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

Question Paper Code: 9009

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – MAY / JUNE 2024
Sixth Semester
Biotechnology
U19BTV33 – NANOBIOTECHNOLOGY
(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.	What is the significance of surface-to-volume ratio in nanoparticles?	2	K2	CO1
2.	Define nano-biomimicry.	2	K1	CO1
3.	What is the principle behind sol-gel processing?	2	K1	CO2
4.	Define gas condensation processing and its role in nanomaterial synthesis.	2	K1	CO2
5.	List the uses of DNA molecules in nanomechanics.	2	K1	CO3
6.	What are carbon nanotubes, and how are they used in bio-applications?	2	K2	CO3
7.	What is the importance of scaffolds in tissue engineering?	2	K1	CO4
8.	Explain the concept of organ printing.	2	K2	CO4
9.	What is meant by drug targeting, and how does nanobiotechnology facilitate it?	2	K2	CO5
10.	How can nanobiotechnology be applied in optical detection methods?	2	K2	CO5

PART – B

Q.No.		Questions	Marks	KL	CO
11.	a)	Explore the classification of nanomaterials based on their properties, structures, and applications, providing examples of each classification category.	13	K3	CO1
		(OR)			
	b)	Compare and contrast different characterization techniques used in nanotechnology, discussing their principles, strengths, and limitations.	13	K4	CO1
12.	a)	Discuss the methods of mechanical grinding, wet chemical synthesis, and gas-phase synthesis for the preparation of nanostructured materials.	13	K3	CO2
		(OR)			
	b)	Describe the various biological methods used for nanomaterial synthesis.	13	K3	CO2
13.	a)	Explain the principles of lipid nanotechnology and its applications in the design and fabrication of liposomes, lipid nanoparticles, and lipid-based drug delivery systems.	13	K3	CO3
		(OR)			
	b)	Describe the importance of nanomaterial-based biosensors in healthcare and diagnostics and applications in detecting biomolecules, pathogens, and environmental pollutants.	13	K4	CO3
14.	a)	Describe the electrospinning technique in detail, including its principle, process parameters, and applications in tissue engineering.	13	K3	CO4
		(OR)			
	b) i.	Explore the concept of nano artificial cells and their potential applications in tissue engineering.	7	K4	CO4
	ii.	Discuss how nano artificial cells mimic cellular functions and interactions to promote tissue regeneration and repair.	6		
15.	a)	Discuss the role of nanobiotechnology in early diagnostics, highlighting its applications in detecting diseases at the molecular level, biomarker identification, and point-of-care testing, and its potential impact on healthcare.	13	K4	CO5
		(OR)			
	b)	Explore the potential of nanobiotechnology in agriculture, highlighting their advantages in improving nutrient uptake, pest control, and crop yield.	13	K4	CO5

PART – C

Q.No.	Questions	Marks	KL	CO
16. a)	Explore the role of nanoparticles in biotechnology, including their applications in drug delivery, imaging, diagnostics, and therapeutics, with examples of current research and commercial products.	15	K4	CO5

(OR)

b)	Provide examples of real-world applications where nanotechnology-based scaffolds have demonstrated significant potential in tissue engineering.	15	K3	CO5