Registration No: | | | | | | | | | | |

Total Number of Pages : 01 **B. Tech.**
PEBT5401

7th Semester Regular/Back Examination 2017-18
Protein Engineering
BRANCH: BIOTECH
Time: 3 Hours
Max Marks: 70
Q. CODE: B328

Answer Question No.1 which is compulsory and *any five* from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions :** **(2x10)**

a) Which covalent bonds have to be introduced to increase thermal stability of enzymes?
b) Define isoelectric point of a protein.
c) Name any two proteins used for diagnostics and therapeutics.
d) Amino acid which promotes alpha-helix formation is _____.
e) What are the types of forces for stabilizing proteins?
f) What are the spectroscopic methods to study the physiological properties of protein?
g) What is error prone PCR?
h) What is DNA shuffling?
i) What are the conditions that denature proteins?
j) Write a note on structural features of the peptide bond.

Q2 Write a note on the spectroscopic properties of proteins. Describe the working principle, method and the application of NMR spectroscopy in protein engineering. **(2+8)**

Q3 **a)** What is meant by direct evolution? Describe the methods of direct evolution employed in protein engineering. **(5)**
b) List out the methods by which a protein can be engineered to enhance its properties. **(5)**

Q4 **a)** Differentiate between rational and irrational methods in protein engineering. **(5)**
b) Discuss in detail on the role of different non-covalent interactions in protein structure and function. **(5)**

Q5 **a)** What is the working principle and role of CD spectroscopy in protein engineering? **(5)**
b) Discuss about the role of engineered proteases in industrial processes. **(5)**

Q6 Discuss the factors important for the stabilization of the folded state of a protein relative to the unfolded state. Describe one example of the use of mutagenesis to investigate protein stability. **(3+7)**

Q7 Elucidate protein structure and its hierarchical architecture. Describe the various forces that stabilize protein structure. **(10)**

Q8 **Write notes on the following (*any* TWO) :** **(5 x 2)**

a) Ramachandran map
b) Mass spectroscopy
c) Chemical shift
d) Absorption spectroscopy