1: Attempt Any Two

   a. What is a promoter? Describe their role in regulation of gene expression.

   b. What is an aptamer. Describe in detail about nucleic acid aptamer selection using SELEX?

   c. Describe microarray by briefly describing the working principle and types of microarray used and their role in molecular biology?

2: Attempt Any Two

   a. Write down the principle and applications of the following techniques with suitable illustrations-
      i. DNA footprinting
      ii. Gel Shift analysis

   b. Describe the role of Vir operon in Agrobacterium mediated gene transfer?

   c. List several Advantages and Disadvantages of immobilization of plant cells?
3: Attempt Any Two
   a. Describe the importance and principles of cryopreservation.
   b. Explain growth cycle and growth curve analysis of a cell line.
   c. Write down the principle and applications of cytotoxicity assays.

4: Write notes on Any Two
   a. Describe derivation and subculture of Mouse Embryonic Stem cells.
   b. Describe somatic cell fusion technique.
   c. Write down the principle and applications of flow-cytometry.