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M.Sc.
BIOCHEMISTRY
BCH - 170: Biomolecules
(2010 Pattern) (Semester - I)

Time : 3 Hours] [Max. Marks : 80

Instructions to candidates:
1) Answer to both sections should be written on separate answer sheets.
2) All questions are compulsory.
3) Figures to right indicate full marks.

SECTION - I

Q1) Explain the following (any 5). [15]
   a) Weak acids with examples.
   b) Amino sugar with example and features.
   c) Rancidity.
   d) Explain term macromolecules. Enlist its types with example.
   e) Amphipathic lipids. How do they behave in water.
   f) Classification of vitamins.

Q2) Answer any three of following. [15]
   a) Write note on biochemical significance of coenzymes of vitamins.
   b) Write note on ionization of water.
   c) Explain significant chemical properties of carbohydrates.
   d) Give structural classification of lipids with examples.

P.T.O.
Q3) Write note on any two of following: [10]
   a) Formation of macromolecules from their monomeric subunits.
   b) Phospholipids.
   c) Storage and structural polysaccharides.

SECTION - II

Q4) Explain the following (any 5). [15]
   a) Zwilter ion formation and properties.
   b) Non standard amino acids with examples.
   c) Significance of hydrogen bonding in stabilizing three dimensional structure of protein.
   d) Proteolysis and its significance.
   e) Draw structure of Histidine, Aspartate and praline.

Q5) Answer any three of following: [15]
   a) Explain features of tertiary structure of proteins.
   b) Write note on titration curve of glycine
   c) Give classification of amino acids.
   d) Explain β structure in detail.

Q6) Write note on any two of following. [10]
   a) Biochemical functions of protein.
   b) Edman’s method for sequencing of proteins.
   c) Forces stabilizing three dimensional structure of protein.
   d) Ramchandran plot.
BCH - 171 : Enzymology & Physiological Biochemistry
Enzymology & Biophysical Techniques
(2008 Pattern and 2010 Pattern) (Semester - I)

Time : 3 Hours

Instructions to the candidates:
1) All questions are compulsory.
2) Attempt any two sections from the following.
3) Answers to both the sections should be written on separate answer sheets.
4) Figures to the right indicate full marks.

SECTION-I
(Enzymology)

Q1) Answer any three of the following: [15]
   a) Explain the mechanism of action of any one enzyme.
   b) How the rate of degradation (Kd) of the enzyme is measured?
   c) Define the terms i) apoenzyme ii) holoenzyme iii) allosteric site iv) cofactor 
v) multi-enzyme.
   d) What is positive co-operativity? Explain with suitable example.

Q2) Attempt any three of the following. [15]
   a) Write a note on zymogen activation.
   b) Comment on catalytic power and regulation of enzyme activity.
   c) Give the effect of competitive and non-competitive inhibitors on double reciprocal plot.
   d) Discuss in detail effect of substrate concentration on enzyme catalyzed reaction.

Q3) Attempt any two of the following. [10]
   a) Write a note on kinetics of enzyme turnover.
   b) How activity of any enzyme is controlled by covalent modification? Explain.
   c) What is specificity? Explain any three specificities with example.

P.T.O.
SECTION-II
(Physiological Biochemistry)
(2008 pattern)

Q4) Attempt any three of the following. [15]
   a) Describe the function of Kidney as an endocrine gland.
   b) What is alkalosis? What are the compensatory mechanisms during alkalosis?
   c) Explain the salient features of the carbonic acid- bicarbonate buffer system.
   d) Write a note on plasma proteins and their diseases.

Q5) Attempt any three of the following. [15]
   a) Describe the role of the antidiuretic hormone in kidney function.
   b) Write a note on buffer systems in the intracellular and extracellular fluids.
   c) Describe the formation of bile pigments. What is the clinical significance of their elevated levels in serum?
   d) What is blood counting? Explain its significance.

Q6) Answer any two of the following: [10]
   a) Write a note on detoxification of foreign substances by liver.
   b) Explain the effect of 2,3 bisphosphoglycerate and pH on binding of oxygen by hemoglobin?
   c) What is the composition of bile juice? How are gall stones formed.
SECTION - III
(Biophysical Techniques)
(2010 Pattern)

Q4) Attempt any three of the following. [15]
   a) Describe the any one application of gel electrophoresis with example.
   b) Explain in detail the principle and technique of ion-exchange
      chromatography.
   c) Why it is necessary to purify enzyme? How enzymes are separated on
      the basis of their solubility?
   d) Explain the principle and application of isoelectric focusing.

Q5) Attempt any three of the following. [15]
   a) Write a note on SDS-PAGE.
   b) Explain how dialysis helps of purify proteins. Write a note on types of
      filtration.
   c) Describe any one application of UV-VIS spectrometer with example.
   d) How molecular weight of a protein can be determined by gel
      chromatography.

Q6) Attempt any two of the following. [10]
   a) Explain the principle and application of Hydroxyapatite Chromatography.
   b) How do you calculate the Rf values of separated amino acids in paper.
      Chromatography? Give its significance.
   c) Explain in detail the theory and working of HPTLC.
M.Sc.
BIOCHEMISTRY
BCH-172 : Cell Biochemistry
(2008 Pattern) (Semester - I)

Time : 3 Hours

Instructions to the candidates:
1) Answer to the both sections should be written on separate answer sheets.
2) All questions are compulsory.
3) Figures to the right indicate full marks.

SECTION-I
(Cell Biochemistry - I)

Q1) Answer any three of the following: [15]
   a) Explain principle & applications of phase contrast microscopy.
   b) What is meant by pure culture? Give methods for its preparation.
   c) Explain structure and arrangement of flagella.
   d) Explain pour plate method. Give its application and limitation.
   e) Discuss methods for preservation of bacterial culture.

Q2) Explain the following(any three): [15]
   a) SEM
   b) Mycoplasma
   c) Endotoxins
   d) Lysogeny cycle of bacterial viruses

Q3) Write note on any two: [10]
   a) Freeze itching
   b) Peptidoglycan
   c) Gram staining

P.T.O.
SECTION-II
(Cell Biochemistry - II)

Q4) Answer any three of following: [15]
   a) Define cell cycle. Explain mitosis phases.
   b) Write a note on cell variability in size & shape.
   c) Distinguish between prokaryotic & eukaryotic cell.
   d) Give functions of plant cell wall.
   e) Explain organogenesis in brief.

Q5) Answer any three: [15]
   a) Elaborate structure of nucleus. Add note on its functions.
   b) Explain cell-cell adhesion.
   c) Write note on biological importance of fungi. Draw its cell structure.
   d) Explain structure and function of plasma membrane.

Q6) Write note on any two [10]
   a) Active & Passive transport
   b) Density gradient centrifugation
   c) Distinguish between xylem & phloem.
Total No. of Questions : 6

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M.Sc.

**BIOCHEMISTRY**

**BCH-172 : Microbiology & Cell Biochemistry of Eukaryotes**

(2010 Pattern) (Semester - I)

**Time : 3 Hours**  

[Max. Marks : 80]

**Instructions to the candidates:**

1) Answer to the both sections should be written on separate answer sheets.
2) All questions are compulsory.
3) Figures to the right indicate full marks.

**SECTION-I**

(Microbiology)

**Q1)** Answer any three of the following:  

[15]

a) What is mode of action of ethylene oxide.

b) What are different chemical agents for control of micro-organism. Add note on action of alchol.

c) What are endotoxins? Explain with suitable examples.

d) What are different methods for isolation of microorganism? Explain any one of them.

e) Classify plant & animal viruses.

**Q2)** Explain the following(any three):  

[15]

a) Bacterial growth curve.

b) Pour plate methods and its applications.

c) Compare bright and dark field microscopy.

d) Drug resistant mutants

e) Replication of bacterial viruses

**Q3)** Write note on any two:  

[10]

a) Differential staining

b) Nitrogenase system

c) Sterilization
SECTION-II
(Cell Biochemistry of Eukaryotes)

Q4) Answer any three of following: [15]
   a) Explain structure and function of plasma membrane.
   b) Describe cytoskeleton & its various components.
   c) Explain phases of mitosis.
   d) Write note on classification of cell on basis of cell variability in size & function.
   e) Explain cell-cell adhesion.

Q5) Answer any three of following: [15]
   a) Give classification of fungi and its biological importance.
   b) Define cell cycle. Elaborate on difference between mitosis and meiosis.
   c) Define gametogenesis. Distinguish between spermatogenesis and oogenesis.
   d) Explain ultra structure of chloroplast.

Q6) Write note on any two: [10]
   a) Density gradient centrifugation
   b) Distinguishing features of xylem & phloem.
   c) Major groups of fungi.

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M.Sc.

BIOCHEMISTRY

BCH - 270: Bioenergetics and Metabolism
(2008 & 2010 Pattern) (Credit System) (Semester - II)

Time : 3 Hours] [Max. Marks :80

Instructions to the candidates:

1) Answer to both sections should be written on separate answer sheets.
2) All questions are compulsory.
3) Figures to the right indicate full marks.

SECTION - I

Bioenergetics and Metabolism I (2008 Pattern)
Bioenergetics and Metabolism I (2010 Pattern)

Q1) Answer any three of following. [15]

a) Explain first law of thermodynamics. Derive its equation form.

b) Explain Glycolysis and its significance.

c) Explain energetics and regulation of citric acid cycle.

d) Describe Ketone bodies formation.

Q2) Answer any three of following. [15]

a) Explain amphibolic nature of TCA cycle.

b) What is chemiosmotic hypothesis.

c) Write note on electron transport chain.

d) Explain bacterial photosynthesis.

P.T.O.
Q3) Write notes on any two. [10]
   
   a) Pentose phosphate pathway.
   
   b) Cyclic & Non cyclic phosphorylation.
   
   c) C₄ pathway.

SECTION - II

Metabolism II: Nitrogen Metabolism (2008 Pattern)
Bioenergetics & Metabolism - II (2010 Pattern)

Q4) Answer any three of the following. [15]

   a) What is transamination of amino acids? Explain with example.
   
   b) Explain degradalive pathway of pyrimidine nucleotide.
   
   c) How biosynthesis of threonine from aspartate is regulated.
   
   d) Give regulation mechanism of ribonucleotide reductase.

Q5) Answer any three of the following. [15]

   a) What is fate of uric acid in different animal species.
   
   b) Write note on nonribosomal protein biosynthesis.
   
   c) Explain with example biosynthesis of aromatic amino acids.
   
   d) Give role of a significance of nitrogenase system.

Q6) Write notes on any two. [10]

   a) Decarboxylation of amino acids.
   
   b) Gamma glutamyl cycle.
   
   c) Nitrogen cycle.
BIOCHEMISTRY
BCH-271: Biophysical Techniques
(2008 Pattern) (Semester - II)

Time: 3 Hours

Instructions to the candidates:
1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Solve section I and section II on separate sheets.

SECTION-I
(Biophysical Techniques - I)

Q1) Answer any three of the following. [15]

a) Differentiate between southern and northern blotting techniques. Give their application.

b) Discuss the principle, procedure and application of gas liquid chromatography.

c) How DNA fragments separated in agarose gel electrophoresis.

d) Give the principle, working and application of NMR.

e) Give the importance of freeze drying and lyophilization.

Q2) Answer any three of the following. [15]

a) Give the techniques & application of ion exchange chromatography.

b) Give the principle and types of electrophoresis.

c) Differentiate between stacking gel and separating gel. Give their significance.

d) Give the significance of poly carbonate and nitrocellulose fiber.

e) Give the difference between native and SDS-PAGE electrophoresis.

P.T.O.
Q3) Answer any two of the following. [10]
   a) Write the principle and application of dialysis.
   b) Describe the principle and procedure involved in separation of mixture of an acidic toxic and neutral aminoacids by ion-exchange chromatography.
   c) Why glycerol and bromophenol blue are mixed with sample that are loaded is Gel electrophoresis. Explain.

SECTION-II
(Biophysical Techniques - II)

Q4) Attempt any three of the following. [15]
   a) Write a note on density gradient centrifugation.
   b) What is meant by sensitization in autoradiography.
   c) Write a note on x-ray diffraction.
   d) Define sedimentation. Explain in detail construction and working of analytical ultra centrifugation.
   e) What are the applications of atomic absorption spectroscopy? Explain any two in brief.

Q5) Answer any three of the following. [15]
   a) What is quenching? List out the factors that are involved in quenching.
   b) Explain the methods for determination of molecular weight by sedimentation equilibrium method.
   c) Explain the diffusion, measurement and arrangement of subunits of haemoglobin.
   d) How partial specific volume and diffusion coefficient are corelated.
   e) Explain isotope tracer techniques and types of radiation.

Q6) Write short notes on any two. [10]
   a) Gamma Counter.
   b) Pycnometer.
   c) Meselson stall experiment.

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Total No. of Questions : 6]

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BIOCHEMISTRY

BCH-271: Techniques for Characterization of Biomolecules
(2010 Pattern) (Semester - II)

Time : 3 Hours]  [Max. Marks : 80

Instructions to the candidates:

1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Answer section I and section II on separate sheets.

SECTION-I

(Biophysical Techniques)

Q1) Answer any three of the following. [15]

a) What are the factors that affect sedimentation velocity. Describe any one in detail.

b) With the help of viscometry, how will you prove that certain substances can intercalate between nucleotide bases of DNA?

c) Distinguish between boundary and band sedimentation.

d) How sensitivity of autoradiography is achieved.

Q2) Answer any three of the following. [15]

a) Diffusion measurement and arrangement of subunit of haemoglobin. Explain.

b) What is the effect of addition of ethidium bromide on viscosity of DNA.

c) How types of radiations are used in Biochemistry. Explain.

d) Liquid scintillation counting.

Q3) Write short notes on any two. [10]

a) Meselson stahl experiment

b) Effect of friction on sedimentation.

c) Zimm Crother’s Viscometer.
SECTION-II
(Structure Determination of Biomolecular)

Q4) Attempt any three of the following. [15]
   a) Give the principle and application of NMR spectrography.
   b) Explain on what trains biosemion are classified. Give its application.
   c) What is circular diachroism techniques? Explain its usefulness in structural
determination of protein.
   d) Give the instrumentation of GLMS.
   e) What is polarization of fluorescence? List the basic rule for interpretation.

Q5) Answer any three the following. [15]
   a) Explain the special use of LCMs in biology and biochemistry.
   b) Give the principle and application of IR spectroscopy.
   c) Give the principle working and application of ESR.
   d) Explain the mechanism of glucose oxidase biosensor.
   e) What is the main difference between ORO & CD.

Q6) Write short note on any two. [10]
   a) Application of IR.
   b) Difference between NMR & ESR.
   c) Difference between GCMS and LCMS.
M.Sc.

BIOCHEMISTRY

BCH - 273 : Membrane biochemistry & Nucleic acids
BCH-273 : Membrane biochemistry & Genetics
(2008 & 2010 Pattern) (Semester - II)

Time : 3 Hours] [Max. Marks : 80

Instructions to the candidates:
1) All questions are compulsory.
2) All questions carry equal marks.
3) Figures to right indicate full marks.
4) Draw neat labelled diagrams wherever necessary.
5) Answers to both sections should be written on separate answer sheets.

SECTION-1

Membrane Biochemistry (2008 pattern)
Membrane Biochemistry (2010 Pattern)

Q1) Answer any three of following: [15]

a) Explain various models of biological membrane.
b) Write in detail drug transport through membrane.
c) Write note on lipid interaction in a biological membrane.
d) Describe structure and mechanism of Na\(^+\) K\(^+\) ATPase.

Q2) Answer any Three: [15]

a) Explain mechanism & role of gramicidin.
b) Write note on glycosylation of membrane.
c) Explain protein targeting in brief.
d) What is diffusion? Add note on osmoregulation.

P.T.O.
Q3) Write notes on any two. \([10]\)

a) Bacterial toxins

b) Gap junction

c) Photo transferol system

SECTION - II

Nucleic Acids (2008 pattern)

Genetics (2010 pattern)

Q4) Answer any three of following. \([15]\)

a) Explain Meselson & stahl experiment and its interpretation.

b) Explain plasmids and their types in detail.

c) Write note on chromosomal mutations.

d) Explain mendel’s law of inheritance with example.

Q5) Answer any three of following. \([15]\)

a) Give detailed DNA double helix structure.

b) What are auxatrophs. Explain method for isolation of auxatrophs

c) Explain one-gene-one-cistron with example.

d) Write note on lactose operon.

Q6) Write note on any two. \([10]\)

a) Bacterial conjugation

b) Semiconservative mechanism of DNA replication.

c) Complementation test.
M.Sc. BIOCHEMISTRY
BCH -370: Molecular Biology

(2008 & 2010 Pattern) (Semester - III)

Time : 3 Hours] [Max. Marks :80

Instructions to the candidates:

1) All questions are compulsory.
2) Neat diagrams must be drawn wherever necessary.
3) Figures to right side indicate full marks.

Q1) Answer any four of the following. [20]

a) Write note on types of DNA polymerases and their functional aspect.
b) Explain types of point mutation.
c) What is SOS response? Explain.
d) Explain importance of EF-TU in E.coli during translation.
e) Write note on semiconservative nature of DNA replication.

Q2) Attempt any two of the following. [20]

a) What is transposition? Give any two mechanisms.
b) Explain editing of RNA in detail.
c) Write note on Orazaki fragment.

Q3) Answer any four of the following: [20]

a) Justify prokaryotic transcription and translation are coupled.
b) Explain mitochondrial protein transport.

P.T.O.
c) Give steps involved in homologous recombination in which Rec A participation.

d) Explain glycosylation of protein.

e) How will you prove there are nicks in DNA? Explain.

Q4) Write short notes on (any four) [20]

a) Chromatin remodeling.
b) Pyrimidine dimer formation its repair.
c) Lysosomal protein transport.
d) Clover leaf structure of t-RNA.
e) E.coli RNA polymerase.
BIOCHEMISTRY
BCH - 371 : Medical Biochemistry and Immunology
(2010 Pattern) (Semester - III)

Time : 3 Hours] [Max. Marks : 80

Instructions to the candidates:

1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Answers to the two sections should be written on separate answer sheets.

SECTION-I
(Medical Biochemistry)

Q1) Answer any three of the following: [15]

a) Give the structure and functions of lysosome in animal cell.

b) Explain biochemistry of (CHD) coronary heart disease.

c) Explain the mechanism of Apoptosis.

d) Discuss the mode of transport of drugs in bacterial cell.

e) Explain molecular genetics of cancer.

Q2) Attempt any three of the following: [15]

a) Write a note on mycobacterium & enlist antibiotics used against it.

b) Explain in detail extrinsic and intrinsic mechanism of apoptosis.

c) Elaborate on puromycin and streptomycin.

d) Explain the mode of action of antibiotics that inhibit the biosynthesis of cell wall with example.

e) Write a note on thalassemia.

P.T.O.
Q3) Answer any two of the following. [10]
   a) Interpret the presence of following enzymes in serum (i) LDH, (ii) Creatinine kinase.
   b) Explain molecular genetics of cancer.
   c) Define the term analgesics - Give their mechanism of action with suitable example.

SECTION-II
(Immunology)

Q4) Attempt any three of the following: [15]
   a) List out antigen-antibody reaction and explain any one in detail.
   b) Compare and contrast innate immunity and Humoral immunity.
   c) Explain how immunoelectrophoresis is more advantious then immunodiffusion reaction.
   d) Give the appropriate meanings of following term with respect to antigens.
      i) Antigenicity
      ii) Hapten
      iii) Specificity
      iv) Complete antigen
      v) Carrier
   e) Compare the complement activation events of the classical pathway with those of alternate pathway.

Q5) Answer any three of the following: [15]
   a) Describe the structural features of Immunoglobulin ‘G’ and list out its functions.
   b) Describe types of MHC Molecules in detail.
c) Explain Blood group substances.
d) Give the principle, procedure and uses of Immunofluorescence.
e) Describe structure of antibody with well labelled diagram.

**Q6)** Answer any two of the following: [10]

a) Western Blotting
b) Ouchterlony and Rocket immuno electrophoresis.
c) Immunodeficiency disease.
BIOCHEMISTRY
BCH-372: Signal Transduction Pathways
(2008 Pattern) (Semester - III)

Time: 3 Hours
[Max. Marks: 80]

Instructions to the candidates:
1) All questions are compulsory.
2) Answers to the two sections should be written on separate answer sheets.
3) Figures to the right indicate full marks.

SECTION-I
(Signal Transduction Pathways - I)

Q1) Answer any two of the following: [10]
   a) Discuss the role of microfilaments and microtubules.
   b) Draw the structure of the typical nerve and explain the function of each organelle.
   c) Discuss the role of cGMP, phosphodiesterase and transducine in visual excitation.

Q2) Attempt any three of the following: [15]
   a) How does the absorption of light by the retinal Schiff base generate a signal?
   b) Describe in detail the molecular organization of thick and thin filaments.
   c) Explain the biochemical mechanism of hearing.
   d) Give a short account on the propagation of nerve impulse.

Q3) Write a short notes on (any three) [15]
   a) Biochemistry of taste
   b) Chemotaxis
   c) Acetyl choline esterase
   d) Cardiac muscle contraction

P.T.O.
SECTION-II
(Signal Transduction Pathways - II)

Q4) Answer any two of the following: [10]
   a) Describe in detail the chemical composition of the brain.
   b) Name the parts of CNS which constitute brain stem. What are the general functions of nervous system?
   c) Write a note on sensory perception.

Q5) Attempt any three of the following: [15]
   a) Describe the various factors affecting the development of CNS.
   b) What are the nuclear groups of hypothalamus and their main functions?
   c) Give an account on the structure and function of blood-brain barriers.
   d) Describe the steps involved in the generation of action potential.

Q6) Write a short notes on (any three) [15]
   a) Cerebrospinal fluid
   b) Neurotransmitter Metabolism
   c) Sensory modalities
   d) Zinc fingers

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Total No. of Questions : 4]

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M.Sc.

BIOCHEMISTRY

BCH-372 : Neurochemistry

(2010 Pattern) (Semester - III)

Time : 3 Hours] [Max. Marks : 80

Instructions to the candidates:

1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw necessary diagrams wherever necessary.

Q1) Answer any four of the following: [20]

a) Describe the functions of CNS.

b) Write a note on Cytology neuron.

c) Explain the role of ion channels in generation of action potential.

d) What are mechanically gated channels? Explain their role with example.

e) Explain the fundamental differences between Chemically Gated and Voltage-Gated Channels?

Q2) Attempt any two of the following: [20]

a) Describe the synthesis, storage and degradation of acetylcholine.

b) Write a note on neuropeptides.

c) Explain the biochemical mechanism of hearing.

Q3) Answer any two of the following: [20]

a) Describe the roles of the cerebellum in the regulation of skilled movement.

b) What are the molecular mechanisms by which Ca^{++} leads to transmitter release?

c) Describe the ionic basis for inhibitory and excitatory post-synaptic potentials and how these changes can alter synaptic transmission.
**Q4** Write a short notes on (any four) [20]

a) Brain and behaviour
b) Short term memory
c) Biochemistry of vision
d) Blood-brain barrier
e) Sensory circuits
BIOCHEMISTRY  
BCH-373 : Biochemical Toxicology  
(2010 Pattern) (Semester - III)

Instructions to the candidates:
1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q1) Answer any five of the following: [20]

a) Explain forensic applications of toxicology.
b) What are animal & plant toxins?
c) Give overall impact of chlorinated insecticides on ecosystem.
d) Explain pathogenesis of fatty liver. Give its clinical manifestations.
e) Differentiate between venomous & poisonous animals.
f) Explain detoxication and toxication reactions.

Q2) Attempt any five of following: [20]

a) Explain how teratogenic potential of chemical is evaluated?
b) Write note on principle of toxicology.
c) Give mechanism of animals developing tolerance against toxicants.
d) Explain local and systemic toxicity.
e) What are local toxic effects of organophosphorous insecticides?
f) Explain cardiovascular effects of cadmium exposure.

P.T.O.
Q3) Answer any four of following:

   a) What are toxic effects of ozone and peroxycetyl nitrate?

   b) What is fate of heavy metals in human body? Give special mention of lead.

   c) Explain Phase I & Phase II biotransformation reaction.

   d) Compare reversible and irreversible toxicity.

   e) Give factors effect occupational health.

Q4) Write notes on any four:

   a) Dose-response relationship.

   b) Xenobiotics metabolism.

   c) Effect of chlorinated insecticides on ecosystem.

   d) Carcinogenicity of arsenic.

   e) Classification of toxic agents.
BCH - 470: Biochemical Endocrinology and Tissue culture (2008 Pattern)
BCH - 470: Biochemical Endocrinology and Plant Biochemistry (2010 Pattern)
(Semester - IV)

Time : 3 Hours

[Max. Marks : 80]

Instructions to the candidates:

1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Solve Section I and Section II on separate answer sheet.

SECTION - I
(Biochemical Endocrinology)

Q1) Answer any three of the following. [15]

a) Explain the mechanism of action of hormone that acts via intracellular receptor.

b) Explain the biochemical reaction involved in estrogen and progesterone synthesis.

c) How secretion of insulin is regulated.

d) Give the structural aspects of glycoprotein hormones.

e) Describe the structural features and physiological functions of GH.

Q2) Answer any three of the following. [15]

a) Give the structural features & physiological functions of ACTH.

b) What do you understand the terms Osteomalacia, primary and secondary aldosteronism?

c) Explain how insulin affects the gene expressions?

d) Which two enzymes are critical for catabolism and catecholamines? What is the metabolic product of the sequential action of these two enzymes?

e) How secretion of thyroid hormone is regulated?
Q3) Write short note on any two  
   a) Role of calcium on release of catecholamine?  
   b) Effect of renin-angiotensin system on synthesis of adrenal steroid hormone.  
   c) Hormonal interrelationship.  

SECTION - II  
(Tissue Culture) (2008 Pattern)  

Q4) Answer any three of the following.  
   a) Give advantages and disadvantages of natural media.  
   b) What is haploid culture. Give its applications with examples.  
   c) Give importance & limitation of organ culture.  
   d) Explain characteristics of transformed cells.  
   e) What is sterilization? Explain different methods involved.  

Q5) Answer any three of the following.  
   a) Explain meaning and methods used in primary culture.  
   b) Discuss technique of micropropagation in detail.  
   c) What are somatic hybrids & cybrids. Give protoplast fusion technique.  
   d) Write note on cloning.  
   e) Explain various methods involved in animal tissue culture.  

Q6) Write short notes on any two.  
   a) Secondary metabolites.  
   b) Animal cell preservation methods.  
   c) Transformed cells.  
   d) Agrobacterium mediated hairy root culture.  

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SECTION - II
(Plant Biochemistry) (2010 Pattern)

Q4) Answer any three of the following. [15]
   a) What is role of secondary metabolites in plants with respect to flavonoids, lignins, pectin, terpenoids.
   b) Explain germination of seed and storage protein.
   c) Give role of phosphorus in plant growth.
   d) What is crop improvement? Explain role of plant breeding in it.
   e) What is micropropagation? Explain.

Q5) Explain the following (any 3) [15]
   a) Role of nitrogenase system and nitrate reductase in plant.
   b) Z- scheme of photosynthesis.
   c) CAM metabolism.
   d) Alkaloids.
   e) Oxygenase activity of Rubisco.

Q6) Write note on any two. [10]
   a) Flavonoids.
   b) Cryopreservation.
   c) Somatic hybridization.
Time: 3 Hours]  

Instructions to the candidates:

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

Q1) Answer any four of the following: [20]

a) Explain role of nuclease and topoisomerase.

b) Write note on plasmids as vectors in genetic engineering.

c) Write note on methods for selection of recombinant clones.

d) Explain Southern blotting.

e) Explain role of reverse transcriptase enzyme.

Q2) Answer any four: [20]

a) What is meant by transgenic plants. Explain with example.

b) Write note on microarray technology.

c) Give applications of protein engineering.

d) What is genomic library? Give method for its construction.

P.T.O.
Q3) Answer any four of the following [20]

a) Give method of blue white screening and its application.
b) Explain PBR 322 in detail.
c) Give applications of RFLP.
d) What is colony hybridization?

Q4) Write note on any four of following. [20]

a) Ti plasmid
b) PCR types
c) Applications of genetic engineering in medicine.
d) Methods of transfection.
M.Sc.
BIOCHEMISTRY
BCH - 471: Fermentation and Enzymes Technology and
Food Technology (2008 Pattern)
Fermentation Technology and Food Technology (2010 Pattern)
(Semester - IV)

Time : 3 Hours] 
[Max. Marks : 80

Instructions to the candidates:
1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Answer to the two sections should be written on separate answer sheets.

SECTION-I
(Fermentation and Enzyme Technology)

Q1) Explain any three of the following. [15]
   a) Batch culture.
   b) Agitation and Aeration.
   c) Effluent treatment.
   d) Methods for feedback control.
   e) Fermenter design.

Q2) Answer any three of the following. [15]
   a) What are the different methods of preservation of obdientially important micro-organism.
   b) What are the different nitrogen source that are used in fermentation?
   c) What are different steps involved in sterilization?
   d) How product is recovered by chromatographic techniques.
   e) What is meant by media formulation.

P.T.O.
Q3) Write short notes on any two.
   a) Effect of inducer on fermentation.
   b) Development of inoculum for bacterial process.
   c) Instrumentation and control system in fermentation.

SECTION-II
(Food Technology)

Q4) Attempt any three of the following.
   a) Monitoring of food quality is essential. Why?
   b) Differentiate the features of food obtained from plant source and animal source.
   c) What are genetically modified foods? Give their consequences.
   d) How will you manufacture natural and synthetic sweeteners.
   e) SCP are unconventional source of good proteins. Justify.

Q5) Answer any three of the following.
   a) Give the different method of starch production.
   b) What are the different enzymes used in fruit juice technology. Explain.
   c) Explain the different methods of food preservation.
   d) Discuss the role of enzymes in food processing with suitable example.
   e) Elaborate on various types of food additives.

Q6) Write short notes on any two.
   a) Meat tenderisation.
   b) Flavouring agents in food industry.
   c) Primary feedstock and its importance.

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