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Reg. No. :

Code No. : 30420 E Sub. Code : CEMI 61

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2025.

Sixth Semester

Microbiology

Major Elective — BIOTECHNOLOGY AND GENETIC
ENGINEERING

(For those who joined in July 2021 and 2022 only)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL the questions.

Choose the correct answer :

1. Restriction endonucleases are _____.
 - (a) used for invitro DNA synthesis
 - (b) synthesized by bacteria as part of their defense mechanism
 - (c) present in mammalian cells for degradation of DNA when the cells dies
 - (d) used in genetic engineering for ligating two DNA molecules

2. Restriction endonucleases hydrolyzes polynucleotide from _____.
 - (a) Only the 5' end
 - (b) Other ferminal
 - (c) At an internal phosphodigester bond
 - (d) A phosphodiester bond within a specific sequence
3. To be a cloning vector, a plasmid does not require _____.
 - (a) an origin of replication
 - (b) an antibiotic resistance marker
 - (c) a restriction site
 - (d) to have a high copy number
4. In recombinant DNA methods, the term vectors refers to _____.
 - (a) the enzyme that cuts DNA into restriction fragments
 - (b) the sticky end of a DNA fragment
 - (c) a plasmid used to transfer DNA into a living cells
 - (d) a DNA probe used to identify a particular gene

5. In prokaryotes, the lagging primers are removed by _____.
- 3' to 5' exonuclease
 - DNA ligase
 - DNA polymerase I
 - DNA polymerase III
6. Which type of DNA cleavage is done in the Maxam Gilbert method?
- Edge
 - Interstitial
 - Base-specific
 - Gene specific
7. *Agrobacterium tumefaciens* is often used as vehicle to introduce foreign DNA into plants. The *agrobacterium* 7-DNA in plant cells can be found as _____.
- an autonomously replicating nuclear plasmid
 - a mitochondrial plasmid
 - a chloroplast plasmid
 - integrated into the plant genome
8. The following are useful to introduce gene into crop plants except _____.
- Ti plasmid
 - Particle gun
 - Breeding
 - Auxin
9. Which of the following methods for the production of transgenic mice involves the initial creation of a cell chimera?
- Pronuclear microinjection
 - Retroviral transduction
 - Transfection of ES cells
 - All of the above
10. The term 'transfection' refers to which of the following?
- Synthesis of mRNA from a DNA template
 - Synthesis of protein based on an mRNA sequence
 - Introduction of foreign DNA into a cell
 - The process by which a normal cell becomes malignant

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) Discuss about scope of genetic engineering.
- Or
- (b) Write down the procedure of isolation and purification of DNA from cells.

12. (a) Phage vectors.

Or

(b) Write short notes on YAC vector.

13. (a) Discuss about Hybrid mapping.

Or

(b) Describe briefly about sequence of genome acquisition and analysis.

14. (a) State the application of herbicide resistant plants.

Or

(b) Discuss about somatic embryogenesis.

15. (a) Write about gene therapy types and applications.

Or

(b) State the importance of Human Genome Mapping.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 600 words.

16. (a) Define restriction enzymes and write about its types and sources.

Or

(b) Discuss about the application of genetic engineering.

17. (a) Focus on PSF²¹²⁴ vectors.

Or

(b) Write a detail notes on PUC vectors.

18. (a) Discuss in detail about FISH technique.

Or

(b) Short gun method with diagrammatic explanation and application in G.E.

19. (a) Write notes on gene silencing in crop plants.

Or

(b) Describe the properties of Ti plasmid.

20. (a) State the principle and application of monoclonal antibodies.

Or

(b) Write a detail notes on vaccine production.