

Total No. of Questions : 6]

SEAT No. :

P2843

[5531]-11

[Total No. of Pages : 2

M.Sc.

BIOCHEMISTRY

BCH-170 : Biomolecules

(2008/2010 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Answer to both the sections should be solved in separate answer sheets.*
- 3) Figures to the right side indicate full marks.*

SECTION - I

Q1) Answer any five of the following : **[15]**

- a) Write a note on deoxy sugar. Give their significance.
- b) Differentiate between reducing sugar and non reducing sugar.
- c) Write a note on lipid bilayer and give its biological significance.
- d) Classify vitamins as fat soluble and water soluble.
- e) Give the macromolecules and their monomeric subunits.
- f) Give the properties of water.

Q2) Answer any three of the following : **[15]**

- a) Explain reaction of glucose with oxidising and reducing agents, give their significance.
- b) Give the types and significance of various lipoproteins.
- c) Discuss the structure, biochemical function and deficiency disease of riboflavin.
- d) Differentiate between function of storage and structural polysaccharide.

Q3) Write short notes on any two of the following : **[10]**

- a) Night Blindness.
- b) Phospholipids.
- c) Various coenzymes of vitamins.

P.T.O.

SECTION - II

Q4) Answer any five of the following : **[15]**

- a) Write a note on peptide bond.
- b) What is Sanger's reagent? Explain its use.
- c) An amino acid is 3 zwitter ion. Explain.
- d) Write a note on rare amino acid with its biological significance.
- e) Differentiate between simple and conjugate proteins.
- f) List out the types of amino acid based on the polarity.

Q5) Answer any three of the following : **[15]**

- a) Classify proteins based on their biological function.
- b) Elaborate the features of tertiary structure of proteins.
- c) Classify amino acid on the basis of their R group.
- d) Describe any two supersecondary structure of proteins.

Q6) Write short notes on any two of the following : **[10]**

- a) Ramchandran plot.
- b) Biochemical function of protein.
- c) Titration curve of glycine.



Total No. of Questions :6]

SEAT No. :

P2844

[5531]-12

[Total No. of Pages :3

M.Sc.

BIOCHEMISTRY

BCH - 171 : Enzymology and Physiology Biochemistry

Enzymology and Biophysical Techniques

(2008 & 2010 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

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

SECTION - I
(Enzymology)

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

- a) Derive Michealis-Menten equation based on equilibrium assumption.
- b) Explain proximity and orientation effect on catalysis.
- c) Explain in detail the role of the three amino acid residues in the catalytic triad of chymotrypsin.
- d) Define enzyme inhibition. Explain types of enzyme inhibition with a example.

Q2) Attempt any three of the following. **[15]**

- a) Discuss the general properties of enzymes.
- b) What do you understand by zymogens? What is the importance of the zymogens.
- c) Define the terms : K_m and K_{cat} . What is their significance.
- d) Write a note on mechanism of enzyme degradation.

P.T.O.

Q3) Answer any two of the following. [10]

- a) What is multienzyme system? Describe the regulation of mammalian pyruvate dehydrogenase system.
- b) What is the significance of change in pH on enzyme catalyzed reaction?
- c) Write a note on allosteric enzymes.

SECTION - II
(Physiological Biochemistry)

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

- a) Explain the origin, development and structure of blood cells.
- b) What is the relationship between hemoglobin and oxygen partial pressure?
- c) List the disorder of liver and describe any two in detail.
- d) Summarize the causes of some important disorders affecting RBC.

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

- a) Justify the physiological importance of liver.
- b) Explain in brief the mechanism of action of diuretics.
- c) Identify the specific conditions that cause metabolic alkalosis.
- d) Describe the importance of any two trace elements in the body.

Q6) Answer any two of the following. [10]

- a) Describe briefly the factors affecting Hb affinity for oxygen.
- b) Explain the physiological consequences involved in any two liver disorders.
- c) Write a note on plasma proteins.

SECTION - II
(Biophysical Techniques)

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

- a) Explain the principle of DNA cellulose chromatography with example.
- b) Elaborate on the principle and application of Native PAGE and SDS-PAGE.
- c) How does HPTLC give rapid separation and higher resolution?
- d) Write a note on finger printing.

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

- a) Briefly describe the function of following components of spectrophotometer:
filter, radiation source, sample cell, grating and detector.
- b) Write the principles and applications of affinity chromatography.
- c) Discuss the principle, procedure and application of Ion exchange chromatography.
- d) Write a note on reverse dialysis.

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

- a) What are the applications of purified enzymes? How enzymes are separated on the basis of their ionic charge.
- b) In what important properties, the Sephadex and Sephacry 1 gels differ from each other?
- c) What is a restriction map? Explain with example.



Total No. of Questions :6]

SEAT No. :

[Total No. of Pages :4

P2845

[5531] - 13

M.Sc.

BIOCHEMISTRY

**BCH-172 : Microbiology and Cell Biochemistry of Eukaryotes
(2010 Pattern) (Semester- I)**

Time : 3 Hours]

[Max. Marks :80

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Answer to both the sections should be solved in separate answer sheets.*
- 3) *Figures to the right side indicate full marks.*

SECTION-I

(Microbiology)

Q1) Answer any five of the following. **[15]**

- a) Discuss in detail differential staining with suitable example.
- b) What do you understand with pour plate method? Give the limitation of it.
- c) Explain in detail electron microscopy for studying microorganism with its limitations.
- d) How the host microbe interaction takes place to cause an infection.
- e) Explain the mode of action of phenol.
- f) Classify plant and animal viruses.

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

- a) Why penicillin is more effective against Gram+ve than Gram-ve bacteria.
- b) What is the mode of action of alcohol as antimicrobial agent?
- c) Discuss in detail Koch's Postulates.
- d) Discuss in detail Bright field and dark field microscopy with applications.

P.T.O.

Q3) Answer any two of the following. [10]

- a) Define sterilization, antimicrobial agents, sanitizer, disinfectant, bactericide.
- b) How dyes and heavy metals are useful in controlling growth of microbes?
- c) Discuss the mode of action of diphtheria and cholera toxins.

SECTION-II

(Cell Biochemistry of Eukaryotes)

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

- a) Write a note on cell to cell communication.
- b) Why are mitochondria termed as “power house” of cells?
- c) Describe the chemical composition of plasma membrane.
- d) Describe in detail various functions of the nucleus.
- e) Differentiate between passive and active transport.
- f) Describe the types of vesicles which arise from Golgi membrane.

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

- a) What are the differences between prokaryotic and eukaryotic cells?
- b) Draw a well labeled diagram of an animal cell and explain the function of any three cell organelles.
- c) Write a note on fungi and its biological importance.
- d) Write a note on structure and function of plant cell wall.

Q6) Write short notes on any two of the following. [10]

- a) Cellular differentiation and its importance.
- b) Stem cells.
- c) Cell cycle and mitosis.



Total No. of Questions :6]

P2845

[5531] - 13

M.Sc.

BIOCHEMISTRY

BCH-172: Cell Biochemistry

(2008 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks :80

Instructions to the candidates:

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

SECTION-I

(Cell Biochemistry-I)

Q1) Answer any five of the following. **[15]**

- a) Give the classification of microorganism with its specific characteristic.
- b) Explain the production of mutant by physical and chemical agents.
- c) Write a note on freeze etching, freeze fracture and shadow casting.
- d) Give the life cycle of mycoplasma.
- e) Define and give the difference between endotoxin and exotoxins.
- f) Explain the principle and application of phase contrast microscope.

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

- a) What are pure cultures? Explain its cultural characteristics.
- b) Give the Structure of peptidoglycon and other cell wall components.
- c) Explain the nutritional requirement for cultivation of Bacteria.
- d) What is meant by synchronous growth and continuous growth of microorganisms? Explain.

Q3) Write Short notes on any two of the following. [10]

- a) Fluorescence microscopy.
- b) Host Microbe Interactions.
- c) Industrial important microorganisms.

SECTION-II
(Cell Biochemistry - II)

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

- a) Explain various types of cell size, shape with suitable example.
- b) Describe the different phases of cell cycle.
- c) Give the plant Cell wall and explain its various functions.
- d) Explain Prokaryotic and eukaryotic cell structure in details.
- e) Describe mechanism of organogenesis.
- f) Explain the structure and function of chloroplast in plant cell.

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

- a) Explain the difference between mitosis and meiosis.
- b) Describe Density gradient centrifugation process.
- c) What is the significance of mitochondria to an eukaryotic cell? Explain in detail the structure and function.
- d) What is the difference between the nuclear envelop and the cell membrane in terms of structure and function.

Q6) Write short notes on any two of the following. [10]

- a) Cell-cell communication.
- b) Fungi and its biological importance.
- c) Types of proteins with examples.



Total No. of Questions : 6]

SEAT No. :

P2846

[5531]-21

[Total No. of Pages : 2

M.Sc.

BIOCHEMISTRY

**BCH - 270 : Bioenergetics and Metabolism
(2008/2010 Pattern) (Semester - II) (Old and New)**

Time : 3 Hours]

[Max. Marks : 80

Instruction to the candidates:

- 1) *All questions are compulsory.*
- 2) *Answer to both the sections should be solved in separate answer sheets.*
- 3) *Figures to the right side indicate full marks.*

SECTION - I

Q1) Answer any five of the following. **[15]**

- a) What is the fate of pyruvate in anaerobic condition?
- b) Give an account of glycogen storage diseases.
- c) Give the significance of glyoxalate pathway.
- d) How many ATPs are generated during the complete oxidation of glucose to CO₂ and H₂O? Show the energetic chart.
- e) Write a note on intracellular organization of photosynthetic system.
- f) Outline the sequence of reactions that lead to the formation of Vitamin C in some animals.

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

- a) Elaborate on the steps involved in CO₂ fixation to Carbohydrate in plants.
- b) Write a note on interconversion of hexoses.
- c) Discuss the role of electron carriers in mitochondrial respiration.
- d) Outline the steps involved in oxidation of acetylCoA to CO₂ and show its regulation.

Q3) Write short notes on any two of the following. **[10]**

- a) Pentose phosphate pathway.
- b) Biosynthesis of triglycerides.
- c) Calvin cycle.

P.T.O.

SECTION - II

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

- a) Write a note on inborn error of amino acid metabolism.
- b) Enlist the amino acid that can be synthesized by Pyruvate.
- c) Explain purine biosynthesis by de novo pathway.
- d) Give two examples of salvage pathways of nucleotide synthesis.
- e) How are branched amino acids degraded in our body?
- f) Elaborate on porphyrin biosynthesis.

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

- a) What are polyamines? How are they synthesized?
- b) Define Ketogenesis. Write note on acetyl-CoA as a precursor in ketogenesis.
- c) Discuss the catabolism of purine to uric acid.
- d) Give the significance of transamination and oxidative deamination in amino acid metabolism.

Q6) Write short notes on any two of the following. [10]

- a) Enzymes involved in biosynthesis of triglycerides.
- b) Phenylketonuria and Alkaptonuria.
- c) Biosynthesis of IMP from PRPP.



Total No. of Questions : 6]

SEAT No. :

P2848

[5531]-23

[Total No. of Pages : 2

M.Sc.

BIOCHEMISTRY

**BCH-273 : Membrane Biochemistry and Genetics
(2010 Pattern) (Semester - II)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

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

SECTION-I

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

- a) Write the structure and function of calcium transport system.
- b) Explain the fluid Mosaic model of organization of cell membrane.
- c) Differentiate between phagocytosis and pinocytosis.
- d) Explain the transport of drugs across the microbial membrane.

Q2) Answer any three of the following: **[15]**

- a) Write the role of proton gradient in energy generation.
- b) Write a note on freeze fracture technique.
- c) Explain the organization of cell membrane.
- d) Show the mechanism of exocytosis and its physiological significance.

Q3) Write note on any two of the following: **[10]**

- a) Ionophores.
- b) Membrane proteins.
- c) Carrier type of transport animation.

P.T.O.

SECTION-II

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

- a) Explain Watson and Crick model of DNA.
- b) Write a note on three types of RNA.
- c) Explain Mendel's principle of independent assortment with examples.
- d) Explain the principle of complementation tests.

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

- a) Explain control of Tryptophan operon.
- b) Give any two methods of DNA repair with diagram.
- c) Write note on experiments that proved DNA as genetic material.
- d) How the mutants are isolated? Give its significance.

Q6) Write note on any two of the following: [10]

- a) Nearest neighbour analysis.
- b) Epistasis.
- c) Genetic code.



Total No. of Questions : 4]

SEAT No. :

P2849

[5531]-31

[Total No. of Pages : 2

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 the right indicate full marks.*

Q1) Answer any four of the following :

[20]

- a) What is DNA methylation? Give its significance.
- b) Define mutants. Explain excision repair system.
- c) What is role of DNA polymerase in replication? Explain.
- d) Explain how RNA editing changes protein encoded by mRNA.
- e) What is mRNA capping? Give its role & importance.

Q2) Attempt any two of the following :

[20]

- a) Write note on intracellular protein targeting.
- b) Write a note on inhibitors of transcription process.
- c) What are transposons? Give any two mechanisms of transpositions.

Q3) Answer any four of the following :

[20]

- a) Give role of RecA, RuvA, RuvB, RuvC in recombination.
- b) Explain Glycosylation of protein.
- c) Write note on role of t-RNA in translation process.
- d) Explain mitochondrial protein transport.
- e) Write note on replication fork.

P.T.O.

Q4) Write short notes on (any four) :

[20]

- a) Regulation of transcription.
- b) Okazaki fragments.
- c) SOS repair.
- d) E.coli RNA polymerase.
- e) Chromatin remodeling.
- f) Mobile genetic elements.



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Total No. of Questions :6]

SEAT No. :

P2850

[5531]-32

[Total No. of Pages :2

M.Sc.

BIOCHEMISTRY

BCH -371 : Medical Biochemistry and Immunology

(2008 & 2010 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Neat diagram must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Answers to the two sections should be written on separate answer books.*

SECTION - I

(Medical Biochemistry)

Q1) Answer any Three of the following. **[15]**

- a) What are hallucinogens? Give their features.
- b) Give the composition of cerebrospinal fluid and their biochemical significance.
- c) Elaborate on the role of isoenzymes in the diagnosis of heart diseases.
- d) Explain in detail, mechanism that leads to activation of fibrinogen to fibrin.

Q2) Answer any Three of the following. **[15]**

- a) What are lysosomes? Give their physiological role.
- b) Elaborate on types of Influenza.
- c) Explain the process of programmed cell death.
- d) Discuss the mechanism of action of streptomycin and tetracycline.

Q3) Write notes on any two of the following **[10]**

- a) Sickle cell anemia
- b) Carcinogens
- c) Biochemistry of Alzheimer's disease

P.T.O.

SECTION - II

(Immunology)

Q4) Answer Any Three of the following **[15]**

- a) How does innate immunity differ from acquired immunity? Give example.
- b) Explain the principle, procedure and application of ELISA.
- c) Describe the detail structure of immunoglobulin molecule with well labelled diagram.
- d) Elaborate on the steps involved in the production of monoclonal antibodies.

Q5) Answer any Three of the following. **[15]**

- a) Discuss the etiology and development of AIDS.
- b) Elaborate on biochemical basis of autoimmune diseases.
- c) Explain primary and secondary lymphoid organ.
- d) Write a note on class I and class II MHC molecule with their function.

Q6) Write note on any two of the following. **[10]**

- a) Immuno diffusion
- b) Interferons
- c) Classical Pathway



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P2851

[5531]-33

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 neat diagram wherever necessary.*

Q1) Answer any four of the following:

[20]

- a) Define and identify on the diagram of a neuron, the following region: dendrites, axon, axon hillock, soma and synaptic cleft.
- b) Describe the roles of the cerebellum in the regulation of skilled movement.
- c) What are fundamental differences between chemically gated and voltage-gated channels?
- d) Write a note on cytology of a neuron.
- e) Neuropeptides.

Q2) Attempt any two of the following:

[20]

- a) Explain the synthetic pathways and inactivation mechanism of catecholamines and acetylcholine.
- b) Explain the structure of the hypothalamus including the major hypothalamic nuclei.
- c) Describe the local factors affecting brain blood flow. Compare their effectiveness with autonomous regulation of cerebral blood flow.

P.T.O.

Q3) Answer any two of the following:

[20]

- a) Explain the mode of action of hair cells involved in the generation of sound.
- b) Explain the mechanism proposed for short term and long term memory storage.
- c) Draw a cross section of a spinal cord and discuss the organization of the sensory and motor components of gray matter. Describe the somatotopic arrangement of motor neuron pools.

Q4) Write short notes on any four of the following:

[20]

- a) Retina.
- b) GABA Receptor.
- c) Limbic signalling.
- d) Olfactory receptors.
- e) Synaptic plasticity.



Total No. of Questions :4]

SEAT No. :

P2852

[5531]-34

[Total No. of Pages :2

M.Sc.

BIOCHEMISTRY

**BCH-373: Biochemical Toxicology
(2008 & 2010 Pattern) (Semester - III)**

Time : 3Hours]

[Max. Marks : 80

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) What do you mean by poison? How toxicants are classified?
- b) Explain the dose response relationship.
- c) What are the different areas of toxicology? Explain their roles.
- d) Explain in brief the allergic reaction and idiosyncratic reaction.
- e) What are teratogenic effects.
- f) How acute and chronic toxicity of toxicant is determined?

Q2) Attempt any five of the following.

[20]

- a) Give the site and mechanism of toxic action of DDT.
- b) What are toxic effect of ethanol?
- c) How mutagenic potential of toxic substance is evaluated?
- d) Give the data of cadmium in human body.
- e) What measures you would suggest to prevent the occupational hazard?
- f) What are the general toxic effects of solvents and vapor.

Q3) Answer any four of the following

[20]

- a) How oxidative type of air pollution is generated?
- b) Give the composition of snake venom.
- c) Explain the various types of antagonism.
- d) What are the clinical applications of toxicology.
- e) Give the data of mercury in human body.
- f) What are the cellular and carcinogenic effects of arsenic?

P.T.O.

Q4) Give the pathogenesis and clinical manifestation of any four of the following. **[20]**

- a) Oncogenesis of lungs.
- b) Hematopoietic effects of benzene
- c) Encephalopathy due to lead
- d) Pholotoxicity by plant toxins.
- e) Silicosis and asbertosis.



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Total No. of Questions :6]

SEAT No. :

P2853

[5531]-41

[Total No. of Pages :3

M.Sc.

BIOCHEMISTRY

BCH-470: Biochemical Endocrinology and Tissue culture (2008Pattern)

**BCH-470: Biochemical Endocrinology and Plant Biochemistry(2010Pattern)
(Semester -IV)**

Time : 3Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Draw neat diagram wherever necessary.*
- 3) *Figures to the right hand side indicate full marks.*
- 4) *Answers to the two sections should be written on separate answer books.*

SECTION-I

(Biochemical Endocrinology)

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

- a) Describe the role of posterior pituitary hormones.
- b) Write a note on synthesis of thyroid hormones.
- c) Describe the steps involved in the synthesis of prostaglandins.
- d) Write a note on glucagon

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

- a) What are the hormones secreted by the adrenal cortex? what are their respective functions?
- b) Explain the functions of testosterone
- c) Describe the effect of growth hormones.
- d) Write a note on gastro-intestinal hormones.

Q3) Answer any two of the following. [10]

- a) What are growth factors? Explain the effect of any two growth factors.
- b) Describe the structure of human TSH, Explain its regulation.
- c) What are the steps involved in testosterone biosynthesis?

P.T.O.

SECTION-II

(Tissue Culture) (2008 old Pattern)

Q4) Answer any five of the following, **[15]**

- a) What is media? Give importance of micronutrients.
- b) Define phytochemical. Give their importance.
- c) Give the advantages of serum as a constituent in culture media.
- d) Describe characteristics of established cell lines.
- e) Describe protoplast fusion.
- f) Give the process of agrobacterium mediated hairy root culture.

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

- a) Give the difference between suspension and monolayer culture and explain the methods for its growth.
- b) Describe somatic cell hybridisation
- c) Explain the term organ culture , Describe various methods involved in organ culture.
- d) Explain the techniques used for development of embryo culture.

Q6) Write short notes on any two of the following. **[10]**

- a) Anther culture
- b) Contact Inhibition
- c) Natural media.

SECTION-II

(Plant Biochemistry) (2010 New)

Q4) Answer any five of the following. **[15]**

- a) Hill Reaction
- b) Photophosphorylation.
- c) CO₂ fixation
- d) Biosynthesis of sucrose.
- e) Role of sulphur in plant growth
- f) Seed germination and storage proteins.

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

- a) Protoplast function techniques.
- b) Describe any three plant diseases with respect to pest , symptoms and treatment.
- c) Describe the role of nitrogenase system and nitrate reductase in plant.
- d) Give the types of growth hormones and explain role of each in plant growth.

Q6) Write short notes on any two of the following. **[10]**

- a) Application of plant breeding in crop improvement with suitable examples.
- b) Somatic cell hybridisation.
- c) Nitrogen cycle.



Total No. of Questions : 4]

SEAT No. :

P2854

[5531]-42

[Total No. of Pages : 2

M.Sc.

BIOCHEMISTRY

**BCH-472 : Genetic Engineering
(2008 and 2010 Pattern) (Semester - IV)**

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 the right side indicate full marks.*

Q1) Answer any four of the following:

[20]

- a) Write note on applications of transgenic plants.
- b) Comment on role of restriction enzymes in genetic engineering.
- c) What are cosmids? Explain their role in cloning.
- d) Compare cDNA and genomic library.
- e) Comment on different methods for selection of recombinants.

Q2) Answer any two of the following:

[20]

- a) Write note on chromosome walking.
- b) What RNAi technology? Give its applications.
- c) Write note on applications of genetic engineering in industry.
- d) Explain transfection.
- e) Write note on phage vectors.

P.T.O.

Q3) Answer in brief (Any Four):

[20]

- a) Write note on microarray and its applications.
- b) Write note on different enzymes used in genetic engineering.
- c) Explain different types of PCR with examples.
- d) Give different applications of RFLP.
- e) Role of genetic engineering in producing pest resistant plants.

Q4) Write short notes on any four of the following:

[20]

- a) Derived vectors.
- b) Ti plasmid and its role in genetic engineering.
- c) Replica plating.
- d) S1 mapping.
- e) Epigenetics.

