B.Sc. (Part-III) (CBCS Pattern) Semester-VI

USBCDST-14 - Biochemistry Paper-II : Protein Synthesis and Recombinant DNA Technology

P. Pages : 2 **GUG/S/25/13338**

Time : Three Hours * 1 7 0 3 * Max. Marks : 50

Notes : 1. All questions are compulsory and carry equal marks.
2. Draw well labelled diagram wherever necessary.

1. Describe in detail- The process of initiation of protein synthesis in prokaryotes. **10**

OR

a) What is the role of ribosomes in translation? **2½**

b) Describe the formation of the pre-initiation complex. **2½**

c) Explain the function of EF- Tu, and EF- Ts, and EF-G in protein synthesis. **2½**

d) What are post- translational modifications? Provide examples. **2½**

2. Explain the regulation of gene expression in lac operon. **10**

OR

a) What is negative and positive gene regulation? **2½**

b) What are operons? Explain their significance in prokaryotic gene regulation. **2½**

c) Describe the role of activators and repressors in transcriptional control. **2½**

d) How does genetic recombination regulate gene expression in bacteriophages? **2½**

3. Describe the following methods used for DNA ligation: **10**

i) Use of Linkers ii) Use of Adaptors

OR

a) What is the importance of restriction – modification system in molecular biology? **2½**

b) Explain the role of sticky and blunt ends in DNA manipulation. **2½**

c) Describe the role of T4 DNA ligase in DNA joining techniques. **2½**

d) What are expression vectors? Explain their key features. **2½**

4. Describe the process of blue – white screening for selection of recombinant clones. **10**

OR

a) What is electroporation and how is it used in gene transfer? **2½**

b) Explain the calcium phosphate precipitation technique. **2½**

c) Explain the primer formation in polymerase chain reaction (PCR). **2½**

d) What are the applications of recombinant DNA technology in agriculture? **2½**

5. Attempt **any ten** of the following (one mark each) **10**

a) What is the initiator codon in prokaryotic translation?

b) Define fMet – tRNA and its role in translation initiation.

c) What are the A and P sites in the ribosome?

d) What is an operon?

e) Name the artificial inducer of lac operon.

f) What is the function of a repressor protein?

g) Define recombinant DNA technology.

h) What is the significance of restriction enzyme in rDNA technology?

i) Name one commonly used cloning vector.

j) What is a genomic library?

k) Define cDNA library.

l) What is the purpose of southern blotting?

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