





TISSUE ENGINEERING
SEMESTER - 8



Time : 3 Hours]

[Full Marks : 70

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : 10 ∞ 1 = 10

i) The formation of blood vessel from the pre-existing blood vessel is known as

- | | |
|-----------------|--------------------|
| a) angiogenesis | b) vascularization |
| c) osteogenesis | d) phagocytosis. |

ii) The Major Histocompatibility Complexes (MHCs) are

- | | |
|-------------------------|-----------------------------|
| a) signaling molecules | b) growth factors |
| c) cell surface markers | d) cell adhesion molecules. |

iii) Bone Morphogenic Protein (BMP) is a

- | | |
|------------------------|----------------------|
| a) cell surface marker | b) growth factors |
| c) hormone | d) neurotransmitter. |

iv) Polyglycolic Acid (PGA) scaffold is

- | | |
|----------------|-------------------|
| a) biotolerant | b) bioactive |
| c) bioinert | d) biodegradable. |



v) In tissue engineering, harvested cells are frozen away and stored in

- a) liquid hydrogen
- b) liquid nitrogen
- c) liquid helium
- d) autoclave.



vi) Cell signaling compounds cytokines are a group of

- a) proteins and peptides
- b) fats and triglycerides
- c) carbohydrates
- d) hormones and steroids.

vii) c-AMP and c-GMP functions as

- a) hormone
- b) receptor
- c) second messenger
- d) ligand.

viii) The signals which affect only cells of the same cell type as the emitting cell are

- a) endocrine
- b) autocrine
- c) paracrine
- d) none of these.

ix) Carbon nanotubes are used for tissue engineering scaffolds as they are

- a) biocompatible
- b) biodegradable
- c) biopolymers
- d) none of these.

x) PLA degrades within the body to form

- a) amino acid
- b) glycolic acid
- c) lactic acid
- d) phosphoric acid.



5

GROUP – B**(Short Answer Type Questions)**Answer any *three* of the following. $3 \times 5 = 15$

2. What are CAMs ? What are the different types of CAMs associated with cell signalling ?
How do CAMs help to transmit signals ? 2 + 2 + 1
3. What are the basic criteria of a scaffold used for tissue reconstruction ? Give two common examples of scaffolds constructed from natural materials. State three major components of ECM. 2 + 2 + 1
4. What is tissue engineering ? Mention the basic clinical goals and fundamental challenges of tissue engineering. 2 + 3
5. What is vasualization ? Describe the mechanism of basic wound healing. 2 + 3
6. Define the term “cellular differentiation”. Mention the basic properties of stem cell. 3 + 2
7. Describe different kinds of matrix materials used in tissue engineering. Mention the importance of growth factors in this field. 3 + 2

GROUP – C**(Long Answer Type Questions)**Answer any *three* of the following. $3 \times 15 = 45$

8. Define the term “angiogenesis”. Describe the process of angiogenesis along with chemical stimulants. Mention the current scope of development and therapeutics uses of tissue engineering. 3 + 6 + 6
9. Give a brief overview of receptor-ligand binding mechanism. Describe the signaling pathway for cell's response to the ligand. What is cell surface marker ? 6 + 7 + 2
10. What is a Bioreactor ? Why is cell seeding important in a Bioreactor ? How do bioreactors function for engineering 3D-tissue construction ? 2 + 3 + 10



11. What do you understand by growth factors ? Cytokines are a unique family of growth factors — Justify. Classify growth factors based on their principal source and primary activity.



2 + 3 + 10

12. a) What are the basic aspects of wound healing ?

b) With the help of a suitable diagram, explain the different pathways for cell signalling.

5 + 10

13. Write short notes on any *two* of the following :

$2 \times 7\frac{1}{2} = 15$

- a) Transplant immunology
- b) Cell preservation and storage
- c) Cells for tissue engineering
- d) Engineering tissues for bones and cartilages.

END