

(For candidates admitted from 2022–2023 onwards)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2022.

Biochemistry – Core Choice Course

BIOTECHNOLOGY AND GENETIC ENGINEERING

Time : Three hours

Maximum : 75 marks

SECTION A — (20 marks)

Answer ALL questions.

- I. Multiple choice questions (5 × 1 = 5)
1. Ti plasmid found in _____ bacterium.
 - (a) Agrobacterium rhizogens
 - (b) Staphylococcus aureus
 - (c) E.coli
 - (d) Agrobacterium tumefaciens
 2. Totipotency refers to _____.
 - (a) Development of fruits from flowers in a culture
 - (b) Development of an organ from a cell in a culture medium
 - (c) Flowering in a culture medium
 - (d) All of the above

18. (a) Briefly explain the DNA finger printing and its applications.

Or

- (b) Illustrate the AFLP analysis.
19. (a) What are the steps involved in *ex-vivo* gene therapy?

Or

- (b) How to test and generate the embryonic stem cells?
20. (a) What are the applications of Genetically Modified Organisms (GMOs) in developing countries?

Or

- (b) Describe the biosafety and its types.

SECTION C — (3 × 10 = 30)

Answer any THREE questions.

21. Explain the characteristic features of ideal vector and what are the vectors used in higher plants?
22. Elaborate the different kinds of gene transfer methods used in animal cell culture.
23. Give detail note on principle, types and applications of polymerase chain reaction.
24. Illustrate the stem cell culture and its applications.
25. How to determine the nucleotide sequence of the entire human nuclear genome?

3. A thermostable DNA polymerase used in PCR is _____.

- (a) Polymerase I
- (b) DNA polymerase
- (c) Taq DNA polymerase
- (d) Polymerase 2

4. _____ is the process of inserting genes in to cells to treat disease.

- (a) Autotherapy (b) Allotherapy
- (c) Gene therapy (d) Forensic therapy

5. The largest gene in human is

- (a) Titin
- (b) Dystrophin
- (c) Insulin
- (d) Phosphofructokinase

II. Fill in the blanks: (5 × 1 = 5)

6. _____ is the enzyme involved in the synthesis of the DNA over an RNA template. Reverse transcriptase

7. Gene gun method of gene transfer also known as Biolistics

8. The set of DNAs generated by using random primers in a PCR reaction is called _____ RAPD.

9. In 1990 the first gene therapy was given to treat _____ deficiency.

10. The _____ country has first position in transgenic crops USA.

III. Answer ALL questions: (5 × 2 = 10)

11. Draw the structure of cosmid.

12. Define Micropropagation.

13. Give short note on chromosome jumping.

14. Define ribozyme.

15. What is bioethics?

SECTION B — (5 × 5 = 25)

Answer ALL questions, choosing either (a) or (b).

16. (a) Give short note on gene modification enzymes used in genetic engineering process.

Or

(b) Draw the structure of pUC vector and write any two advantages and disadvantages of the same vector.

17. (a) Define an animal cell line. How to grow an animal cell line?

Or

(b) Discuss the enzymatic method for the isolation of protoplast.