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SB—03—2025

FACULTY OF SCIENCE

B.Sc. (Second Year) (Third Semester) EXAMINATION

APRIL/MAY, 2025

(New Course)

BIOTECHNOLOGY

(CCBT-1C)

(Metabolism)

(Wednesday, 2-4-2025)

Time : 2.00 p.m. to 5.00 p.m.

Time—3 Hours

Maximum Marks—75

N.B. :— (i) Attempt all questions.

(ii) All questions carry equal marks.

(iii) Represent your answers with well labelled diagrams wherever necessary.

1. Define Photosynthesis. Describe in detail non-cycle photophosphorylation. 15

Or

(a) Explain C₄ pathway. 8

(b) Write a note on C₂ pathway. 7

2. Define Glycolysis. Describe in detail EMP pathway. 15

Or

(a) Describe ETC. 8

(b) Write a note on anaerobic respiration. 7

P.T.O.

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3. Describe in detail oxidation of saturated fatty acid with suitable example. 15

Or

(a) Write a note on odd chain fatty acid oxidation. 8

(b) Explain in brief transamination of amino acids. 7

4. Describe in detail synthesis of saturated fatty acid. 15

Or

(a) Write a note on FAS complex. 8

(b) Explain ER and Mitochondrial regulation of fatty acid. 7

5. Write notes on any *three* : 3×5=15

(a) C₃ pathway

(b) TCA

(c) Carnitine shuttle

(d) Chemiosmotic theory

(e) Synthesis of Urea.

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SB—08—2025

FACULTY OF SCIENCE

B.Sc. (Second Year) (Third Semester) EXAMINATION

APRIL/MAY, 2025

(New Pattern)

BIOTECHNOLOGY

Paper—CCBT-2C

(Advanced Cell Biology)

(Friday, 4-4-2025)

Time : 2.00 p.m. to 5.00 p.m.

Time—3 Hours

Maximum Marks—75

N.B. :— (i) All questions are compulsory.

(ii) Each question carries equal marks.

(iii) Draw neat diagram wherever necessary.

1. Explain in detail structural organization of Bacteria. 15

Or

(a) Describe in detail Animal cells. 8

(b) Write a note on cell theory. 7

2. Describe in detail structure and function of Nucleus. 15

Or

(a) Explain in brief Melanosomes. 8

(b) Write a note on Cytoskeleton. 7

P.T.O.

WT

(2)

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3. What is endocytosis ? Explain in brief phagocytosis and pinocytosis. 15

Or

(a) Write a note on diffusion. 8

(b) Explain in detail calcium pump and proton pump. 7

4. Explain in brief Mitosis. 15

Or

(a) Write in brief meiosis. 8

(b) Describe in detail cell cycle. 7

5. Write short notes on (any *three*) : 15

(a) Diversity in cell size and shape

(b) Microfilaments

(c) Fluid mosaic model

(d) Osmosis

(e) G-Protein coupled receptor.

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SB—14—2025

FACULTY OF SCIENCE

B.Sc. (Second Year) (Third Semester) EXAMINATION

APRIL/MAY, 2025

(New Pattern)

BIOTECHNOLOGY

(Molecular Biology)

(Monday, 7-4-2025)

Time : 2.00 p.m. to 5.00 p.m.

Time—3 Hours

Maximum Marks—75

N.B. :— (i) All questions are compulsory.

(ii) All questions carry equal marks.

(iii) Draw labelled diagrams wherever necessary.

1. Explain in detail eukaryotic replication mechanism. 15

Or

(a) Explain Cot curve of DNA. 8

(b) Describe the structure of DNA. 7

P.T.O.

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2. Describe in detail prokaryotic transcription. 15

Or

(a) Explain in detail mechanism of co-transcriptional modifications in mRNA. 8

(b) Explain in detail structure of RNA Polymerase. 7

3. What is genetic code ? Explain its properties and add a note on wobble hypothesis. 15

Or

(a) Describe in detail Initiation step of Eukaryotic translation. 8

(b) Explain the role of chaperons and chaperonins and add a note on proteolytic processing. 7

4. Describe in detail lactose operon. 15

Or

(a) Explain the mechanism of Attenuation of tryptophan. 8

(b) Describe regulation of synthesis of tryptophan at transcriptional level. 7

5. Write short notes on any *three* of the following : 3×5=15

(a) Chemical properties of DNA

(b) Structure and role of *t*RNA

(c) Chemical modification of protein

(d) Structural genes.

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SB—21—2025

FACULTY OF SCIENCE

B.Sc. (Second Year) (Third Semester) EXAMINATION

APRIL/MAY, 2025

(New Pattern)

BIOTECHNOLOGY

Paper—DSEBT-4CI

(Bioinstrumentation Techniques)

(Wednesday, 9-4-2025)

Time : 2.00 p.m. to 5.00 p.m.

Time—3 Hours

Maximum Marks—75

N.B. :— (i) All questions are compulsory.

(ii) Each question carries equal marks.

(iii) Draw a well labelled diagram wherever necessary.

1. Describe TEM in detail with principle, theory, ray diagram, image formation and applications. 15

Or

(a) Write compound microscope in detail. 8

(b) Describe phase contrast microscope in detail. 7

2. Describe gas chromatography with advantages and disadvantages. 15

P.T.O.

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(2)

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Or

- (a) Paper chromatography. 8
- (b) Thin layer chromatography. 7
3. Describe types of centrifuges with advantages and disadvantages. 15
- Or*
- (a) Types of rotors. 8
- (b) Centripetal force. 7
4. Write a note on Polyacrylamide gel electrophoresis (PAGE). 15
- Or*
- (a) IEF 8
- (b) PFGE (Pulse Field Gel Electrophoresis). 7
5. Write short notes on (any *three*) : 15
- (a) SEM
- (b) Column chromatography
- (c) Centrifugal force
- (d) Agarose gel electrophoresis.

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SB—22—2025

FACULTY OF SCIENCE AND TECHNOLOGY

B.Sc. (Second Year) (Third Semester) EXAMINATION

APRIL/MAY, 2025

(New Pattern)

BIOTECHNOLOGY

Paper—DSEBT-4CII

(Plant Physiology)

(Wednesday, 9-4-2025)

Time : 2.00 p.m. to 5.00 p.m.

Time—3 Hours

Maximum Marks—75

N.B. :— (i) Attempt all questions.

(ii) Figures to the right indicate full marks.

(iii) Illustrate your answers with suitable diagram, scheme etc.

1. Describe the mechanism of translocation of organic solutes. 15

Or

(i) Describe diffusion and guttation. 8

(ii) Give the composition of phloem sap. 7

2. Describe cyclic and non-cyclic Photophosphorylation. 15

Or

(i) Give salient features of C4 plants. 8

(ii) Describe Photorespiration. 7

P.T.O.

WT (2) SB—22—2025

3. Describe TCA cycle. 15

Or

(i) Describe glycolysis. 8

(ii) Describe types of respiration. 7

4. Give an account of different types of stresses in plants. 15

Or

(i) Describe Auxin and Cytokinin. 8

(ii) Describe Xenobiotic. 7

5. Write notes on (any *three*) : 15

(a) Importance of respiration

(b) ETC

(c) CAM pathway

(d) Transpiration

(e) Abscisic acid.

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SB—05—2025

FACULTY OF SCIENCE

B.Sc. (Second Year) (Fourth Semester) EXAMINATION

APRIL/MAY, 2025

(New Course)

BIOTECHNOLOGY

Paper—CCBT-1D

(Basic Enzymology)

(Thursday, 3-4-2025)

Time : 2.00 p.m. to 5.00 p.m.

Time—3 Hours

Maximum Marks—75

N.B. :— (i) All questions are compulsory.

(ii) All questions carry equal marks.

(iii) Draw neat and well labelled diagram.

1. Describe nomenclature and classification of Enzymes. 15

Or

Write notes on :

(a) Coenzymes and cofactors. 8

(b) Ribozymes and metalloenzymes. 7

2. Define Active site. Describe induced fit theory of Enzyme action. 15

P.T.O.

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(2)

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Or

Write notes on :

- (a) Competitive inhibition 8
- (b) Acid-Base Catalysis. 7
3. Describe isolation and purification of Enzymes. Add a note on Salt precipitation. 15

Or

- (a) Immobilization of Enzymes. 8
- (b) Molecular weight determination. 7
4. Explain factors affecting enzyme activity. 15

Or

Write notes on :

- (a) Michaelis-Menten equation 8
- (b) LB Plot. 7
5. Write short notes on (any *three*) : 15
- (a) Non-competitive Inhibition
- (b) Covalent Catalysis
- (c) Enzyme activity
- (d) Allosteric enzymes
- (e) Turnover number.

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SB—11—2025

FACULTY OF SCIENCE

B.Sc. (BT) (Second Year) (Fourth Semester) EXAMINATION

APRIL/MAY, 2025

(New Pattern)

BIOTECHNOLOGY

Paper—CCBT-2D

(Applied and Medical Microbiology)

(Saturday, 5-4-2025)

Time : 2.00 p.m. to 5.00 p.m.

Time—3 Hours

Maximum Marks—75

N.B. :- (i) All questions are compulsory.

(ii) Each question carries equal marks.

(iii) Draw neat and labelled diagram wherever necessary.

1. Describe in detail non-symbiotic nitrogen fixation. 15

Or

(a) Phosphorus cycle. 8

(b) Significance of microorganisms in air. 7

2. Explain in brief bacteriological examination of water. 15

P.T.O.

WT

(2)

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Or

- (a) Imvic. 8
- (b) Microbial examination of food. 7
3. Explain in detail opportunistic pathogens and carriers. 15
- Or
- (a) Water borne infections. 8
- (b) Epidemiology. 7
4. Describe in detail Tuberculosis. 15
- Or
- (a) AIDS. 8
- (b) Chikungunya. 7
5. Write short notes on (any *three*) : 15
- (a) Sulphur cycle
- (b) MPN
- (c) Normal flora of skin and mouth
- (d) Typhoid.

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SB—17—2025

FACULTY OF SCIENCE

B.Sc. (Second Year) (Fourth Semester) EXAMINATION

APRIL/MAY, 2025

(New Pattern)

BIOTECHNOLOGY

Paper—CCBT-3D

(Immunology and Virology)

(Tuesday, 8-4-2025)

Time : 2.00 p.m. to 5.00 p.m.

Time—3 Hours

Maximum Marks—75

N.B. :— (i) Attempt *all* questions.

(ii) *All* questions carry equal marks.

(iii) Represent your answers with well labelled diagrams wherever necessary.

1. Define Immunity. Describe in detail Innate and Adaptive immunity. 15

Or

(a) Describe in detail Lymphocytes. 8

(b) Explain structure and function of Lymph node. 7

P.T.O.

WT

(2)

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2. Define Antibody. Describe different classes of Immunoglobulins. 15
- Or*
- (a) Describe precipitation reactions. 8
- (b) Write a note on Antigen. 7
3. Describe in detail classification of viruses. 15
- Or*
- (a) Describe symmetry of viruses. 8
- (b) Explain Lytic cycle of phage. 7
4. Describe in detail structure, pathogenesis and treatment of HIV. 15
- Or*
- (a) Describe TMV. 8
- (b) Write a note on Corona Virus. 7
5. Write notes on any *three* : 3×5=15
- (a) Thymus
- (b) Agglutination reactions
- (c) Ultra structure of virus
- (d) M13 virus
- (e) Ebola virus.

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SB—25—2025

FACULTY OF SCIENCE

B.Sc. (Second Year) (Fourth Semester) EXAMINATION

APRIL/MAY, 2025

BIOTECHNOLOGY

(Basics of Biostats and Computer)

(Friday, 11-4-2025)

Time : 2.00 p.m. to 5.00 p.m.

Time—3 Hours

Maximum Marks—75

N.B. :— (i) All questions are compulsory.

(ii) All questions carry equal marks.

(iii) Draw neat and well labelled diagram wherever necessary.

1. Describe in detail the measures of central tendency with their formulae and examples. 15

Or

(a) Explain the grouped and ungrouped data with their examples. 8

(b) Write on Diagrammatic Representation of Data by using Simple Bar and Sub-divided Bar. 7

P.T.O.

WT

(2)

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2. What is the concept of variance ? Explain the standard deviation. 15

Or

(a) Write in brief coefficient of variation. 8

(b) Write the definition, formula and examples of range. 7

3. Draw a well labelled diagram of computer and write functions of their different parts. 15

Or

(a) Describe in brief operating system in computer. 8

(b) Write on Binary Number system and their conversion. 7

4. What is the concept of Internet ? Write functions of WWW, URL, http, Browsers and Search Engines. 15

Or

(a) How to creat a presentation in PowerPoint ? Explain the steps. 8

(b) Write on MS-Word and Excel. 7

5. Write shorts notes on (any *three*) : 3×5=15

(a) Mode

(b) Formula and example of standard deviation

(c) Hexadecimal number system

(d) Internet

(e) Histogram.

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SB—26—2025

FACULTY OF SCIENCE

B.Sc. (Second Year) (Fourth Semester) EXAMINATION

APRIL/MAY, 2025

BIOTECHNOLOGY

Paper—DSEBT-4DII

(Plant Tissue Culture)

(Friday, 11-4-2025)

Time : 2.00 p.m. to 5.00 p.m.

Time—3 Hours

Maximum Marks—75

N.B. :— (i) All questions are compulsory.

(ii) All questions carry equal marks.

(iii) Draw neat and well labelled diagram wherever necessary.

1. Define plant tissue culture. Describe media preparation for PTC. 15

Or

Write notes on :

(a) Organization of PTC Laboratory. 8

(b) Sterilization Technique. 7

P.T.O.

WT

(2)

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2. Describe in detail callus culture. 15

Or

Write notes on :

(a) Somatic hybridisation. 8

(b) Pollen culture. 7

3. Give a detailed account of Somaclonal variation. 15

Or

Write notes on :

(a) Cryopreservation. 8

(b) Metabolic engineering of secondary metabolite. 7

4. Describe in detail application of Plant tissue culture. 15

Or

Write notes on :

(a) Commercial production of secondary metabolites. 8

(b) Germplasm conservation. 7

5. Write short notes on (any *three*) : 3×5=15

(a) Embryo culture

(b) Re-differentiation and dedifferentiation

(c) Micropropagation of ornamental plants

(d) Anther culture

(e) Elicitors.

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