[Time: 2½ Hours]   **[Marks:75]**

Please check whether you have got the right question paper.

N.B: 1.   Attempt **all** questions.
        2.   All **questions** carry **equal marks.**
        3.   **Draw** neat labelled **diagrams** wherever necessary.

Q.1 a. Do as directed **(any three):-**   **03**
  i.   _____ enzyme is used for digestion of β –globin gene in a sickle cell trait.
  ii. Taq polymerase extracted from _____ organism is used in PCR.
  iii. What is the difference between dNTP and ddNTP?
  iv. State any two strategies used for insertion of DNA into the host cell for genetic immunization.
  v.   Explain the term – Peptide vaccine.
  vi. State any two advantages of Vaccinia virus as a vector for vaccine preparation.

  b. Attempt the following **(any two):-**   **12**
  i.   Comment: DNA fingerprinting has many applications.
  ii. Discuss steps involved in PCR cycle.
  iii. Explain the preparation of vaccine against FMDV.
  iv. Schematically explain the preparation of subunit vaccine against HSV.

Q.2 a. Give an example of the following **(any three):-**   **03**
  i.   *Agrobacterium* species
  ii. Plant growth regulators
  iii. Types of pTi
  iv. Reporter genes
  v.   Plants used for preparation of edible vaccines
  vi. Transgenes incorporated in normal rice to produce Golden rice

  b. Answer the following **(any two):-**   **12**
  i.   Discuss edible vaccines with a suitable example.
  ii. Describe the transfer of T-DNA in plants.
  iii. Give an account of 'Electroporation as a method of producing transgenic plants'.
  iv. What is the mode of action of Cry protein?

Q.3 a. Define the following **(any three):-**   **03**
  i.   Stem cell
  ii. Superovulation
  iii. Quiescent epithelial cell
  iv. Lox site
  v.   Antifreeze protein
  vi. Cloning

  b. Give an account of the following **(any two):-**   **12**
  i.   Transgenic fish as a means to improve fish aquaculture.
  ii. Production of transgenic mice by DNA microinjection.
  iii. Cre – loxP system for regulating transgene expression.
  iv. Applications of transgenic animals.

Turn over

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Q.4 a. Explain the following terms **(any three)**:-   **03**
   i. EMBL
   ii. URL
   iii. Home page
   iv. PIR
   v. ENTREZ
   vi. HTML

   b. Answer the following **(any two):-**   **12**
   i. Discuss the scope and application of Bioinformatics.
   ii. Define sequence similarity searching. Describe the tools used in similarity searching.
   iii. Give an account of role of computers in Bioinformatics.
   iv. What is WWW? Explain its importance in Bioinformatics.

Q.5 Write short notes on **(any three):-**   **15**
     a) Diagnosis of sickle cell anemia using RFLP
     b) Liposome mediated gene transfer
     c) qPCR
     d) pTi derived vector system
     e) Any one test to ensure the site specific integration of a target gene
     f) Web search tools