

(6 pages)

Reg. No. : .....

Code No. : 10068 E Sub. Code : CEMI 61

B.Sc.(CBCS) DEGREE EXAMINATION,  
NOVEMBER 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 questions.

Choose the correct answer :

1. What is a vector in genetic engineering?
  - (a) A DNA molecule that carries a gene of interest into a host cell
  - (b) a type of restriction enzyme
  - (c) a type of DNA polymerase
  - (d) a type of gene
2. What is the term for the process of introducing a gene into an organism to treat a disease?
  - (a) gene therapy
  - (b) gene editing
  - (c) genetic modification
  - (d) cloning
3. Which of the following is a common type of cloning vector?
  - (a) plasmid
  - (b) virus
  - (c) bacteriophage
  - (d) All of the above
4. What is the primary function of a cloning vector?
  - (a) to amplify the gene of interest
  - (b) to express the gene of interest
  - (c) to carry the gene of interest into a host cell
  - (d) to sequence the gene of interest
5. What is the unit of measurement of genetic distance in linkage mapping?
  - (a) base pairs
  - (b) centimorgans
  - (c) Kilobases
  - (d) Metabases
6. Which technique is commonly used in gene mapping to identify genetic variations?
  - (a) PCR
  - (b) DNA sequencing
  - (c) RFLP
  - (d) All of the above

7. What is the role of *Agrobacterium tumefaciens* in plant genetic engineering?
- (a) to introduce genes into plant cells
  - (b) to select for transformed cell
  - (c) to regenerate plants from tissue culture
  - (d) to analyze gene expression
8. What is the term for plants that have been engineered to produce a specific trait such as pest resistance or drought tolerance?
- (a) Transgenic plants
  - (b) genetically modified organisms
  - (c) Mutant plants
  - (d) Hybrid plants
9. What is the role of embryonic stem cells in animal biotechnology?
- (a) to produce genetically modified animals
  - (b) to study development biology
  - (c) to generate tissues for transplantation
  - (d) All of the above
10. What is the term for an animal that has been genetically modified to lack a specific gene.
- (a) Knockout animal
  - (b) Transgenic animal
  - (c) Chimera
  - (d) Clone

PART B — (5 × 5 = 25 marks)

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

11. (a) What are the Eukaryotic and prokaryotic hosts used for cloning?
- Or
- (b) Write short notes on History of genetic engineering.
12. (a) How would you construct PUC.
- Or
- (b) Discuss about Lambda phage vectors.
13. (a) Elucidate the importance of SST tags.
- Or
- (b) Write about genome.
14. (a) Discuss about somatic embryogenesis?
- Or
- (b) Explain about Plant tissue culture?
15. (a) Write about Human Genome mapping?
- Or
- (b) Discuss about Targeted genome editing

PART C — (5 × 8 = 40 marks)

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

16. (a) Write about the principles of r DNA technology.

Or

- (b) Write a detail notes on DNA ligases.

17. (a) Discuss in detail about PSF 2124 vector.

Or

- (b) Focus on Lamda Phage vectors.

18. (a) Write short notes on the following.

- (i) FISH
- (ii) RFLP
- (iii) ISH

Or

- (b) Discuss about chromosome mapping.

19. (a) Write about plant growth regulators?

Or

- (b) Explain in detail about drought resistant plant.

Page 5 Code No. : 10068 E

20. (a) Write a detail notes on immunoproteins?

Or

- (b) Write about Molecular and cellular biology of fertilization.
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Page 6 Code No. : 10068 E