[Duration: Three Hours] **[Marks: 100]**

N.B: 1. **All** questions are **compulsory**.
    2. **Figures** to the **right** indicate full marks.
    3. Draw **neat and labelled** diagrams wherever necessary.

Q.1 (A) Choose the correct option from the following **and rewrite the sentence.** **(10)**

i. Cultivation and marketing of vegetables is known as _____.
  a) olericulture   b) pomology   c) floriculture   d) arboriculture

ii. An enclosed area where plants like fruits, vegetables, flowers and ornamental plants are intensively cultivated is called_____.
  a) garden   b) lawn   c) forest   d) edges

iii. A National Park, which is situated in the heart of a metropolitan city of Mumbai, is _____.
  a) Sanjay Gandhi National Park   b) Maharashtra Nature Park
  c) Kamla Nehru Udyan   d) Rajiv Gandhi National Park

iv. To carry out aseptic transfer of media or culture, _____ instrument is commonly used.
  a) autoclave   b) Laminar Air Flow   c) illuminated rack   d) incubator

v. Haploid plants can be achieved by _____ culture.
  a) root   b) embryo   c) pollen   d) shoot tip

vi. The enzyme used for joining the DNA fragments is _____.
  a) phosphatase   b) ligase   c) exonuclease   d) helicase

vii. When the amount of one variable tends to bear a constant ratio to the amount of the change in second variable, it is called as _____ correlation.
  a) linear   b) nonlinear   c) sigmoid   d) horizontal

viii. Coefficient of correlation can range from _____.
  a) -1 to +1   b) 0 to +10   c) -10 to +10   d) -2 to +2

ix. One of the following is a Nucleic acid sequence database_____.
  a) DDBJ   b) UNI PROT   c) SWISS PROT   d) PDB

x. NCBI stands for :
  a) National Centre for Bioinformatics Institute.
  b) National Centre for Biotechnology Information.
  c) Natural Centre for Biotechnology Information.
  d) National Council for Bioinformatics Information.

Q.1 (B) Answer the following in **one or two sentences:** **(10)**

i. Define horticulture.
ii. What is totipotency ?
iii. What is organogenesis?
iv. What do you mean by perfect negative correlation?
v. Define Bioinformatics.

Q.2 Answer **any two** of the following: **(20)**

i. What is a botanical garden? Discuss its importance.

ii. Describe water garden and focal point.

iii. Highlight on the importance of horticulture. Add a note on flower bed.

iv. Citing suitable botanical names of plants explain in detail avenues, lawn and edges.

Q.3 Answer **any two** of the following: **(20)**

i. Describe the different applications of Plant Tissue Culture.

ii. Describe the process of root culture. Add a note on it's importance.

iii. Describe the process of r-DNA technology/ gene cloning.

iv. What are cloning vectors? Give an account of different vectors used in r-DNA Technology.

Q.4 Answer **any two** of the following: **(20)**

i. In a certain plant, blue colour of flower is dominant to yellow colour. When two heterozygous blue flower coloured plants were crossed, 120 blue flowers and 30 yellow flowers were obtained. Calculate X^2 to test the hypothesis for Mendelian monohybrid 3:1 ratio.
   (Given: Tabulated X^2 at 5% significance = 3.84)

ii. The following are the length in cm and breadth in cm of chilli fruits:

Length (cm)	9	10	11	10	9	9	10	11	11	10
Breadth (cm)	2	3	3	2	3	2	3	4	3	5

Calculate the coefficient of correlation and comment on the result.

iii. Explain BLAST as a retrieval tool of biological data.

iv. Give an account of bioinformatics programme in India.

Q.5 Write **short notes: (Any Four)** **(20)**

i. Informal garden.

ii. Hedges.

iii. Wet Sterilization.

iv. Importance of embryo culture.

v. Steps involved in calculating coefficient of correlation.

vi. www and its different components.

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