



Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech (BME)/SEM-8/BME-803D/2010

2010

TISSUE ENGINEERING

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following :

10 × 1 = 10

i) In vaccine preparation Tween is used for

- a) Cell lysis
- b) Cell purification
- c) Cell growth
- d) Cell maturation.



ii) The family of receptors that play an important role in cell adhesion is

- a) Somatostatins
- b) Interleukins
- c) Integrins
- d) Interferons.

iii) Solid Free Forming is a fabrication technique for

- a) 2D scaffold
- b) 3D scaffold
- c) Micro scaffold
- d) Nano-patterned scaffold.

iv) PLA scaffold is

- a) biodegradable
- b) bioactive
- c) bioinert
- d) none of these.



v) Hydrogels can also be used as scaffolds for

- a) cell growth
- b) cell delivery
- c) cell growth and cell delivery
- d) none of these.

vi) GABA is a

- a) neurotransmitter
- b) neuroinhibitor
- c) contact inhibitor
- d) contact excitator.

vii) Endocrine signaling is performed by

- a) enzymes
- b) hormones
- c) cytokines
- d) carbohydrates.



viii) Programmed Cell death is also known as

- a) Apoptois
- b) Lysis
- c) Degeneration
- d) Deformation.

ix) The protein of cell that binds to a specific molecules is known as

- a) ligand
- b) receptor
- c) hormone
- d) cytokine.

x) Notch is a cell surface protein that functions as a

- a) Receptor
- b) Hormone
- c) Protein-A
- d) Cytokine.



GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. What is tissue engineering ? Mention the basic clinical goals and fundamental challenges of tissue engineering.
3. Define stem cells. Classify them based on their functioning.
 $2 + 3$
4. What do you mean by cell signaling molecules ? Briefly explain the different methods of cell-to-cell communication.
 $2 + 3$
5. How is cell culture carried out under laboratory conditions ?
What is the significance of an autoclave in cell culture ?
 $2 + 3$
6. What are the different components of the Extracellular matrix ? How do they function ? $2 + 3$
7. Write down the different process of vaccine formation.



GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

8. Define tissue. What are the different types of tissues in the mammalian body ? Classify tissue based on their structure and function. $2 + 4 + 9$
9. What are the principal cell types involved in Inflammatory responses ? With the help of a flow-chart, explain the different processes involved in wound healing. What is target cell apoptosis ? $5 + 7 + 3$
10. Give a brief overview of growth factor and its significance. Describe the signaling pathway for cell's response to the ligand. What is cell surface marker ? $6 + 7 + 2$
11. What is scaffold ? Name the engineering materials used for scaffold fabrication ? Mention the important parameter for scaffold selection. Describe the different types of scaffold used in tissue engineering. Briefly explain the process of cell placement on scaffold. $4 + 2 + 5 + 4$



12. Describe the different types of angiogenesis to mimic nutrient transport within the tissue compartment. Mention the chemical stimulation for angiogenesis. With the help of a diagram, explain the mechanism of adhesion between leukocytes and endothelial cells. 6 + 2 + 7
13. What do you understand by cell-cell interaction ? Briefly explain the different types of stem cells. Demonstrate bioreactor for achieving nutrient transport in an engineered tissue construct. 2 + 9 + 4
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