pages : 3

PE-5329

[6511]-404

S.Y. M.Sc.

BIOCHEMISTRY

**BCH-413(B) : Clinical Nutrition and Food Technology
(2019 Pattern) (Semester - IV)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No.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 sheets for both sections.*
- 5) *Draw diagram wherever necessary.*

SECTION - I

(Clinical Nutrition)

Q1) a) Answer the following question Any Four: **[4×2=8]**

- i) Define alkaline food with examples.
 - ii) Define the term Inborn error of Metabolism.
 - iii) What is a fermentation process?
 - iv) What do you mean by Refining of food product?
 - v) Define the term food toxin.
- b) What is cooking? Explain the effect of cooking on food quality with advantages and disadvantages of cooking. **[3]**

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

- a) What is obesity? Why this condition occur? What are the metabolic changes observe in this state. **[6]**
- b) What is 'albinism'? Enlist symptoms and causes of it. **[4]**
- c) Define the term Malnutrition. **[2]**

P.T.O.

Q3) Answer the following questions: [12]

- a) What are dietary fiber? Explain the importance of fiber in food. [4]
- b) List the importance of Weight Management. [4]
- c) Write short account on nutritional anemia. [4]

Q4) Attempt the following questions: [12]

- a) Name different agencies and their role in supplementary nutritional programme. [4]
- b) Explain difference between natural food and genetically modified food. [4]
- c) What is effect of sprouting on quality and digestion of food. [4]

SECTION - II

(Food Technology)

Q5) a) Answer the following questions (Any Four): [4×2=8]

- i) What do you mean by synthetic syrups.
 - ii) Write the principle of food preservation.
 - iii) List the various sources for starch production.
 - iv) List any two important points of good laboratory practices in food technology laboratory.
 - v) Give food of animal and plant origin.
- b) How will you monitor food quality. [3]

Q6) Attempt the following questions: [12]

- a) What is meat tenderization? List the enzymes used in it? Why it is require? [4]
- b) Write short note on AUMARK. [4]
- c) Describe food spoilage. [4]

Q7) Write the answers of following questions: [12]

- a) What are thickening agents? Write its application in food industry. [4]
- b) Describe the role of FSSAI. [4]
- c) Describe the role of anti-caking agents in food technology with example. [4]

Q8) Attempt following questions: [12]

- a) Describe the role of salt in food preservation. [4]
- b) What is 'spoilage' condition seen in the food? Write about changes observe in this condition. [4]
- c) Write short account on 'Refining of various food product'. [4]

