First Terminal Examination - 2023

HSE II **Part III- BIOLOGY**

BOTANY **Maximum Score: 30**

Time: 1hr

General Instructions to Candidates:

- **There is a 'cool off time' of 10 minutes in addition to the writing time of 1hour.**
- **Use the cool off time to get familiar with questions and to plan your answers.**
- **Read the instructions and questions carefully before answering**
- **Total score of this examination is 30.**
- **Candidates can attempt any questions of their choice from the options given in the each section.**
- **You are not allowed to write your answers or to discuss with others during the cooloff time**

PART I

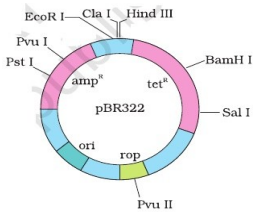
Answer any 3 questions from 1 to 5. Each carries 1 score. (3 X 1 = 3)

1. Observe the relationship between the first pair and fill in the blanks.
   a. Perisperm :- Remnants of nucellus
      ----------: - Fruit wall
   b. Parthenocarpy : Formation of fruit without fertilization
      Apomixis : ----------
2. The enzyme used to join DNA segments is……..
3. Most resistant organic material on exine of pollengrains
   (a) Sporopollenin (b) Cellulose (c) Chitin (d) Pectin
4. Ti plasmid used in genetic engineering is obtained from…….
5. The construction of the rDNA accomplished in 1972 by …… and …….

PART II

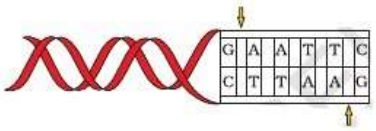
Answer any 9 questions from 6 to 16. Each carries 2 score. (9 X 2 = 18)

6. If the female parent produces bisexual flowers, emasculation is necessary in artificial hybridization.
   a. What is emasculation
   b. Write down the importance of emasculation
7. Observe the cloning vector and answer the questions.
   a. What are the features of cloning vector?
   b. Write the function of 'rop' in this cloning vector

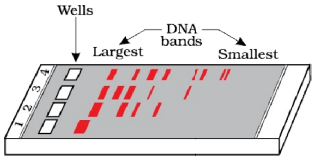


8. A typical angiosperm embryosac is 7 celled 8 nucleate stage.
   a. Name the cells that constitute egg apparatus?
   b. Name the diploid cell present in embryosac
9. EcoRI is a restriction endonuclease. What do E, co, R, I represent?

10. How is it possible in Oxalis and Viola plants to produce assured seed set even in the absence of pollinators?
11. Write notes on
    a. Microinjection
    b. Biolistics
12. Different stages of development in a dicot embryo are given below. Arrange them in the correct sequential order
    (Heart shaped embryo , Globular embryo , Mature embryo, Proembryo)
13. Observe the nucleotide sequence given below
    a. Name this kind of nucleotide sequence
    b. Define this sequence



14. Give reason
    a. Ground nut seeds and Castor seeds are dicot seeds. But ground nut seeds are ex- albuminous and castor seeds are albuminous.
    b. Self incompatibility discourage self pollination
15. A microsporangium is surrounded by four layers. Name the first three layers and write their function
16. Figure given below depicts Gel electrophoresis.
    a. Explain the principles behind it.
    b. How do you visualize DNA fragments ?



PART III

Answer any 3 questions from 17 to 20. Each carries 3 score. (3 X 3 = 9)

17. In large number of plants, pollination is carried out by insects.
    a. List out four characters of flowers that helps insect pollination
    b. Give two examples for such flowers
18. Ampicillin resistance gene (**ampR)** and Tetracycline resistance gene **(tetR**) are selectable markers present in the cloning vector pBR322
    a. What is the significance of selectable markers in Cloning vector?
    b. What do you mean by insertional inactivation?
    c. How insertional inactivation is used to identify recombinants?
19. Double fertilization is a characteristic feature of angiosperms.
    a. Which are the events in double fertilization?
    b. Identify A, B, C & D

    Male gamete + ……(A)…….. →Zygote (2n) → ……(B)……
    Male gamete + ……(C)…… → PEN (3n) → ……(D)……
20. The cell which is capable of taking up alien DNA is called Competent host
    a. How can we make a host cell competent to receive a foreign gene or DNA?
    b. Why should the host cell be made competent ?