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: 9022

M.E. / M.Tech. DEGREE END-SEMESTER EXAMINATIONS –JUNE / JULY 2024
Second Semester
Biotechnology
P23BT206 – ADVANCED PROTEIN ENGINEERING
(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.	Brief the significance of peptide mapping.	2	K1	CO1
2.	Does all proteins possess quaternary structure? Comment on it.	2	K2	CO1
3.	List few PCR based techniques useful in protein engineering.	2	K1	CO2
4.	What is the rationale behind cell free protein engineering?	2	K2	CO2
5.	Emphasize the need to engineer therapeutic proteins with an example.	2	K2	CO3
6.	What are engineered vaccines? Give examples.	2	K1	CO3
7.	List out few protein crosslinking tools used in nanomaterial construction.	2	K1	CO4
8.	What are hydrogels? Mention its application.	2	K1	CO4
9.	How metal co-factor requirements could be modified?	2	K2	CO5
10.	Show how protein specificity could be modified? Give an example.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Explain with a neat diagram, the structure of alpha helix, beta strand and loop in protein structure.	8	K3	CO1
		ii.	Explain the thermodynamics of protein folding.	5	K3	
			(OR)			
	b)	i.	Brief any one spectroscopic method for determining secondary and tertiary structure of protein.	10	K3	CO1
		ii.	Write down its applications.	3	K3	
12.	a)	i.	Describe the principle and procedure for random and site directed mutagenesis in protein engineering.	8	K3	CO2
		ii.	Comment on its advantages and disadvantages.	5	K3	
			(OR)			
	b)		Explain with an example, the principle of protein structure modeling and design.	13	K3	CO2
13.	a)	i.	Explain the mechanism of slow and fast acting insulin.	8	K3	CO3
		ii.	Discuss the applications of engineered insulin in therapy.	5	K3	
			(OR)			
	b)	i.	Describe how humanization of primate antibodies can carried out.	7	K3	CO3
		ii.	Illustrate the construction of immune-toxins with example and its application.	6	K3	
14.	a)		Describe how engineered proteins could be used for constructing functional biomeatterials.	13	K4	CO4
			(OR)			
	b)		Describe with an example, how coiled coil peptides are used in biomaterial construction.	13	K4	CO4
15.	a)	i.	Describe with an example, how thermal stability of a protein could be modified.	8	K4	CO5
		ii.	Discuss how di-sulphide bond modification stabilizes the protein.	5	K4	CO5
			(OR)			
	b)		Explore the techniques in engineering post translational modification.	13	K4	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	What is phage display technique? Explain how it is useful in screening for selected peptides with an example. Discuss its application in genetic engineering and health care.	15	K4	CO2
		(OR)			
	b)	What are oxygenases? Elaborate how they are useful in pollutant degradation with an example. Illustrate how engineering oxygenases are beneficial for bioremediation.	15	K4	CO5