Total No. of Questions : 10]

SEAT No. : ____

PD3198

[Total No. of Pages : 3

[6477]-101
M.Sc. - I
BIOCHEMISTRY
CHB - 501 - MJ : Biomolecules (T)
(2023 Credit Pattern) (Semester - I)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Q.1 and Q.6 are compulsory and carry 5 marks each.***
2) ***Attempt any three questions from question 2 to question 5.***
3) ***Attempt any three questions from question No. 7 to question No. 10.***
4) ***Answer of the two sections should be written an two separate answer sheets.***
5) ***Figures on right hand side indicate marks.***

SECTION - I

Q1) Answer the following. **[5]**

a) Define the term Macromolecules with example.

b) Write the Important function of HDL.

c) Write various source of vitamin A.

d) Write the structure of β(Beta) Maltose.

e) Define the term weak acid with example.

Q2) a) Answer the following questions.

i) Define Monosacctrides. How they classify? Give examples. **[3]**

ii) How vitamins are classified? Elaborate your answer with example. **[3]**

b) Answer the following question.

i) Why water is called universal solvent? **[2]**

ii) Write the structure of triglycerides. **[2]**

P.T.O.

Q3) Write short account on the following. **[5×2=10]**

a) Structure of water molecule.

b) Glycosidic bond.

c) Deoxy sugars

d) Coenzymes

e) Micelles

Q4) a) Answer the following.

i) Define the term polysaccharides? With the help of example classify polysaccharides. **[3]**

ii) Why sucrose is called an Invert sugar? Draw the structure of sucrose. **[3]**

b) Answer the following.

i) Write the biochemical function and deficiency of 'Riboflavin'. **[2]**

ii) Write short account on 'Rancidity'. **[2]**

Q5) Answer the following any two. **[10]**

a) What are fatty acids? How they are classify? Give examples. **[5]**

b) Write about osazone formation of glucose with reaction. **[5]**

c) What are lipoproteins? How they are classify? Write function of each class of lipoprotein. **[5]**

SECTION – II

Q6) Answer the following questions. **[5]**

a) Define amino acids.

b) What are 'Motifs'?

c) Write any two biological significance of protein.

d) What are nucleosides?

e) Write the structure of phenylalanine.

Q7) a) Answer the following questions.

i) With the help of diagram explain the primary function of protein. **[3]**

ii) Draw the structure of tRNA. Explain its and elaborate the function of tRNA. **[3]**

b) Answer the following questions.

i) How amino acids are classify on the basis of dietary need? Give examples. **[2]**

ii) Explain the α helix secondary structure of protein. **[2]**

Q8) Answer the following short notes. **[5×2=10]**

a) Biuret Reaction

b) Rare amino acids

c) Nucleotides

d) Acid base properties of amino acid

e) Ninhydrin Reaction of amino acid

Q9) a) Answer the following questions.

i) Explain Watson and crick model of DNA. **[3]**

ii) Write about steps involved in protein sequencing. **[3]**

b) Answer the following questions.

i) Write short account on Ramchandran plot. **[2]**

ii) What is β pleated sheets? Explain. **[2]**

Q10) Answer the following (any two). **[10]**

a) With the help of diagram explain titration curve of Glycine. **[5]**

b) Explain structure of Haemoglobin with the help of diagram. **[5]**

c) Explain types of DNA using diagram. **[5]**

Total No. of Questions : 10]

SEAT No. :

PD3199

[Total No. of Pages : 3

[6477]-102
First Year M.Sc.
BIOCHEMISTRY
CHB-502-MJ : Enzymology and Biophysical Techniques
(2023 Credit Pattern) (Semester - I)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Q.1 and Q.6 are compulsory and carry 5 marks.***
2) ***Attempt any three questions from Q.2 to Q.5.***
3) ***Attempt any three questions from Q.7 to Q.10.***
4) ***Answer to the two sections should be written in seperate answer sheets.***
5) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Answer any five of the following : **[5]**

a) What are the predomenant elements that alter the rate of enzymatic reactions?

b) Define the following term.

i) K_m

ii) V_{max}

c) How is substrate bound to the active site of an enzyme?

d) What are affinity lables?

e) Write M.M. equation.

f) Which enzyme has highest turnover no.?

Q2) Answer the following :

a) i) What is meant by enzyme inhibition? Discuss in detail competitive inhibition. **[3]**

ii) What is the effect of pH and temperature on enzyme activity? **[3]**

b) i) How is zymogen activated? **[2]**

ii) What is enzyme turnover? Comment on its significance. **[2]**

Q3) Write short notes on (Any 5) : **[10]**

a) Binding and active site of enzyme.

b) Lock and key hypothesis

c) Isoenzymes

d) Presteady state kinetics

e) Enzyme specificites

f) Allosteric enzymes

P.T.O.

Q4) Solve the following :

a) i) Comment on MWC model for regulation of enzyme activity. **[3]**

ii) Hepatic enzyme gives a V_{max} of 90m mole min^{-1} and initial velocity of 30mm min^{-1} at (s) of 2.5×10^{-2}M. Assuming enzyme obeys M.M. equation calculate km of the enzyme. **[3]**

b) i) How proximity and overnation enhances rate of enzyme catalysed reaction. **[2]**

ii) What is the relation between enzyme catalyzed reaction and transition state of reaction? **[2]**

Q5) Attempt any two of the following : **[10]**

a) How enzymes are classified? Elucidate your answer with suitable examples.

b) Explain in detail mechanism of action of chymotrypsin enzyme.

c) Discuss the kinetics of two substrate reaction.

SECTION - II

Q6) Attempt any five of the following : **[5]**

a) What is cation exchange column?

b) What are the disadvantages of gel electrophoresis?

c) Which buffer is used for isoelectric focusing?

d) What is dialysis in relation to membrane?

e) How do you calculate Rf values of separated amino acids in paper chromatography?

f) What is chromatogrpahy?

Q7) Answer the following :

a) i) Describe any three factors that have an impact on the biomolecules absorption spectra. **[3]**

ii) How will you check the purity of an eznyme? **[3]**

b) i) Mention two unique advantages of Gel filtration chromatography. **[2]**

ii) Comment on TLC. **[2]**

Q8) Write short notes on (Any 5) **[10]**

a) Lyophilization

b) disc PAGE

c) Reverse dialysis

d) Absorption spectrum

e) Agarose gel electrophoresis

f) Moving boundary electrophoresis

Q9) Solve the following :

a) i) Draw the schematic diagram of U.V. visible spectrophotometer and explain the instrumentation. **[3]**

ii) Discuss why ammonium sulphate is preferred over other salts for precipitating proteins. **[3]**

b) i) Give an exmaple for the following : **[2]**

1) A stationary phase used in hydrophobic chromatography.

2) A gas use in GLC as mobile phase

ii) State the principle of GLC. **[2]**

Q10)Attempt any two of the following : **[10]**

a) Explain the components of HPLC.

b) Discuss the principle and applications of DNA-Cellulose chromatography.

c) Mention the role of the following :

i) Bromophenol blue in sample buffer

ii) Ampholytes in isoelectric focusing.

iii) High temperature in GLC

iv) Photomultiplier tube in U.V. spectrophotometer.

v) TEMED in gel electrophoresis.

Total No. of Questions : 5]

SEAT No. :

PD3200

[Total No. of Pages : 2

[6477]-103
First Year M.Sc.
BIOCHEMISTRY
CHB-503-MJ : Cell Biology
(2023 Credit Pattern) (Semester - I)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Attempt any three questions from Q.2 to Q5.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following questions (any 5) : **[5]**

a) What is mycellium?

b) Explain the function of mitochondria.

c) What are cell adhesion molecules?

d) Explain the difference between mitosis and meosis.

e) Explain fibronectin structure.

f) How does cyclins and cyclin-dependent kinases function?

Q2) a) Answer the following question : **[6]**

i) Explain the structure and function of xylem and phloem?

ii) Distinguish between internal organization in prokaryotic cell and eukaryotic cell.

b) Answer the following question : **[4]**

i) Draw and label structure of plant cell.

ii) Explain the term sister chromatid.

Q3) Write short note (any 5) : **[10]**

a) Chloroplast

b) Germ cells

c) Animal cell

d) Acrosome reaction

e) Extracellular matrix

f) Golgi apparatus

P.T.O.

Q4) a) Answer the following question : **[6]**

i) Explain with diagram hemidesmosomes.

ii) Explain density gradient centrifugation.

b) Answer the following question : **[4]**

i) How is cell cycle regulated.

ii) Explain specific cell aggregation in sponges.

Q5) Answer the following question (any 2) **[10]**

a) Describe the process of fertilization.

b) Describe different phases of cell cycle.

c) Explain with the diagram the process of meosis.

Total No. of Questions : 5]

SEAT No. :

PD3201

[Total No. of Pages : 2

[6477]-104
First Year M.Sc.
BIOCHEMISTRY
CHB-505-MJ : Microbiology
(2023 Credit Pattern) (Semester - I)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Attempt any three questions from Q.2 to Q.5.***
3) ***Figures to the right indicate full marks.***

Q1) Answer any five of the following : **[5]**

a) Define enterotoxin and neurotoxin.

b) Differentiate between sporocidal and bactericidal.

c) Enlist the methods for pure culture preparation.

d) Explain pathogenesity of bacteria.

e) Define viroids and give an example of disease caused by it.

f) Define mutant, mutation and mutagen.

Q2) a) Attempt the following : **[6]**

i) Explain continuous culture of bacteria.

ii) Write the principle and applications of phase contrast microscopy.

b) Attempt the following : **[4]**

i) Enlist the groups of chemical antimicrobial agents with suitable examples.

ii) Explain phototrophs and chemotrophs.

P.T.O.

Q3) Write a short note on any five of the following : **[10]**

a) Aerobic and anaerobic bacteria.

b) Bacteriophage

c) Denitrification

d) Vaccines

e) SEM

f) Streak plate technique

Q4) a) Attempt the following : **[6]**

i) Explain the production of Lysine.

ii) Compare the advantages and disadvantages of various techniques of isolation of micro-organisms in pure cultures.

b) Attempt the following : **[4]**

i) Explain the mode of action of tetanus toxin.

ii) Explain isolation and purification of auxotrophic mutants.

Q5) Answer any two of the following : **[10]**

a) Give a detail account on nitrogenase enzyme complex.

b) Explain the mechanism of Lysogeny.

c) Differentiate between prokaryotic and eukaryotic cells.

Total No. of Questions : 6]

SEAT No. : ____

PD3202

[Total No. of Pages : 2

[6477]-106
First Year M.Sc.
BIOCHEMISTRY
CHB -508 RM : Research Methodology
(2023 Credit Pattern) (Semester - I)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Attempt all question.***
2) ***Figures to the right indicate full marks.***

Q1) Answer the following questions. **[5×2=10]**

a) Which is universal solvent? list the other solvents generally used.

b) Define trade secretes and give example.

c) What is use of cobalt in Irradiation.

d) What is incinerator? write application.

e) Differentiate between word processing and spreadsheet packages.

Q2) Attempt any two of the following. **[2×5=10]**

a) What is use of centrifuge? Write short account or safety of it.

b) What is PPE? Explain wide range of equipments used in it.

c) What is patent? list rights of patents.

P.T.O.

Q3) Attempt the following questions as short notes. **[3×5=15]**

a) Use of microwave in disintection.

b) Importants of patent.

c) Storage of chemicals.

Q4) Attempt following questions: **[2×5=10]**

a) Calculate mean of the following using formula.

61, 68, 69, 70, 63, 70, 69, 78.

b) Calculate median of the following using formula.

61, 63, 68, 69, 70, 70, 78

Q5) Answer the following questions. **[3×5=15]**

a) Write short account on Basic Rules of Laboratory work.

b) How will you Import.

i) C × F file

ii) A structure into drawing editor.

c) List the types of Intellectual property with importants.

Q6) Answer the following questions. **[2×5=10]**

a) Give graphical representation of patent grading procedure.

b) What is Biomedical waste? Write short account on disposal of Biomedical waste.

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Total No. of Questions : 10]

SEAT No. : ____

PD3203

[Total No. of Pages : 3

[6477]-201
M.Sc. - I
BIO-CHEMISTRY
CHB-551-MJ : Bioenergetics and Metabolism
(2023 Credit Pattern) (Semester -II)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Q. number 1 and Q. number 6 are compulsory and carry 5 marks.***
2) ***Attempt any three questions from Q. number 2 to Q. Number 5.***
3) ***Attempt any three questions from Q. number 7 to Q. number 10.***
4) ***Use separate answer paper sheets for both sections.***
5) ***Figure on right hand side indicate marks.***

SECTION-I

Q1) Attempt the following questions. **[5]**

a) Define the term Enthalpy?

b) Define the term oxidative phosphorylation?

c) List the energy rich compounds in the body.

d) Draw struture of ATP.

e) Write the names of types of fatty acid oxidation.

Q2) a) Attempt the following questions. **[6+4=10]**

i) With the help of example explain substrate level phosphorylation. **[3]**

ii) Explain carnitine shuttle. **[3]**

b) Attempt the following questions.

i) Write the energetics TCA **[2]**

ii) Explain the reaction of conversion of pyruvate to acetyl coenzyme A. **[2]**

P.T.O.

Q3) Write short notes on the following. Any 5. **[10]**

a) Pay-off phase of glycolysis

b) Three bypass reactions of gluconeogenesis

c) Glyoxalate cycle

d) Triglyceride synthesis

e) Fate of pyruvate

f) Regulation of glycolysis

Q4) a) Attempt the following questions. **[6+4=10]**

i) Draw a neat, labelled diagram of Electron Transport Chain (ETC). **[3]**

ii) Explain how many ATP are produce when palmitoyl Co A enters in beta oxidation. **[3]**

b) Attempt the following questions.

i) Write the flow chart of the synthesis of fatty acid? **[2]**

ii) How is TCA cycle regulated? **[2]**

Q5) a) Attempt the following questions. **[6+4=10]**

i) Explain the entry of glycogen in glycolysis with reactions. **[3]**

ii) Elaborate the Q cycle in Electron Transport chain. **[3]**

b) Attempt the following questions.

i) What are ketone bodies? **[2]**

ii) Define the term Inborn error of carbohydrate metabolism with example. **[2]**

SECTION-II

Q6) Attempt the following questions. **[5]**

a) What do you mean by salvage pathway?

b) What is phenylketonuria?

c) Define the term proteolysis with significance.

d) Give the examples of nucleotide coenzymes.

e) What is Tyrosinemia?

Q7) a) Attempt the following questions. **[6+4=10]**

i) Explain the Urea cycle with diagram. **[3]**

ii) Explain the mechanism of Ribonucleotide reductase enzyme. **[3]**

b) Attempt the following questions.

i) Define the term proteolysis. **[2]**

ii) Write the conversion Histidine → Histamine **[2]**

Q8) Write short notes on the following. Any 5. **[10]**

a) Transamination of amino acids

b) dUMP → dTMP conversion

c) Significances of glutathione biosynthesis

d) Conversion of phenyl alanine → Tyrosine

e) PRPP synthesis from Ribose -5-phosphate

f) IMP → GMP conversion

Q9) a) Attempt the following questions. **[6+4=10]**

i) Explain the conversion of Serine to Glycine with role of tetra-hydro-folate. **[3]**

ii) Explain the salvage pathway of purine nucleotide. **[3]**

b) Attempt the following questions.

i) How is Pyrimidine biosynthesis regulated? **[2]**

ii) What are decarboxylation reactions of amino acids? Give example. **[2]**

Q10)a) Attempt the following questions. **[6+4=10]**

i) Explain the regulation of urea cycle. **[3]**

ii) How Isoleucine, leucine enters in degradation pathway? **[3]**

b) Attempt the following questions.

i) Write the following conversation of chorishmate → Penyl-alanine **[2]**

ii) How Dopa amine is synthesized? **[2]**

Total No. of Questions : 10]

SEAT No. : ____

PD3204

[Total No. of Pages : 3

[6477]-202
M.Sc. - I
BIOCHEMISTRY
CHB-552-MJ : Membrane Biochemistry and Genetics
(2023 Credit Pattern) (Semester - II)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Q.1 and Q.6 are compulsory and carry 5 marks each.***
2) ***Attempt any Three questions from Q.2 to Q.5.***
3) ***Attempt any Three questions from Q. No. 7 to Q. No. 10.***
4) ***Answers the two sections should be written in separate answer books.***
5) ***Figures to the right indicate full marks.***

SECTION - I

(Membrane Biochemistry)

Q1) Answer the following. **[5]**

a) What is the difference between simple and facilitated diffusion?

b) Define Exocytosis

c) In what way are membrane proteins asymmetrical?

d) Name any two ion translocating antibiotics

e) Justify the statement: Phosphatidylcholine and Sphingomyelin are generally present outside the leaflet of cell membrane

Q2) Attempt the following questions.

a) How does Na^+K^+ ATpase pump work? **[3]**

b) How does a gap junction facilitate intercellular communication? **[3]**

c) Discuss facilitated diffusion and its type. **[4]**

Q3) Answer the following questions.

a) What happens to the blood cells when suspended in isotonic, hypotonic and hypertonic solution? **[3]**

b) How is calcium transported out of the cell? **[4]**

c) Comment on factors affecting physical properties of membrane. **[3]**

P.T.O.

Q4) Explain the following.

a) Nuclear Pore **[2]**

b) Phosphotransferase system **[3]**

c) Acetylcholine receptor **[2]**

d) Uniporter, Symporter and Antiporter **[3]**

Q5) Attempt the following questions.

a) Describe the process of receptor mediated endocytosis with suitable example. **[5]**

b) What is the mechanism of voltage gated ion channel? What triggers voltage gated ion channels. **[5]**

SECTION - II

(Genetics)

Q6) Answer the following. **[5]**

a) Describe Mendel's law of dominance.

b) What are Prototrophs? Explain with an example.

c) What are cosmids? Give example.

d) What is complementation tests?

e) What do you mean by colinearity in genetics?

Q7) Answer the following.

a) Explain Hershey and Chase experiment to prove DNA as genetic material. **[3]**

b) Describe in detail Mendel's law of independent assortment with suitable examples for crossing of genes. **[3]**

c) What is fertility factor? Explain the process of conjugation in bacteria with a well labelled diagram. **[4]**

Q8) Explain the following.

a) Denaturation of DNA **[3]**

b) Concept of gene by Benzer **[4]**

c) Plasmid as vector **[3]**

Q9) Attempt the following questions.

a) Define genotype and phenotype with examples. **[2]**

b) What are conditional mutants? Give examples. **[2]**

c) Describe any two genetic disorders of chromosomal origin. **[3]**

d) How are mutants isolated and selected? **[3]**

Q10) Answer the following.

a) Write a short note on human teratogenesis. **[5]**

b) Define transduction and explain in detail the mechanism of transduction with a neat labelled diagram. **[5]**

Total No. of Questions : 5]

SEAT No. : ____

PD3205

[Total No. of Pages : 2

[6477]-203

M.Sc.-I

BIOCHEMISTRY

CHB -553-MJ : Techniques in Characterization of Biomolecules

(2023 Credit Pattern) (Semester -II)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory and carry 5 marks.***
2) ***Attempt any three questions from Q.2 to Q.5.***
3) ***Answer to both sections should be written on separate answer sheets.***
4) ***Figures to the right indicates full marks.***

Q1) Answer any five of the following. **[5]**

a) Why does viscocity change with temperature.

b) What is sedimentation coefficient and in what unit it is measured?

c) Why are Ramchandran plots important?

d) How does light affect fluorescence?

e) What is the main use of MALDI TOF in protein studies?

f) Why does radiation occur?

Q2) Answer the following.

a) i) What is X-ray diffraction of biomolecule? **[3]**

ii) Discuss the principle of IR spectroscopy in the molecular structure elucidation. **[3]**

b) i) Explain the principle of CD. **[2]**

ii) Which radiation is used in autoradiography. **[2]**

P.T.O.

Q3) Write short notes on. (Any five) **[10]**

a) Intrinsic viscosity

b) Fluorescence

c) Ultra centrifugation

d) Autoradiography

e) X-ray Diffraction

f) MALDI-TOF-MS

Q4) Solve the following.

a) i) Write the factors affecting viscosity. **[3]**

ii) Explain the difference between diffusion and sedimentation equilibrium **[3]**

b) i) What is zonal centrifugation **[2]**

ii) What is the use of chromophose in spectroscopy? **[2]**

Q5) Attempt any two of the following. **[10]**

a) Write the application of preparative centrifugation.

b) Write a note on NMR.

c) Explain the ionization methods used in LCMS and GCMS.

Total No. of Questions : 5]

SEAT No. : ____

PD3206

[Total No. of Pages : 2

[6477]-204
M.Sc. - I
BIO-CHEMISTRY
CHB-555/560-MJ : Bioinformatics
(2023 Credit Pattern) (Semester - II)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Attempt any 3 questions from Q.2 to Q.5.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following questions (Any 5) **[5]**

a) What is Scopus, and how does it help researchers?

b) What is h-index?

c) What is UniRef, and why is it important?

d) What is phylogenetic analysis used for?

e) Explain protein data bank.

f) How does NCBI help in science?

Q2) a) Answer the following questions. **[6]**

i) What does phylogenetic analysis help scientists understand?

ii) How can you evaluate the quality of a scientific journal using impact factors?

b) Answer the following questions. **[4]**

i) What kind of tools and databases are available through the EBI?

ii) What is the role of PubMed, and Google Scholar in conducting a literature search?

P.T.O.

Q3) Write a Short note (Any 5) **[10]**

a) CLUSTALW

b) GenPept

c) dbEST

d) BLAST

e) Multiple sequence alignment

f) Local alignment

Q4) a) Answer the following questions. **[6]**

i) What kind of information can be found in GenBank?

ii) Explain how pairwise alignment works and why it is useful in comparing sequences.

b) Answer the following questions. **[4]**

i) What is the main use of GenBank, and who uses it?

ii) How does UniProtKB help in understanding proteins?

Q5) Answer the following questions (Any Two). **[10]**

a) How do BLAST and CLUSTALW help in sequence analysis?

b) How do you conduct a scientific literature search using PubMed, Scopus, and Google Scholar?

c) How do GenPept and UniProtKB assist in protein sequence analysis?

Total No. of Questions : 7]

SEAT No. : ____

PD3207

[Total No. of Pages : 2

[6477]-301
S.Y. M.Sc.
BIOCHEMISTRY
CHB - 601 - MJ : Molecular Biology
(2023 Credit Pattern) (Semester - III)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Answer in short (any 5) : **[10]**

a) What are transposable elements?

b) What is translation? Give the role of mRNA in translation.

c) What is nonsense codon? Give its functions.

d) What is the role of origin of replication locus in DNA replication.

e) What is pyrimidine dimer?

f) Why is RNA splicing important?

g) Give the significance of signal sequence in protein targetting.

Q2) a) Answer any 2 of the following. **[6]**

i) Describe in detail initiation of translation in prokaryotes.

ii) How is protein targetted across ER membrane?

iii) Describe in detail mechanism of bacterial defense against viruses.

b) Describe the process of transcription in prokaryotes. **[4]**

P.T.O.

Q3) a) Answer any 2 of the following. **[6]**

i) Write a short note on the enzyme RNA polymerase.

ii) Write a short note on Apoptosis.

iii) Explain in detail epigenetic modification.

b) Describe in detail the mechanism of base excision Repair. **[4]**

Q4) a) Answer any 2 of the following. **[6]**

i) Describe the consequences of defective DNA repair system and the disease they cause.

ii) Describe the phenomenon of self splicing and its significance.

iii) What are transcription factors, and how do they regulate gene expression?

b) Explain the mechanism of homologous genetic recombination. **[4]**

Q5) a) Answer any 2 of the following. **[6]**

i) Differentiate between DNA polymerase I, II and III.

ii) How is protein synthesis terminated in Bacteria?

iii) Explain in detail pest translational modification.

b) Describe ubiquitin dependent pathway for protein degradation. **[4]**

Q6) a) Answer any 2 of the following. **[6]**

i) Describe any 3 inhibitors of transcription.

ii) Explain alternative splicing.

iii) How does DNA replication in Eukaryotes differ from prokaryotes?

b) With diagram explain the discontineous synthesis of okazaki fragments.**[4]**

Q7) Answer any 4 of the following. **[10]**

a) Write a short note on 3 polytailing

b) Define DNA strands at the replication fork

c) Write the properties of group I intron.

d) What is the role of ligase enzyme?

e) Give the significance of chromatin remodeling in transcription.

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Total No. of Questions : 10]

SEAT No. :

PD3208

[Total No. of Pages : 3

[6477]-302
M.Sc. - II
BIOCHEMISTRY
CHB-602-MJ : Medical Biochemistry and Immunology
(2023 Credit Pattern) (Semester - III)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Q.1 and Q.6 are compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Solve any three questions from Q.7 to Q.10.***
4) ***Use separate answer sheets for both sections.***
5) ***Figures to the right indicate full marks.***

SECTION - I
(Medical Biochemistry)

Q1) Answer the following : **[5]**

a) What is 'autophagy'?

b) List the enzymes studied in coronary heart diseases.

c) Define the term apoptosis.

d) Define the term cancer.

e) What kind of drugs are macrolides?

Q2) a) Answer the following questions :

i) How 'azoles' works as antifungal drug. **[3]**

ii) How protooncogens are converted to oncogenes? **[3]**

b) Attempt the following questions.

i) Define the term 'Angina'? **[2]**

ii) List the names of enzymes found in lysosomes. **[2]**

Q3) Attempt the following short notes. **[10]**

a) Phagocytosis

b) Cancer causing agents

c) Hallucinogens and their effects

d) Lysosomal storage diseases (LSD).

e) Mode of action of sulfonamides/sulfa drugs.

P.T.O.

Q4) a) Answer the following questions :

i) Discuss with the help of diagram mode of action of antibiotics that inhibits SOS Ribosomal submit action. **[3]**

ii) Write the short account on mode of action of analgesics. **[3]**

b) Attempt the following questions :

i) List types of Tualassemia. **[2]**

ii) What is Necrosis. **[2]**

Q5) Attempt the following questions : (Any two) **[10]**

a) Discuss extrinsic pathway of apoptosis? **[5]**

b) How microorganisms develop resistance to tetracyclins? **[5]**

c) Write the mode of action of penicillin with diagram and explanation. **[5]**

SECTION - II
(Immunology)

Q6) Answer the following questions : **[5]**

a) What are interferons?

b) Write the principle of 'RIA' technique.

c) What do you mean by 'opsonization'.

d) Define the term 'Humoral Immune Response'.

e) What are blood group antigens?

Q7) a) Answer the following questions :

i) With the help of diagram explain structure of class MHC-II. **[3]**

ii) What are vaccines? Explain various types of it. **[3]**

b) Answer the following questions.

i) Draw and labelled the diagram of antibody. **[2]**

ii) How 'monoclonal antibodies' are produced in the laboratory? **[2]**

Q8) Write short notes on the following : **[10]**

a) Bone marrow

b) Type I hypersensitivity

c) Applications of immuno electrophoresis.

d) Types of immuno diffusion.

e) Haematopoiesis.

Q9) a) Answer the following questions :

i) Explain classical pathway of complement system. **[3]**

ii) Discuss antigen presentation & processing by 'cytosolic pathway'. **[3]**

b) Answer the following questions : **[4]**

i) What is active and passive immunity?

ii) Write principles of 'Western Blot' technique.

Q10) Answer the following questions : **[10]**

a) With the help of diagram explain cell mediated immune response. **[5]**

b) What is ELISA? Explain various types using diagrams. **[5]**

Total No. of Questions : 5]

SEAT No. :

PD3209

[Total No. of Pages : 2

[6477]-303
S.Y. M.Sc.
BIOCHEMISTRY
CHB-603-MJ : Biochemistry of Specialized Tissue
(2023 Credit Pattern) (Semester - III)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q.1 is compulsory and carries 5 marks.***
2) ***Attempt any three questions from Q.2 to Q.5.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following : (Any 5) **[5]**

a) How do bacterial flagella move?

b) Which organelle provides ATP energy for muscle contractions?

c) How does sarin affect the cholinergic synapse?

d) What role do the ossicles play in the transmission of sound?

e) Explain how taste perception is initiated at the molecular level.

f) What are mechanoreceptors of the skin

Q2) Answer the following :

a) i) What is the difference between thick and thin filaments? **[3]**

ii) Describe the structure of the skin's epidermis and its relevance to touch sensation. **[3]**

b) i) What are the energy sources for muscle contraction? **[2]**

ii) Define chemotaxis and explain its importance in cell motility. **[2]**

Q3) Write short notes on (any five) : **[10]**

a) Types of cones in the retina?

b) Outer segment of photoreceptor cells.

c) Stereocilia

d) Auditory transduction

e) Sensation of itch

f) G-proteins in olfactory signaling.

P.T.O.

Q4) Solve the following :

a) i) How does the organization of myofibrils contribute to muscle contraction? **[3]**

ii) How do potassium ions move through potassium channels in axons? **[3]**

b) i) Describe the molecular structure of actin. **[2]**

ii) How does acetylcholine transmit signal from nerve to muscle? **[2]**

Q5) Attempt any two of the following : **[10]**

a) Discuss contractile proteins in eukaryotic cells other than muscle filaments, highlighting their roles in cell motility and structure.

b) How does the visual cycle regenerate rhodopsin?

c) Discuss the creation and propagation of a nerve impulse, detailing the phases of depolarization and repolarization.

Total No. of Questions : 5]

SEAT No. : ____

PD3210

[Total No. of Pages : 2

[6477]-304
S.Y.M.Sc.
BIOCHEMISTRY
CHB - 610 MJ : Toxicology
(2023 Credit Pattern) (Semester - III)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.No. 2 to Q.No.5.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following questions. **[5]**

a) Define the term Toxicology.

b) Define Antidote.

c) What are hallucinogens.

d) Define the term biotransformation.

e) List the various areas of toxicology study.

Q2) a) Answer the following questions. **[6]**

i) What is Dose Response? List the types of it.

ii) What measures to be taken during poisoining treatment.

b) Answer the following. **[4]**

i) Define the term tolerance & give its types.

ii) Write few applications of forensic toxicology.

Q3) Write short note on the following. **[5×2=10]**

a) Selective Toxicity.

b) Nacrotics.

c) Systemic toxicity

d) Cardiac poisons

e) Classification of antidote.

P.T.O.

Q4) a) Answer the following questions. **[6]**

i) Write short account on phase I reactions of Biotransformation.

ii) What are asphyxiant poisons?

b) Answer the following questions. **[4]**

i) What are inorganic poisons?

ii) List the sites of exposure of toxic substances.

Q5) Attempt the following questions. **[10]**

a) With the help of example explain phase II Biotransformation reactions.

b) What are miscellaneous poisons? Give their types with examples.

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Total No. of Questions : 5]

SEAT No. : ____

PD3211

[Total No. of Pages : 2

[6477]-305
S.Y.M.Sc.
BIOCHEMISTRY
CHB-611-MJ: Physiological Biochemistry
(2023 Credit Pattern) (Semester - III)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Attempt any three questions from Q.2 to Q.5.***
2) ***Figure to the right indicate full marks.***

Q1) Attempt the following questions. **[5]**

a) List the composition of blood.

b) Write the names of liver disorders.

c) Which are the diagnostic test of kidney?

d) Define the term anemia.

e) Define the term Respiration.

Q2) a) Answer the following questions. **[6]**

i) With the help of diagram Explain functional unit of kidney, 'Nephron'. **[3]**

ii) What is Jaundice? Elaborate its types. **[3]**

b) Answer the following question. **[4]**

i) How carbohydrates are digested?

ii) Define the term 'Metabolic audosis'.

Q3) Write short notes on the following. **[5×2=10]**

a) Blood Brain Barrier (Barrier)

b) Fibrinolysis

c) Transport of O_2 (Oxygen)

d) Transport of CO_2 (Carbon dioxide)

e) Bohrs Effect

P.T.O.

Q4) a) Answer the following question. **[6]**

i) Explain Intrinsic pathway of blood cogulation. **[3]**

ii) How proteins are digested and absorbed? **[3]**

b) Answer the following question. **[4]**

i) What is Respiratory audosis? **[2]**

ii) Write about any four functions of kidney. **[2]**

Q5) Answer the following questions. **[10]**

a) Write about platelet aggregation and Extrinsic pathway of blood cogulation. **[5]**

b) Define the term ultamins. Write about its absorption. **[5]**

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Total No. of Questions : 5]

SEAT No. :

PD3212

[Total No. of Pages : 2

[6477]-306
S.Y. M.Sc.
BIOCHEMISTRY
CHB-612-MJ : Applied Plant Biochemistry
(2023 Credit Pattern) (Semester - III)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q.1 is compulsory and carry 5 marks.***
2) ***Attempt any three questions from Q.2 to Q.5.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following : (Any 5) **[5]**

a) Give role of Mn in plants.

b) Define photophosphorylation.

c) What is ligin?

d) Give any two applications of rubber?

e) What are macromolecules in plant?

f) Name the alkaloid obtained from papaver somniferum.

Q2) Answer the following :

a) i) What is Green house technology? **[3]**

ii) Write a note on terpenoids? **[3]**

b) i) Give role of ethylene in plant growth. **[2]**

ii) Draw the structure of chloroplast. **[2]**

Q3) Write short notes on (any five) : **[10]**

a) Gibberellins

b) Photosystems

c) Parthenocarpy

d) Accessory pigments in photosynthesis

e) Leghemoglobin

f) Photorespiration

P.T.O.

Q4) Solve the following :

a) i) What are advantages of Phytoremediation? **[3]**

ii) Discuss hormones in senescence. **[3]**

b) i) Give names of any two plants used in phytoremediation. **[2]**

ii) Give deficiency symptoms of Mg in plants. **[2]**

Q5) Attempt any two of the following : **[10]**

a) Discuss Hydroponics as a advanced farming technology.

b) Describe calvin cycle.

c) Explain biological and abiological Nitrogen fixation.

Total No. of Questions : 6]

SEAT No. : ____

PD3213

[Total No. of Pages : 2

[6477]-401
M.Sc. -II
BIOCHEMISTRY
CHB-651-MJ : Genetic Engineering
(2023 Credit Pattern) (Semester - IV)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicates full marks.***

Q1) Attempt the following. **[5×2=10]**

a) Write the applications of genetic engineering.

b) Define transformation and transfection.

c) Draw and explain the structure of pUC18.

d) Write the role of restriction endonuclease in genetic engineering.

e) What are the applications of RT-PCR?

Q2) Attempt the following questions (any 2). **[2×5=10]**

a) Explain blue plaques and clear plaques formation while selection of recombinants.

b) What are the advantages of DNA vaccine over conventional vaccines?

c) Explain principle and procedure of southern blotting.

Q3) Write short note on the following (any 3). **[3×5=15]**

a) RFLP.

b) Recombinant vaccine.

c) Ti plasmid.

d) Plaque hybridization.

P.T.O.

Q4) Answer the following: **[10]**

a) Why are sticky ends important in genetic engineering experiments? What are the methods of putting sticky ends to blunt ended DNA molecules?

b) Explain yeast vectors.

Q5) Answer the following: **[3×5=15]**

a) What are the steps to prepare edible vaccine? What are the applications of edible vaccine?

b) Explain the principle and applications of hot-start PCT.

c) What do you understand by artificial chromosome? Explain structure of yeast artificial chromosome with its advantages.

Q6) Answer the following: **[10]**

a) Plant viruses exhibit natural tendency of gene transfer to plants and thus have the potential for use as gene transfer and expression vectors. Explain the statement. Give a brief account on DNA and RNA viruses, which are used as expression vectors for plant transformation.

b) Describe the principle and procedure of RNA labeling by in vitro transcription.

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Total No. of Questions : 10]

SEAT No. : ____

PD3214

[Total No. of Pages : 3

[6477]-402
M.Sc. - II
BIOCHEMISTRY
CHB-652-MJ : Fermentation Technology and Tissue Culture
(2023 Credit Pattern) (Semester - IV)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Q1 and Q6 are compulsory and carry 5 marks each.***
2) ***Attempt any Three questions from Q.2 to Q.5.***
3) ***Attempt any Three (3) questions from Q. No. 7 to Q. No. 10.***
4) ***Answer the two sections should be written on separate answer sheets.***
5) ***Figure on right hand side indicate marks.***

SECTION - I
(Fermentation Technology)

Q1) Answer any five of the following. **[5]**

a) Define COD

b) How dilution rate is useful in continuous culture?

c) What is meant by enrichment culture?

d) What is meant by antifoams?

e) Define feedback repression?

f) What is media formulation?

Q2) a) Attempt the followings: **[6]**

i) What is the importance of antifoaming agents in fermentation?

ii) What is meant by inoculum development? Discuss with example

b) Attempt the following: **[4]**

i) How inhibitors will be useful in fermentation process?

ii) Which are the nitrogen sources used for fermentation?

Q3) a) Attempt the followings: **[6]**

i) What are the things that are filter sterilized?

ii) Discuss the importance of aeration for the fermentation

b) Attempt the following: **[4]**

i) What are the different types of impellers used for agitation?

ii) What is the fate of pyruvate under anaerobic condition?

P.T.O.

Q4) a) Attempt the followings: **[6]**

i) What is the effect of time of sterilization on the yield of the product?

ii) What are the different types of sensors used during fermentation?

b) Attempt the following: **[4]**

i) What do you understand from the term fed batch culture?

ii) How will you isolate auxotrophic mutant?

Q5) Answer any two of the following: **[10]**

a) Discuss with suitable diagram the construction of a fermenter

b) Explain the steps involved in downstream processing?

c) What are the different methods used for effluent treatment?

SECTION - II

(Tissue Culture)

Q6) Attempt the following. **[5]**

a) What is the difference between soft and compact callus tissues?

b) Define the terms: embryoid and cybrid.

c) What are the advantages of natural media of animal tissue culture?

d) Write the importance of suspension culture.

e) Define contact inhibition

Q7) a) Write short note on the following. **[6]**

i) Monolayer culture.

ii) Embryo culture.

b) Attempt the following. **[4]**

i) Differentiate between primary cell line and established cell line.

ii) Explain the importance of root culture.

Q8) Write short note on the following (any 5). **[10]**

a) Cryopreservation

b) Applications of tissue culture

c) Hybridoma technology

d) Conditioning of tissue cultured plants

e) Organ culture.

f) Arrangement of tissue culture laboratory.

Q9) a) Answer the following. **[6]**

i) Describe principle and procedure of preparation of aseptic explant for plant tissue culturing.

ii) What are the applications of cytotoxic assay.

b) Attempt the following. **[4]**

i) Describe media preparation and sterilization technique in tissue culture.

ii) Explain the tests to check viability of cultured cells.

Q10) Attempt any two of the following. **[10]**

a) Describe principle, procedure and applications of protoplast culture.

b) What do you mean by contamination and cross contamination? How to identify it? What care must be taken to avoid it?

c) Explain the role of following in tissue culture laboratory: Laminar Air flow hood, CO_2 incubator, Culture vessels, Autoclave, Refrigerator

Total No. of Questions : 5]

SEAT No. :

PD3215

[Total No. of Pages : 2

[6477]-403

S.Y.M.Sc.

BIOCHEMISTRY

CHB-660-MJ : Endocrinology

(2023 Credit Pattern) (Semester-IV)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Question 1 is compulsory and carry 5 marks.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following questions. **[5]**

a) List the function of cortisol. **[1]**

b) What is Thyroglobulin? **[1]**

c) Define the term Target cell. **[1]**

d) List the major difference between type I diabetes mellitus and type II diabetes mellitus. **[2]**

Q2) a) Attempt the following questions. **[6]**

i) Elaborate a role of IP_3 and DAf as a secondary messenger with diagram. **[3]**

ii) How hormone secreted by thyrotrops from anterior pitutary gland regulates, controls the secretion of harmone from thyroid gland. **[3]**

b) Answer the following questions. **[4]**

i) What are receptors? How are they classified? **[2]**

ii) Elaborate the classification of harmone with example. **[2]**

Q3) Write short account on the following. **[5×2=10]**

a) Parathyroid gland

b) Calcium calmodulin system

c) Insulin and mode of action

d) Catecholamines

e) Hypothalamus

P.T.O.

Q4) a) Answer the following questions. **[6]**

i) Explain the mechanism of action of hormone, secreted by posterior pitutary gland. **[3]**

ii) With the help of diagram explain the synthesis of steroid harmone. **[3]**

b) Answer the following questions. **[4]**

i) Write the physiological role of growth hormones. **[2]**

ii) Write in details about any two gastrointestinal hormone secretion and mode of action. **[2]**

Q5) Answer the following questions. **[2×5=10]**

a) Why cyclic-amp is termed as secondary messenger system? Elaborate your answer with diagram and mechanism.

b) What is target cell insensitivity? Explain with the help of examples.

Total No. of Questions : 5]

SEAT No. :

PD3216

[Total No. of Pages : 2

[6477]-404

M.Sc. - II

BIOCHEMISTRY

CHB-661-MJ : Food Technology

(2023 Credit Pattern) (Semester-IV)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Question 1 is compulsory and carry 5 marks.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following questions. **[5]**

a) What is Spiruline?

b) List the purpose of food analysis in food technology

c) List the types of Genetically modified food (GMO).

d) Which parameters are included in proximate composition analysis of food.

e) Define the term food Thickner with example.

Q2) a) Answer the following questions. **[6]**

i) Define the term single cell protein. List advantages of single cell protein. **[3]**

ii) Explain the effect of germination as the carbohydrate contents of food. **[3]**

b) Answer the following questions. **[4]**

i) Define the term food additives. **[2]**

ii) List anticaking agents used in food Technology. **[2]**

P.T.O.

Q3) Write short notes on the following. **[5×2=10]**

a) Natural sweetners

b) Food preservatives

c) Flavor enhancer

d) Benefits of meat Tenderization

e) Enzymes used in fruit juice processing

Q4) a) Answer the following questions. **[6]**

i) Discuss the main purpose of food Irradiation. **[3]**

ii) Write about the process of starch production. **[3]**

b) Answer the following questions. **[4]**

i) Define the term food spoilage. **[2]**

ii) What are meat tenderizer enzymes? Give examples. **[2]**

Q5) a) Answer the following questions. **[6]**

i) Give source and function of natural colours used in food technology. **[3]**

ii) Discuss the potential advantages of genetically modified food. **[3]**

b) Answer the following questions. **[4]**

i) List the factors responsible to spoil the food. **[2]**

ii) Give examples of unconventional source of protein. **[2]**