

SCHOOL OF CHEMICAL & LIFE SCIENCES
PH.D. COURSE WORK EXAMINATION (OCTOBER 2023)

Title of course paper: Genetic Engineering

Time: Three hours

Maximum Marks: 75

(Write your Roll No. at the top immediately on receipt of this question paper)

Answer ALL questions. All parts of a question must be answered in continuation. Start answering each question on a new page. Cite examples and draw labeled diagrams wherever applicable.

Question 1: Write a short note on the following. Attempt any TEN questions.

(10X1.5=15)

- a) Role of Ori in plasmid vectors.
- b) DNA ligase.
- c) Differentiate between an endonuclease and an exonuclease.
- d) cDNA.
- e) Features of expression vectors.
- f) Proofreading polymerase.
- g) Codon optimization in protein production.
- h) Role of epitope tags in protein purification.
- i) mRNA enrichment.
- j) Ligase chain reaction.
- k) Differentiate between siRNA and miRNA mediated inhibition of gene translation.
- l) Vectors used for the production of glycosylated proteins.
- m) Advantages of using insect expression system.
- n) Protein refolding.
- o) Insertional inactivation.

Question 2.Short Note Type; attempt any four (04) (not more than two pages)

4×5=20

- i. Methods to convert blunt ends into sticky ends.
- ii. Bacterial transformation
- iii. CRISPR/Cas technology
- iv. Role of tags in protein purification.
- v. Baculovirus expression vectors
- vi. SNPs and disease susceptibility

Question 3. Attempt any TWO of the following.

(2X10=20)

- i. Applications of genetic engineering
- ii. Construction of genomic libraries.
- iii. Methods for the selection of the positive clones.
- iv. DNA Sequencing

Question4. Attempt any TWO of the following.

(2X10=20)

- i. Various methods to optimize the expression of the cloned gene.
- ii. Yeast expression vectors used in gene cloning and expression.
- iii. Separation of plasmid DNA on the basis of confirmation.
- iv. Various enzymes used in gene cloning.

Question5. Attempt any TWO of the following.

(2X10=20)

- i. DNA Fingerprinting
 - ii. RFLP
 - iii. PCR and its applications
 - iv. FISH
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