

This question paper contains **3** printed pages]

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S. No. of Question Paper : **5708**

Unique Paper Code : **2494000023**

Name of the Paper : **Tools for Genetic Engineering**

Name of the Course : **GE-Biochemistry (NEP)**

Semester : **VI**

Duration : **2 Hours**

Maximum Marks : **60**

(Write your Roll No. on the top immediately on receipt of this question paper.)

There are six questions in this question paper.

Attempt any *four* questions.

All questions carry equal marks.

Question No. **1** is compulsory.

1. (a) Explain the following :

- (i) DNA molecules are treated with alkaline phosphatase before ligation.
- (ii) Antibiotic resistance genes are used as selectable markers.
- (iii) Plasmid vectors are not suitable for cloning large DNA fragments.

P.T.O.

- (iv) All eukaryotic genes cannot be expressed in *E. coli*.
- (v) DNA polymerase I may not be the best enzyme for PCR.
- (vi) Lambda phage vectors cannot package more than 24kb DNA during *in vitro* packaging.
- (b) Give the contribution of the following :
 - (i) Smith and Nathans
 - (ii) Kary Mullis
 - (iii) Bolivar and Rodriguez. 12,3
- 2. (a) Differentiate between the following :
 - (i) Natural promoters and hybrid promoters
 - (ii) Neoschizomers and Isoschizomers
 - (iii) Linkers and adaptors.
- (b) Give the salient features of Ti-plasmid-based vectors. 9,6
- 3. (a) You are given a plasmid vector that has a unique site BamHI enzyme (5'G/GATCC-3'). Cut this vector with BamHI. Now cut a gene of interest with the same enzyme and ligate them together to form a recombinant molecule. Show all the steps diagrammatically.
- (b) What are the parameters that should be kept in mind while designing primers for PCR ?
- (c) Describe T7 promoter-based expression system. 5,5,5

4. (a) Discuss Sangers's dideoxy method of DNA sequencing.
- (b) Describe the principle of blue-white selection for screening recombinant clones.
- (c) Explain how antibiotic resistance can be used to differentiate between transformants and recombinants ? 6,5,4
5. (a) With the help of reactions show how these enzymes are used in genetic engineering :
- (i) Reverse transcriptase
- (ii) DNA ligase
- (iii) DNase I.
- (b) Draw the DNA sequencing profile (slab gel) obtained by Sanger's method, of the given strand of DNA 5'-ACC TTC CAT GCC GAC TTT GAA CTA-3'. 9,6
6. Write short notes on the following :
- (a) Pyrosequencing
- (b) Genomic library
- (c) Fusion tags. 5,5,5