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: 90011

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2024
Fifth Semester
Biotechnology
U19BT514 - PRINCIPLES OF GENETIC ENGINEERING
(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.	Explain the characteristic features of cloning vector.	2	K2	CO1
2.	What is a YAC vector?	2	K1	CO1
3.	Explain the role of $CaCl_2$ in competent cell preparation.	2	K3	CO2
4.	How blue white selection works in rDNA technology?	2	K3	CO2
5.	Discuss the origin of replication in a vector with one example.	2	K1	CO3
6.	How Ni-NTA used in recombinant protein expression?	2	K4	CO3
7.	When you are amplifying a DNA fragment of size 2.5kb using PCR. Your amplified product has multiple bands of size ranging from 2.5kb to 650 kb. How you will troubleshoot this PCR reaction to amplify only the desired product.	2	K4	CO4
8.	What are the limitations of SYBR green based Real Time - PCR?	2	K4	CO4
9.	List out the components used in CRISPR-CAS9 genome editing.	2	K2	CO5
10.	How PCR is used as diagnostics tool for diseases?	2	K4	CO5

PART – B

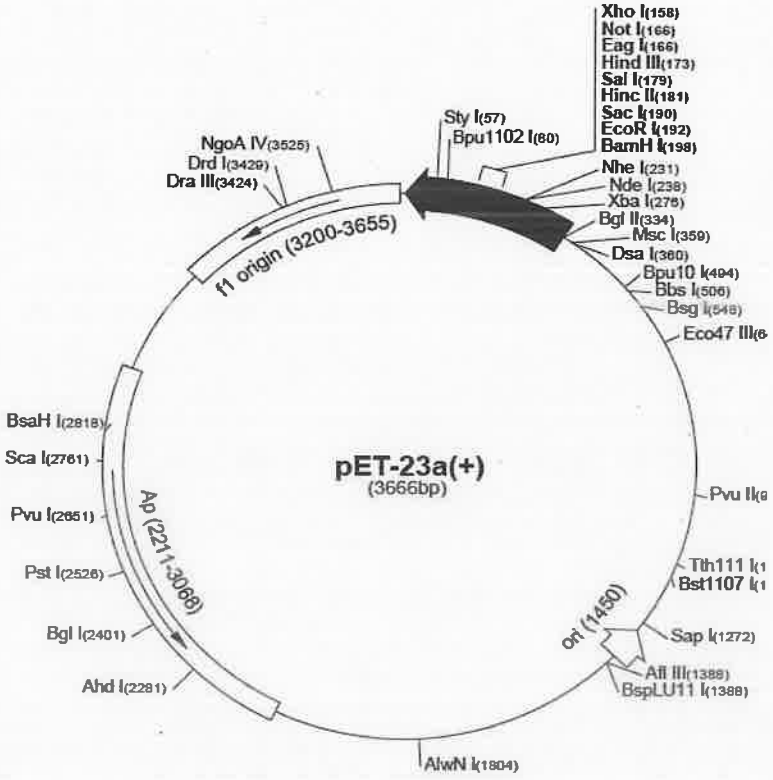
(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Discuss about the suitable vector system used to express the recombinant proteins in CHO cells.	13	K2	CO1
		(OR)			
	b)	Explain about Phagemids and cosmids with examples and highlight its application in targeting bacterial infections.	13	K1	CO1
12.	a)	Discuss about the different DNA delivery methods in Bacterial Cells and highlight the principles, advantages and limitations of Electroporation in detail.	13	K2	CO2
		(OR)			
	b)	Highlight the principle and advantages of given rDNA selection methods. i. Antibiotic Resistances, ii. X-gal selection, iii. Auxotrophic selection iv. Luciferase selection	13	K2	CO2
13.	a)	Discuss in detail about methods adapted for the synthesis and labelling of DNA probe with Biotin.	13	K3	CO3
		(OR)			
	b)	Explain the strategy for the overexpression and purification of the recombinant protein is the Pichia pastoris expression system.	13	K5	CO3
14.	a)	Explain about the DNA and RNA hybridization methods and highlight their applications.	13	K3	CO4
		(OR)			
	b)	Devise a strategy to introduce point mutation in the gene in order to improve the stability of the proteins and elaborate the steps involved in the incorporation of mutations.	13	K5	CO4
15.	a)	Explain the strategy, components and methods adapted for genome editing using i. Zinc finger DNA modifier ii. TALEN	13	K5	CO5
		(OR)			
	b)	Explain the importance of Transgenic BT cotton in detail.	13	K5	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	The recombinant protein X was cloned in pET23a vector (Vector Map given below) using Sac1 and Xba$_1$ as restriction site. Identify the method for sub-cloning of protein X in the desired vector and purify the expressed recombinant protein fromE.coli.	15	K5	CO3



(OR)

	b)	Elaborate the difference of single read sequencing and Paired end sequencing. Highlight the principle and advantages of Illumina Sequencing platform with neat schematic.	15	K6	CO4