

## Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025

**Synthetic Biology and Tissue Engineering**

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.  
2. M : Marks , L: Bloom's level , C: Course outcomes.

Module – 1			M	L	C
Q.1	a.	Define tissue engineering and explain the concept of tissue engineering triad.	10	L1	CO1
	b.	Explain how cells can be used as therapeutic agents to restore tissue function.	10	L2	CO1
OR					
Q.2	a.	Explain the current scope and development of tissue engineering with respect to regenerative medicine.	10	L2	CO1
	b.	Define Scaffold , its properties and list the examples of ECM derived products.	10	L1	CO1
Module – 2					
Q.3	a.	Discuss the applications of skin grafts in tissue engineering.	10	L2	CO2
	b.	Discuss how self – renewal ability of specific cells are used in bone tissue engineering.	10	L2	CO2
OR					
Q.4	a.	Discuss tissue organization levels and explain the classification of multicellular glands with an example in each class.	10	L2	CO2
	b.	Illustrate the types of cell junctions and explain its role in binding the epithelial cells together.	10	L2	CO2
Module – 3					
Q.5	a.	Elaborate the working mechanism of feedback and feed forward types of genetic circuits.	10	L3	CO2
	b.	Give a mechanistic explanation of how biofuel is produced using bioengineered cerevisiae.	10	L3	CO2
OR					
Q.6	a.	Elucidate how various biobrick components are used for bioengineering application.	10	L3	CO2
	b.	Discuss the working mechanism of invitro/cell – free systems and its advantages in the field of synthetic biology.	10	L3	CO2

<b>Module – 4</b>					
<b>Q.7</b>	<b>a.</b>	Illustrate the quantitative methods used for determining the cell viability.	<b>10</b>	<b>L3</b>	<b>CO1</b>
	<b>b.</b>	Discuss the different types of ECM components and its functions.	<b>10</b>	<b>L3</b>	<b>CO1</b>
<b>OR</b>					
<b>Q.8</b>	<b>a.</b>	Justify the statement on how ECM physical properties are crucial for cell behavior.	<b>10</b>	<b>L3</b>	<b>CO1</b>
	<b>b.</b>	Discuss the methods employed for measuring the cell characteristics with special emphasis to morphology.	<b>10</b>	<b>L3</b>	<b>CO1</b>
<b>Module – 5</b>					
<b>Q.9</b>	<b>a.</b>	Elucidate the mechanism attributed to the sequence of events in wound healing.	<b>10</b>	<b>L3</b>	<b>CO3</b>
	<b>b.</b>	Illustrate how growth factors plays a key role in angiogenesis.	<b>10</b>	<b>L3</b>	<b>CO3</b>
<b>OR</b>					
<b>Q.10</b>	<b>a.</b>	Discuss the type of natural biopolymers used in tissue engineering applications.	<b>10</b>	<b>L3</b>	<b>CO3</b>
	<b>b.</b>	Uphold the statement how nanotechnology plays a crucial role in tissue regeneration.	<b>10</b>	<b>L3</b>	<b>CO3</b>

\*\*\*\*\*