

M. Sc. DEGREE EXAMINATION, APRIL 2024
BIOTECHNOLOGY
FOURTH SEMESTER

COURSE : CORE
PAPER : APPLICATIONS OF STEM CELL AND TISSUE ENGINEERING
SUBJECT CODE : 19BY/PC/ST44
TIME : 3 HOURS **MAX. MARKS: 100**

SECTION – A

ANSWER ALL THE QUESTIONS **(10 x 2 = 20)**

1. Define stem cell banking.
2. Abbreviate ISSCR.
3. List the types of stem cells based on their origin and differentiation potential.
4. Summarize the differences between pluripotent and multipotent stem cells.
5. Give the application of stem cells in spinal cord injury.
6. Write a note on time line in tissue engineering
7. Give a short note on bioreactors in tissue engineering
8. Describe in short about Heparin Assisted Liver Support System.
9. Write about artificial womb.
10. Explain in short about breast reconstruction in terms of tissue engineering.

SECTION – B

ANSWER ALL THE QUESTIONS **(5 x 8 = 40)**

11. (a) Define stem cells and describe their two defining characteristics.

(or)

(b) Give an account on stem cell niches.
12. (a) Define multiple sclerosis (MS) and describe the role of stem cells in potential therapies for this condition.

(or)

(b) Describe the symptoms of Parkinson's disease and how stem cell therapy aims to address them.
13. (a) Define cancer stem cells and explain their role in tumor growth and recurrence.

(or)

(b) Explain how stem cells could be used to promote wound healing and tissue regeneration in individuals with burns and skin ulcers.
14. (a) What are biodegradable polymers, and how are they used in tissue engineering scaffolds?

(or)

(b) Explain growth factors used in tissue engineering applications with example.

15. (a) Describe the purpose of a bioartificial pancreas in the context of diabetes management?
(or)
(b) What are renal replacement devices and how do they differ from traditional dialysis treatments?

SECTION – C

ANSWER ANY TWO QUESTIONS

(2 x 20 = 40)

16. Describe the historical timeline of stem cell research, highlighting key discoveries and advancements.
17. Describe how stem cell therapy aims to improve cardiac function in individuals with heart disease.
18. Explain the principles behind using stem cells for orthopedic applications and the potential benefits for patients with musculoskeletal conditions.
19. Elaborate how are red blood cell substitutes engineered to mimic the function of natural red blood cells.
