



MBU-003-1194003 Seat No. _____

M. Sc. (Microbiology) (Sem. IV) (CBCS) Examination

April / May - 2018

421 : Biomolecular Engineering (Ele.)

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)

- (a) Give examples of recombinant thermo stable polymerases.
- (b) What is Plateau effect?
- (c) Write about characteristics of a good primer.
- (d) Explain primer walking in DNA sequencing.
- (e) What is the concept of molecular breeding?
- (f) What is family shuffling?
- (g) Enlist the types of non-covalent forces important for protein conformation.
- (h) What are different levels of protein structures?
- (i) What is overlapping PCR ?
- (j) What is gene library?

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

- (a) Give a detailed account of alpha helix and the beta sheet and its role in protein function.
- (b) What are basic steps of PCR? Write down the principle and applications of nested PCR.
- (c) What is the concept of gene shuffling? Discuss it in the context of evolving molecular properties.

3 Answer the following : (7 Marks each)

- (a) Write a detailed note on *in-vitro* protein folding and its biotechnological significance.
- (b) Discuss molecular chaperones and their role in folding of extremophilic proteins.

OR

- (a) Discuss issues faced while studying over-expression profile of protein.
- (b) Discuss various *in-vitro* approaches for the protein solubilization of an over-expressed protein.

4 Answer the following : (7 Marks each)

- (a) What are the basic steps involved in directed evolution approach of protein engineering? Discuss.
- (b) Discuss protein engineering in the light of sequence optimization and directed evolution.

5 Write a note on any **two** of the following (7 Marks each)

- (a) Peptide geometry and molecular forces in protein structure.
- (b) Pyrosequencing.
- (c) Quantitative real time PCR.
- (d) Selection of recombinant clones.
