DII-003-019403 Seat No. _____

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

May / June – 2015

Micro - 421 : Bimolecular Engineering

(Elective)

Faculty Code : 003

Subject Code : 019403

Time : **3** Hours] [Total Marks : **70**

Instructions: All questions are compulsory. Support your answers with suitable illustrations where required.

Q.1. Answer **ANY SEVEN** (2 Marks each) 14

a. What are various levels of the protein structures?
b. Why should one go for the protein engineering?
c. What is alpha-helix in protein molecule?
d. Comment on the co-expression with molecular chaperones?
e. What is the insolubilization of an expressed protein?
f. What is over expression of a gene?
g. How does overexpression take place?
h. What are the advantages of the random mutagenesis approach in protein engineering?
i. What is molecular breeding?
j. Comment on the significance of the Tm of primer?

Q.2. Answer **ANY TWO** of the following: 7x2 = 14

a. Discuss the protein tertiary structure.
b. What is the significance of protein folding? Discuss the role of the molecular chaperones in protein folding.
c. What are various factors to stabilize the protein structure under extreme conditions?

Q.3. Answer the following (7 marks each) 14

a. What is the mechanism of the chaperone-assisted protein folding? Discuss.
b. Discuss molecular chaperones in extremophiles.

OR

Q.3. Answer the following (7 marks each) 14

a. What is the sequence optimization in protein? Discuss gene shuffling with respect to protein engineering.
b. What is family shuffling? What are its advantages?

Q.4. Discuss: (7 Marks each) 14

a. *In-vitro* strategies of the protein folding.
b. How proper protein folding can be enhanced by *in-vivo* approaches.

Q.5. Describe **ANY TWO** of the followings (7 marks each) 14

a. Genetic heterogeneity and protein engineering

b. Overlapping PCR

c. Hot start PCR

d. Chimeric genes and their significance
