



**DO-003-1194003**

Seat No. \_\_\_\_\_

**M. Sc. (Microbiology) (Sem. IV) (CBCS)  
(W.E.F. 2016) Examination**

**March – 2022**

**MICRO - 421 : Biomolecular Engineering  
(Elective)**

**Faculty Code : 003**

**Subject Code : 1194003**

Time :  $2\frac{1}{2}$  Hours]

[Total Marks : 70

**1 Answer any seven of the following : (2 marks each) 14**

- (a) What are the chimeric genes?
- (b) What is protein engineering?
- (c) Enlist natural and recombinant thermostable polymerases.
- (d) How His-tag can be useful to analyze protein expression?
- (e) What are the basic steps involved in directed evolution?
- (f) What is nested PCR?
- (g) What is multiplex PCR?
- (h) Enlist methods used for the selection of recombinant clones.
- (i) Write about alpha helix and its variations.
- (j) Enlist different heat shock proteins.

**2 Answer any two of the following : (7 marks each) 14**

- (a) Give a detailed account of peptide geometry.
- (b) Write a detailed note on beta secondary structures.
- (c) Explain domains and topology with reference to catalytic action.

- 3** Answer the following : (7 marks each) **14**
- (a) Discuss various approaches used for the solubilization of over-expressed protein.
  - (b) Explain molecular chaperones and their role in folding of extremophilic proteins.

**OR**

- 3** Answer the following : (7 marks each) **14**
- (a) Describe In-vitro protein folding and its significance.
  - (b) Give a detailed account of recombinant biocatalysts and their commercial implications.
- 4** Answer of the following : (7 marks each) **14**
- (a) Discuss nanopore sequencing in detail.
  - (b) Write a note on molecular cloning and expression of recombinant clones.
- 5** Answer any **two** of the following questions : **14**  
(7 marks each)
- (a) Discuss DNA chip technology and oligonucleotide array detector
  - (b) Write a note on real time PCR.
  - (c) Describe genetic heterogeneity and screening of novel traits.
  - (d) Explain various molecular forces that stabilize the protein structure.
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