M.M.: 30 **Time: 60 min**

General Instructions:

(i) There are 12 questions in this paper.

(ii) All questions are compulsory.

1. What happens when an alien gene is ligated at **[1]**
   (a) Sal I site of pBR 322 plasmid
   (b) Pvu site of pBR 322 plasmid
2. How is the action of endonuclease different from that of exonuclease? **[1]**
3. Do Eukaryotic cells have restriction endo-nucleases? Why are these enzymes called Restriction enzymes? **[2]**
4. What is the advantage of modern genetic modification techniques over Hybridization? **[2]**
5. Give reasons:
   (a) DNA cannot pass through host cell's membrane.
   (b) Proteases are added during isolation of DNA for genetic engineering.
   (c) Single cloning site is preferred in a vector. **[3]**
6. Why do DNA fragments move towards anode during electrophoresis? **[1]**
7. Explain the working of a restriction endonuclease enzyme with an example. **[4]**
8. Why and how can bacteria be made 'competent'? **[2]**
9. Describe the process of amplification of gene of interest using PCR. **[3]**
10. Draw & Explain the working of stirred tank bioreactor. **[4]**
11. What are selectable markers? What is their role in Recombinant DNA technology? **[3]**
12. Draw a schematic diagram of E.coli vector pBR 322 and mark the following
    (a) Ori
    (b) rop
    (c) Restriction site Bam HI.
    What is the significance of Ori? **[4]**