Reg.No.:												

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 90006

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2024
Seventh Semester
Biotechnology
U19BTV30 – STEM CELL TECHNOLOGY
(Regulation 2019)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Which types of stem cells are considered pluripotent?	2	K2	CO1
2.	What are mesenchymal stem cells?	2	K1	CO1
3.	How do embryonic stem cells differ from adult stem cells?	2	K2	CO2
4.	What is somatic cell nuclear transfer (SCNT)?	2	K1	CO2
5.	Write down the principle involved in electroporation?	2	K1	CO3
6.	What are the major challenges in stem cell therapy?	2	K1	CO3
7.	How can stem cells be used to study human diseases?	2	K2	CO4
8.	What is the role of induced pluripotent stem cells (iPSCs) in Parkinson's disease therapy?	2	K1	CO4
9.	Why is embryonic stem cell research considered ethically controversial?	2	K2	CO5
10.	How do genetically modified stem cells target specific diseases in gene therapies?	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Discuss the different levels of stem cell potency and their implications for regenerative medicine.	13	K2	CO1

		(OR)			
	b)	How do iPSCs differ from other types of stem cells? Discuss the process of reprogramming somatic cells into iPSCs.	13	K2	CO1
12.	a)	Describe the process of deriving embryonic stem cells (ESCs) from the inner cell mass of a blastocyst. What challenges must be addressed to maintain their pluripotency in vitro?	13	K3	CO2
		(OR)			
	b)	Explain how reproductive cloning using somatic cell nuclear transfer lead to the creation of a cloned organism.	13	K3	CO2
13.	a)	Analyze the genetic challenges in developing effective gene therapies for genetic disorders using stem cells.	13	K4	CO3
		(OR)			
	b)	Evaluate the role of viral vectors in the engineering of stem cells for therapeutic applications.	13	K5	CO3
14.	a)	Discuss the mechanisms by which stem cells contribute to myocardial repair following infarction.	13	K3	CO4
		(OR)			
	b)	Examine the role of stem cell gene therapy in bone marrow transplantation.	13	K4	CO4
15.	a)	Discuss the effectiveness of the current regulatory framework for stem cell therapy in India.	13	K3	CO5
		(OR)			
	b)	Analyze the ethical implications of using genetically modified stem cells in experimental gene therapies.	13	K4	CO5

PART – C

(1 x 15 = 15Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Explore a case where MSCs is applied to promote bone regeneration in a patient with bone fractures or defects. What techniques could be used for MSC implantation, and how could the therapy affect bone healing and integration?	15	K5	CO1
		(OR)			
	b)	Discuss the role of adult stem cells in tissue regeneration and repair. Discuss the differences between adult stem cells and embryonic stem cells in promoting tissue regeneration. Explain suitable methods for transplanting adult stem cells into heart.	15	K5	CO2