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: 9028

M.E. / M.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE / JULY 2024
Second Semester
Biotechnology
P23BTE20 – ADVANCED NANOBIOTECHNOLOGY
(Regulation 2023)

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.	Compare and contrast physical and chemical methods for synthesizing nanomaterials.	2	K2	CO1
2.	Outline the various techniques used for the characterization of nanomaterials.	2	K1	CO1
3.	What are the primary differences between protein and glyco nanostructures?	2	K1	CO2
4.	Mention two common methods for synthesizing lipid-based nanomaterials.	2	K1	CO2
5.	How do nanomaterials contribute to cancer therapy?	2	K2	CO3
6.	What are nano artificial cells?	2	K1	CO3
7.	What is the significance of nanotechnology in point-of-care diagnostics?	2	K1	CO4
8.	How do nanomaterials enter into cells?	2	K2	CO4
9.	How do size, shape, surface properties, and composition influence the toxicity of nanomedicines?	2	K2	CO5
10.	List out the methods used to assess the toxicity of nanomaterials in vitro.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)		Summarize the concept of bottom-up and top-down approaches in nanotechnology synthesis and discuss their advantages and limitations.	13	K3	CO1
			(OR)			
	b)	i.	Compare the environmental impact of biological methods versus conventional chemical methods for nanomaterial synthesis.	8	K4	CO1
		ii.	How do biological methods contribute to sustainability and eco-friendliness in nanotechnology?	5		CO1
12.	a)		Elucidate how molecular motors, DNA walkers, and enzyme-driven nanomachines operate at the nanoscale and their potential roles in drug delivery, biosensing, and nanorobotics.	13	K3	CO2
			(OR)			
	b)		Evaluate the challenges and opportunities associated with the use of carbon nanotubes in biomedical research.	13	K3	CO2
13.	a)	i.	Illustrate the various types of nanomaterials employed in cancer diagnosis.	6	K3	CO3
		ii.	Discuss the applications of nanotechnology in tissue engineering for regenerative medicine and organ transplantation.	7	K3	CO3
			(OR)			
	b)	i.	Explain the concept of nano artificial cells and their potential applications in drug delivery, biosensing, and biocomputation.	7	K4	CO3
		ii.	Highlight recent advancements and challenges in the development of nanotechnology-enabled organ printing technologies for personalized medicine and organ transplantation.	6	K3	CO3
14.	a)		Illustrate how nanomaterials enable site-specific drug delivery, prolonged circulation time, and controlled release kinetics to improve therapeutic efficacy and minimize side effects.	13	K3	CO4
			(OR)			

	b)	i.	Describe the various cellular uptake mechanisms employed by nanomaterials.	7	K4	CO4
		ii.	Discuss the in-vitro methods employed to evaluate the antibacterial and anticancer properties of nanomaterials.	6	K5	CO4
15.	a)	i.	Discuss the methods and endpoints commonly used to evaluate nanotoxicity.	7	K4	CO5
		ii.	Evaluate the current challenges and future directions in nanotoxicology research for assessing the safety of nanomaterials in various applications.	6	K5	CO5
			(OR)			
	b)		Compare and contrast the toxicological profiles of various nanomaterials studied in nanotoxicology.	13	K4	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Explore how nature-inspired designs at the nanoscale can lead to innovative solutions in various industries.	15	K4	CO5
		(OR)			
	b)	Assess the current state of knowledge regarding the risk assessment and regulatory considerations for nanomaterials based on case studies.	15	K4	CO5