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SB—10—2025

FACULTY OF SCIENCE

B.Sc. (Fifth Semester) EXAMINATION

APRIL/MAY, 2025

(New Pattern)

BIOTECHNOLOGY

(rDNA Technology)

(Saturday, 5-4-2025)

Time : 10.00 a.m. to 1.00 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. Describe various vector based and direct transfer of DNA methods used in rDNA technology. 15

Or

(a) Describe in detail organization of λ phage as a vector. 8

(b) Explain various reporter genes used in selection of transformed cells. 7

P.T.O.

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2. Explain in detail principle and mechanism of polymerase chain reaction. 15

Or

(a) Explain the technique of Northern blotting. 8

(b) Explain Sanger's method of DNA sequencing. 7

3. Explain in detail chemical synthesis of DNA. 15

Or

(a) Explain in detail construction of genomic DNA library. 8

(b) Describe Autoradiography of DNA. 7

4. Explain in detail concept of Gene therapy. 15

Or

(a) Explain production technique of recombinant vaccine. 8

(b) Explain production technique of Golden rice. 7

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

(a) cDNA library

(b) pBR 322

(c) Maxam and Gilbert's method of DNA sequencing

(d) Tissue plasminogen Activator.

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SB—16—2025

FACULTY OF SCIENCE

B.Sc. (BT) (Third Year) (Fifth Semester) EXAMINATION

APRIL/MAY, 2025

(New Pattern)

BIOTECHNOLOGY

Paper—CCBT-2E

(Developmental Biology)

(Tuesday, 8-4-2025)

Time : 10.00 a.m. to 1.00 p.m.

Time—3 Hours

Maximum Marks—75

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

(ii) All questions carry equal marks.

(iii) Draw a well labelled diagram wherever necessary.

1. Describe in detail types and patterns of cleavage. 15

Or

(a) Describe in detail Gastrulation. 8

(b) Explain the concept of Gametogenesis. 7

P.T.O.

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2. Explain the role of genes in patterning and development of *Drosophila*. 15

Or

(a) Describe apoptosis in detail. 8

(b) Explain stem cell technology. 7

3. Describe in detail floral patterning in *Arabidopsis*. 15

Or

(a) Describe in detail photomorphogenesis. 8

(b) Write in detail organ development. 7

4. Describe in detail Embryo culture and preservation. 15

Or

(a) Explain concept of test tube baby. 8

(b) Give an account on GMOS. 7

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

(a) Transdifferentiation

(b) Seedling development

(c) Cancer Biology

(d) Meristem structure

(e) Cloning in mammals.

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SB—24—2025

FACULTY OF SCIENCE

B.Sc. (BT) (Third Year) (Fifth Semester) EXAMINATION

APRIL/MAY, 2025

(New Pattern)

BIOTECHNOLOGY

Paper—CCBT-3E

(Bioprocess Technology)

(Friday, 11-4-2025)

Time : 10.00 a.m. to 1.00 p.m.

Time—3 Hours

Maximum Marks—75

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

(ii) All questions carry equal marks.

(iii) Draw a well labelled diagram wherever necessary.

1. Define fermentor. Explain in detail design of fermentor with applications. 15

Or

(a) Explain in detail materials of construction of fermentor and their specification. 8

(b) Give an account on welding and surface treatment components of fermentor. 7

2. Define sterilization. Explain in detail air and media sterilization with principle and mechanisms. 15

P.T.O.

WT

(2)

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Or

- (a) Define media. Explain in detail media optimization. 8
- (b) Explain in detail design of media. 7
3. Explain in detail measurement and control of Bioprocess parameters. 15
- Or*
- (a) Explain in detail batch culture kinetics. 8
- (b) Explain in detail continuous culture kinetics. 7
4. Explain in detail computer controlled fermentation and factors used in scale up. 15
- Or*
- (a) Explain in detail SOP and GMP. 8
- (b) Explain in detail foam and it's control. 7
5. Write short notes on (any *three*) : 3×5=15
- (a) Agitator
- (b) Decimal reduction
- (c) Classification of bioproducts
- (d) Quality control
- (e) Depth filter.

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SB—27—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

BIOTECHNOLOGY

Paper—DSEBT-4E-I

(Advanced Bioinformatics)

(Saturday, 12-4-2025)

Time : 10.00 a.m. to 1.00 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. What is bioinformatics ? Describe in detail advanced fields of bioinformatics. 15

Or

Write notes on :

(a) WWW

8

(b) Role of Internet.

7

P.T.O.

WT

(2)

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2. Describe in detail pairwise sequence alignment. 15

Or

Write notes on :

(a) Rasmol 8

(b) PyMol. 7

3. Describe PDB and PubChem structural databases. 15

Or

Write notes on :

(a) DDBJ 8

(b) GenBank. 7

4. Describe secondary structure classification of protein. 15

Or

Write notes on :

(a) Homology modeling 8

(b) Motif. 7

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

(a) URLs

(b) Cn3D

(c) EMBL

(d) Domain.

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SB—28—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

BIOTECHNOLOGY

(Medical Biotechnology)

(Saturday, 12-4-2025)

Time : 10.00 a.m. to 1.00 p.m.

Time—3 Hours

Maximum Marks—75

N.B. :— All questions are compulsory.

1. Write a brief essay on recombinant DNA and protein based vaccines. 15

Or

(a) Prepare a draft on stem cell therapy. 8

(b) Write a brief note on plant based vaccines. 7

2. Explain in detail the production of monoclonal antibodies. 15

Or

(a) Give the role of ELISA in the diagnosis of bacterial disease. 8

(b) Discuss the concept of reverse vaccinology. 7

3. Define stem cell. Explain in detail properties and potency of stem cells. 15

P.T.O.

WT

(2)

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Or

- (a) Elaborate the concept of tissue engineering. 8
- (b) Give the clinical applications of embryonic stem cells. 7
4. What are oncogenes ? Describe in detail the cell cycle with respect to cancer. 15

Or

- (a) Explain the defects in complement system. 8
- (b) Write a brief note on AIDS. 7
5. Write short notes on the following (any *three*) : 15
- (a) Tumor suppressor gene
- (b) Apoptosis
- (c) Antibody
- (d) Role of Scaffolds
- (e) Conjugate vaccine.

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SA—1001—2025

FACULTY OF ALL

B.A./B.Com./B.Sc. (Third Year) (Fifth Semester) EXAMINATION

APRIAL/MAY, 2025

(CBCS/New Pattern)

ENVIRONMENTAL STUDIES (Compulsory)

Paper-V

(Monday, 28-4-2025)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (i) Attempt all questions.

(ii) Illustrate your answer with suitable well labelled diagram wherever necessary.

(i) सर्व प्रश्न सोडवा.

(ii) आवश्यक असेल तेथे आकृती काढून नावे द्या.

1. Write in detail uses and overexploitation of forest resources. 15

वनसंपदेचे उपयोग व त्याचा अतिस्विक्त वापर यावर सविस्तर माहिती लिहा.

Or/किंवा

(a) Describe soil pollution. 8

मृदा प्रदूषणाची माहिती लिहा.

(b) Development of wasteland. 7

पडीक जमिनीचा विकास.

2. Describe in detail causes, effects and control measures of Air Pollution. 15

वायु प्रदूषणाची कारणे, परिणाम व त्याचे नियंत्रण यावर सविस्तर माहिती लिहा.

P.T.O.

WT

(2)

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Or/किंवा

- (a) Productive use of biodiversity. 8
जैवविविधतेचे उत्पादक महत्त्व.
- (b) Sustainable development process. 7
शाश्वत विकास प्रक्रिया.
3. Write short notes on any two : 10
- (a) Nuclear hazards
- (b) Soil erosion
- (c) Ozone layer depletion
- (d) Watershed management.
- कोणत्याही दोनवर थोडक्यात टिपा लिहा :
- (a) आण्विक संकटे
- (b) जमिनीची धूप
- (c) ओझोन स्तराचा क्षय
- (d) पाणलोट क्षेत्र विकास.

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SB—07—2025

FACULTY OF SCIENCE

B.Sc. (BT) (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2025

(New Course)

BIOTECHNOLOGY

Paper—CCBT-2F

(Industrial Biotechnology)

(Friday, 4-4-2025)

Time : 10.00 a.m. to 1.00 p.m.

Time—3 Hours

Maximum Marks—75

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

(ii) All questions carry equal marks.

(iii) Draw a well labelled diagram wherever necessary.

1. Describe in detail isolation of mutant which do not produce feedback inhibitors or repressor. 15

Or

(a) Explain in detail modification of permeability with example. 8

(b) Explain isolation of mutant which do not recognize presence of inhibitors or repressor. 7

2. Describe in detail precipitation and centrifugation for removal of cell mass. 15

P.T.O.

WT

(2)

SB—07—2025

Or

- (a) Explain in detail physical method of cell disruption. 8
- (b) Explain in detail liquid-liquid extraction. 7
3. Explain in detail microbial production of Vitamin B₁₂ with applications. 15
- Or*
- (a) Describe in detail production of citric acid by surface culture method. 8
- (b) Explain production of pectinase with application. 7
4. Explain in detail quality control and QA. 15
- Or*
- (a) Explain sterility and pyrogen testing in detail. 8
- (b) Give an account on GLP and GMP. 7
5. Write short notes on (any *three*) : 15
- (a) Filtration
- (b) Ion exchange chromatography
- (c) Crystallization
- (d) Carcinogenicity testing
- (e) Penicillin production.

SB—07—2025

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SB—13—2025

FACULTY OF SCIENCE

B.Sc. (BT) (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2025

BIOTECHNOLOGY

Paper—CCBT-3F

(Environmental Biotechnology)

(Monday, 7-4-2025)

Time : 10.00 a.m. to 1.00 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 in detail waste water treatment. 15

Or

(a) Air lift membrane bioreactors. 8

(b) Packed bed reactors. 7

2. Describe in detail biodegradation of Hydrocarbon. 15

P.T.O.

WT

(2)

SB—13—2025

Or

- (a) Anaerobic degradation pathways. 8
- (b) Aerobic degradation pathways. 7
3. Describe phytoremediation with types and its application. 15
- Or*
- (a) Bioremediation of soil. 8
- (b) Ex-situ methods. 7
4. Write a note on pesticide degradation with example. 15
- Or*
- (a) Herbicide degradation. 8
- (b) Cytochrome P450 system. 7
5. Write short notes on (any *three*) : 15
- (a) Rotating biological contactors
- (b) Municipal solid waste management
- (c) In-situ methods
- (d) Xenobiotics
- (e) Plasmid borne metabolic processes.

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SB—19—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

(New Pattern)

BIOTECHNOLOGY

(Agriculture Biotechnology)

(Wednesday, 9-4-2025)

Time : 10.00 a.m. to 1.00 p.m.

Time—3 Hours

Maximum Marks—75

N.B. :— All questions are compulsory.

1. Explain the process of symbiotic nitrogen fixation in leguminous crops. 15

Or

(a) What are phytohormones ? Explain their classification. 8

(b) Describe the physiological effects of Phytohormones. 7

2. Describe in detail nitrogen cycle with a neat labelled diagram. 15

Or

(a) Write a brief note on nitrogenase complex. 8

(b) Explain the process of development of symbiosis. 7

P.T.O.

WT

(2)

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3. Define Biofertilizer. Explain various types of biofertilizers. 15

Or

(a) Give the mode of application and advantages of biofertilizers. 8

(b) Explain the mass production of Azotobacter biofertilizer. 7

4. Describe the classification of plant diseases based on symptoms. 15

Or

(a) Discuss in detail about black arm disease of cotton. 8

(b) Explain powdery mildew of wheat. 7

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

(a) Biopesticides

(b) SCP

(c) Rhizobium

(d) Biofuel production

(e) Bt.

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SB—02—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

BIOTECHNOLOGY

(Pharmaceutical Biotechnology)

(Tuesday, 15-4-2025)

Time : 10.00 a.m. to 1.00 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 various factors used to enhance the production of plant secondary metabolites. 15

Or

(a) Explain various steps involved in secondary metabolite production through cell suspension culture. 8

(b) Explain in brief various types of plant secondary metabolites. 7

2. What is microbial resistance ? Explain various types of microbial resistance against antibiotics. 15

P.T.O.

WT

(2)

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Or

- (a) Explain types of antimicrobial agents based on their mode of action. 8
- (b) Explain various methods of Microbial assay. 7
3. Describe in detail structure and mechanism of action of Quinolones, Amantadine and Nystatin. 15

Or

- (a) Explain mechanism of action of Anticancer drugs. 8
- (b) Describe in detail mechanism of action of antidiabetic drugs. 7
4. Explain principle and various methods of protein engineering. 15

Or

- (a) Describe the concept of pharmacokinetics. 8
- (b) Explain various methods of drug delivery systems to deliver pharmaceutical product. 7
5. Write on any *three* : 15
- (a) Classes of plant secondary metabolites
- (b) General characteristics of antibiotics
- (c) Antihypertensive drugs
- (d) Indian Pharmacopoeia.

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SB—20—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

(New Pattern)

BIOTECHNOLOGY

(Animal Biotechnology)

(Wednesday, 9-4-2025)

Time : 10.00 a.m. to 1.00 p.m.

Time—3 Hours

Maximum Marks—75

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

(ii) Draw neat diagram wherever necessary.

1. Describe in detail materials used for animal cell culture. 15

Or

(a) Write a short note on Laminar flow hoods. 8

(b) Write a short note on established cell lines. 7

2. Describe in detail isolation and separation of cells. 15

Or

(a) Explain the maintenance of cell culture. 8

(b) Explain the serum dependent media. 7

P.T.O.

WT

(2)

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3. Describe in detail biology and characterization of cultured cells. 15

Or

(a) Explain cell synchronization of animal cell culture. 8

(b) Write a short note on the measurement of cell death. 7

4. Describe in detail physical and chemical methods for cell transformation. 15

Or

(a) Explain the cell fusion methods of animal cell. 8

(b) Explain the hybridoma technology. 7

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

(a) Centrifuge

(b) Viable cell count

(c) Apoptosis

(d) Gene therapy

(e) Embryonic culture.

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