Exam Code: 107405 (20)

Paper Code: 5164

Programme: Bachelor of Science (Bio-Technology)
Semester-V

Course Title: rDNA Technology-I

Course Code: BBTM-5061

Time Allowed: 3 Hours **Max Marks: 30**

Candidates are required to attempt five questions, selecting at least one question from each of the four sections (A-D). The fifth question may be attempted from any section. Draw well labelled diagram where ever necessary. Each question carries 6 marks.

Section A

1. (a) Diagramatically explain procedure of genetic engineering. (2)
   (b)Write down source, recognition sequence of Eco RI , Bam HI. (2)
   (c) Define and give examples of isoschizomers and rare cutting enzymes. (2)
2. (a) Write down Characteristics features and functions of RNase-H, DNase-I, Nuclease S. (2)

(b) Discuss applications of DNA-Pol I, Klenow fragment, T4DNA polymerase, Reverse transcriptase and Taq polymerase. (4)

Section B

3. (a) Write down importance of multiple cloning site and copy number for the construction of vector. (2)
   (b) Differentiate between insertional and replacement Bacteriophage lambda based vectors. (4)
4. (a) Differentiate between pUC 8, phagemid and cosmid. (4)
   (b)Write down procedure of isolation and purification of DNA from plants. (2)

Section C

5. (a) Explain the procedure of CaC12 uptake method and electroporation method in detail. (4)
   (b) Write down a short note on transfection, microprojectile method. (2)
6. (a) Describe phenomenon of insertional inactivation of antibiotic gene and write down the procedure of idententification of recombinants. (4)
   (b) What do you know about blue white selection. (2)

Section D

7. (a)Explain procedure of Random priming and End labelling. (3)
   (b) Write down principle and procedure of Western blotting. (3)
8. (a) Discuss Non-Radioactive labelling techniques. (3)
   (b) Write down principle and procedure of Nucleic acid hybridization. (3)

Exam Code: 107405 **Paper Code: 5165**

Programme: Bachelor of Science (Biotechnology)

Semester – V

Course Title: Plant Biotechnology-I

Course Code: BBTM-5062

Time Allowed: 3 Hours **Maximum Marks: 30**

Attempt five questions in all, selecting at least one question from each section. The fifth question may be attempted from any section. Each question carries 6 marks.

SECTION – A

1. a) Define plant nutrition. What are plant macronutrients and micronutrients? Give examples
   b) Elaborate historical background of plant tissue culture.
2. Define Murashige and Skoog's (MS) medium. Discuss in detail about chemical composition of MS medium. How will you prepare MS medium from stock solutions?

SECTION – B

3. a) What are auxins? How they are synthesized in plants?
   b) Discuss briefly about physiological functions of cytokinins in plants.
4. Discuss briefly about physiological functions and biosynthesis of gibberellins in plants.

SECTION – C

5. What is plant-explant-plant concept? Discuss in detail about various factors influencing growth and development of plantlets in tissue culture.
6. a) What is tissue competency? Describe in detail about *in vitro* developmental pathways.
   b) Explain dedifferentiation and redifferentiation of cells

SECTION – D

7. Elaborate in detail about direct gene transfer methods for transgenic plant production.
8. a) What are transgenic plants? How they are produced?
   b) Discuss briefly the structure and role of Ti plasmid in genetic transformation.

Exam Code: 107405 **Paper Code: 5166**
(20)

Programme: Bachelor of Science (Bio-Technology)
Semester-V

Course Title: Animal Biotechnology-I

Course Code: BBTM-5063

Time Allowed: 3 Hours **Max Marks: 30**

Attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section. Each question carries equal (6) marks.

Section — A

1. Write Short Notes on:
   a. Elements of Aseptic technique
   b. Design and Layout of ATC Lab
2. What is cell Viability? How will you check the viability of cells in culture?

Section — B

3. a) What are the potential risks associated with routine cell culture?
   b) Write short note on cross contamination. List the steps to prevent the cellular cross contamination.

4. What are P1, P2 and P3 facility? What are their applications?

Section — C

5. a) What is the importance of pH While culturing animal cells? How is the pH maintained in culture media?
   b) Write a note on Mechanical Stabilizers and adhesion factors.
6. What are constituents of serum? Describe the advantages and disadvantages of serum supplemented medium?

Section — D

7. Write notes on different substrates used for the growth of cells. Describe the advantages and disadvantages of each
8. Write Notes on:
   a) Population Doubling time
   b) Multiplication Rate
   c) Phases of Cell Cycle

Exam Code: 107405 **Paper Code: 5167**

Programme: Bachelor of Science (Bio-Technology)

Semester-V

Course Title: Bioprocess Engineering-I

Course Code: BBTM-5064

Time Allowed: 3 Hours **Max Marks: 30**

Note: Candidates are required to attempt five questions in all, selecting at least one question from each section. The fifth question may be attempted from any section. Each question carries 6 marks.

Section-A

1. State Fourier's Law of heat transfer and explain its significance in chemical and biochemical processes. (6)
2. Describe the methods commonly used to enhance oxygen transfer in bioreactors. (6)

Section-B

3. Define the yield coefficient and explain its significance in microbial growth. (6)
4. What is meant by microbial growth kinetics, and why is it important in bioprocessing? (6)

Section-C

5. Discuss the following
   a) Non-competitive inhibition (3)
   b) Multistage feedback system (3)
6. What are effector molecules, and how do enzyme inhibitors and activators act as effectors? (6)

Section-D

7. Why is sterilization important in bioprocesses, and what are the main goals of air and media sterilization? (6)
8. What is the Del factor, and how is it used in calculating sterilization requirements? (6)

Exam Code: 107405 **Paper Code: 5168**
(20)

Programme: Bachelor of Science (Bio-Technology)
Semester-V

Course Title: Biochemical and Biophysical Techniques-I

Course Code: BBTM-5065

Time Allowed: 3 Hours **Max Marks: 30**

Attempt 5 questions, selecting atleast one from each of section A, B, C and D. Fifth question can be attempted from any section. Each question carries six marks

Section A

1. What is Sedimentation coefficient? Discuss the factors affecting sedimentation coefficient? (6 marks)
2. a)List different types of rotors and explain how we can take care of them
   B) Write a note on Density gradient centrifugation.
   (3+3 marks)

Section B

3. Write a note on the principle and applications of Affinity Chromatography? (6 marks)
4. A) Write a note on gel exclusion chromatography

B) What is partition Coefficient?

(4+2 marks)

Section C

5. Discuss the principle and applications of High performance liquid chromatography (6 marks)
6. a) Briefly explain the applications of Gas liquid chromatography

   b) Write a note on Fast Protein liquid chromatography

   (3+3 marks)

Section D

7. Write a note on basic principle and instrumentation of ESR (6 marks)
8. a) Discuss principle of Lambert Beer's Law.

   b) Theory and principle of double beam UV/V is spectroscopy (3+3 marks)

Exam Code: 107405 **Paper Code: 5169**
(20)

Programme: Bachelor of Science (Bio-Technology)
Semester-V

Course Title: Industrial Biotechnology-II

Course Code: BBTM-5066

Time Allowed: 3 Hours **Max Marks: 30**

Candidates are required to attempt five questions, selecting at least one question from each section. A, B, C, D. The fifth question may be attempted from any of these four sections. Each question carries 6 marks.

Section — A

1. a) Write a brief note on microbial production process of streptomycin? Name the media components used at industrial scale production of streptomycin? (3)
   b) Explain the microbiology of acetone-butanol fermentation? Give only the flow chart of production process? (3)
2. a) Write a comprehensive note on various types of feed stocks used industrially for the production of biofuels? (3)

b) What are xenobiotics? Write a brief note on microbial degradation of any two of these environmental pollutants? (3)

Section — B

3. Write a comprehensive note on microbial production of
   - Vitamin B12
   - Glutamic acid (6)
4. Name the different types of wines available commercially? Explain the industrial microbial process for the production of any two wines studied by you? (6)

Section—C

5. a) Explain the various factors affect the process of vermicomposting? What is vermiwash, give advantages of its use over traditional fertilizers? (3)

   b) Give a diagrammatic sketch for the production of BT-cotton? What are the advantages using BT-cotton over the traditional cotton varieties? (3)
6. Give a detailed account of single cell protein production from.
   - Yeast
   - Spirulina (6)

Section — D

7. a)Write a detailed note on BNF? Give its significance in process of atmospheric nitrogen fixation? (3)

   b) What do you know about phosphate solubilising bacteria? How these bacteria help in enrichment of phosphate in agricultural fields? (3)
8. Comprehensively describe the process of microbial association with higher plants? Explain with help of at least two examples studied by you? (6)