22MBU517

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2025
(Fifth Semester)

Branch – **MICROBIOLOGY**

PRINCIPLES OF GENETIC ENGINEERING & RECOMBINANT DNA TECHNOLOGY

Time: Three Hours Maximum: 50 Marks

SECTION-A (5 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (5 x 1 = 5)

1. ---------- is an example of Palindromic DNA
   a)5'- GCGGCCGC -3' b) 5'- ATCGAT -3'
   c)5'- AGCT -3' d) All of the above

2. Identify the vectors that clone the largest DNA fragment
   a) Plasmids b) BACs
   c)Bacteriophage d) Cosmids

3. In Blue white screening, label the gene which gets inactivated
   a) Lac Z b) Lac A
   c) Trp A d) Trp B

4. A modified form of the traditional Polymerase Chain Reaction method that reduces the production of non-specific DNA is called ----------
   a) Hot start PCR b) Touch down PCR
   b) Reverse transcriptase PCR d) Multiplex PCR

5. Who developed the method based on the chemical modification of DNA
   a) Hershey and chase b) Kary B. Mullis
   c) Frederick Sanger d) Allan Maxam and Walter Gilbert

SECTION - B (15 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 3 = 15)

6 a. Describe the role of methylation in DNA ligase function.
OR
b. Explain the significance of DNA Polymerase in Gene cloning

7 a. Bring out the salient features of PBR 322 and pUC vectors.
OR
b. Develop the strategies involved in inserting new DNA into the Ti plasmid.

8 a. Summarise the steps in constructing a cDNA library with a neat diagram.
OR
b. Narrate the process of insertional inactivation in antibiotic resistance genes with a neat diagram.

9 a. Prepare a step-by-step protocol to perform PCR.
OR
b. Sketch a flowchart showcasing the steps of Western Blotting.

10 a. Compare the chemical dideoxy and the chain termination method.
OR
b. How do next-generation sequencing methods differ from traditional sequencing methods?

Cont...

SECTION -C (30 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 x 6 = 30)

11 a Elucidate the methods of Blunt end Ligation with diagrams

Or

b Outline the steps in Gene Cloning with a neat diagram. Add a note on the enzymes involved.

12 a Cosmids can clone up to 52kb of DNA. Justify this statement.

Or

b Compare the baculovirus expression system with the bacterial and mammalian expression systems.

13 a Examine the key features of Maniatis Strategy and add a note on its significance

Or

b Select recombinants based on Nucleic Acid Hybridization methods.

14 a Highlight the steps involved in Southern Blotting with a neat diagram.

or

b Distinguish between RFLP AND RAPD.

15 a Summarise the steps involved in the Chemical dideoxy method with a neat diagram.

Or

b Outline the steps in next-generation sequencing. Add a note on its applications.

Z-Z-Z END