

**M. Sc. (Biotechnology) Sem-II (2012 Course)(Choice Based Credit System) : WINTER - 2018**

**SUBJECT : GENETIC ENGINEERING & APPLICATIONS**

Day : Wednesday **W-2018-1208** Time : 02.00 PM TO 05.00 PM  
Date : 24/10/2018 Max. Marks : 60

**N.B.:**

- 1) **Q.No.1 and Q.No.5 are COMPULSORY.** Out of the remaining questions attempt **ANY TWO** from Q.No. 2, 3, 4 and **ANY TWO** from Q.No. 6, 7, 8.
- 2) Answers to both the sections should be written in **SEPARATE** answer books.
- 3) Draw neat and labeled diagrams **WHEREVER** necessary.
- 4) Figures to the right indicate **FULL** marks.

**SECTION – I**

- Q.1** Answer **ANY FIVE** of the following: [10]
- a) Enlist four different types of DNA polymerases.
  - b) Enlist four different types of methylases.
  - c) Enlist two endonuclease and two exonuclease enzymes.
  - d) What are high capacity vectors? Give examples.
  - e) Enlist four methods of direct gene transfer.
  - f) What is “biotin”? What is its application in DNA labeling?
- Q.2** Explain in detail: [10]
- a) Difference between class I, II and III of restriction endonucleases.
  - b) Different techniques of DNA labeling with suitable diagrams.
- Q.3** Answer the following: [10]
- a) Enlist the modifications in PCR technique. Explain “hot start PCR” in detail.
  - b) Discuss the techniques for cloning in plant cells.
- Q.4** Write short notes on: [10]
- a) Cosmids
  - b) Phagemids
  - c) Tag vectors
  - d) Full length cDNA synthesis techniques
  - e) Cloning in animal cells

**SECTION – II**

- Q.5** Answer **ANY FIVE** of the following: [10]
- a) What is the importance of 2 $\mu$  plasmid in *S.cerevisiae*?
  - b) Name the fungi that are commonly used for cloning purpose and strong promoters used in fungi.
  - c) What is the principle of pyrosequencing?
  - d) Explain the principle of DNase I footprinting.
  - e) Explain the technique of hybrid release translation (HRT).
  - f) Enlist the factors affecting recombinant protein expression in *E. coli*
- Q.6** Answer the following: [10]
- a) Discuss different methods of mutagenesis with suitable diagrams.
  - b) What are reporter genes? How do they assist in deletion analysis to identify control sequences?
- Q.7** Elaborate: [10]
- a) Different techniques of restriction mapping. Add a note on applications of restriction mapping.
  - b) Merits and demerits of recombinant protein production in yeast.
- Q.8** Write short notes on: [10]
- a) Gene therapy for inherited diseases
  - b) Delta endotoxin of *B.thuringiensis*.
  - c) Use of antisense RNA in plant genetic engineering
  - d) Recombinant proteins from insect cells
  - e) Automated sequencing
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