

**B. Sc. BIOTECHNOLOGY**  
**Third Semester**  
**Plant and Animal Breeding**  
**(BBT - 12)**

**Duration: 3Hrs.**

**Full Marks: 70**

**(PART-B: Descriptive)**

**Duration: 2 hrs. 40 mins.**

**Marks: 50**

**Write short notes on any five of the following:**

**2×5=10**

- a) Domestication
- b) Self-incompatibility
- c) Genetic erosion
- d) Trait of selection
- e) Crisscrossing
- f) Sex Selection
- g) Panmixia

**2. Answer any five of the following - in brief:**

**3×5=15**

- a) Define plant breeding. Give three examples of significant achievements in plant breeding with their popularity in the society.
- b) Relevance of land races as important genetic resource in hybrid production.
- c) What do you mean by controlled hybridization? State the steps followed in performing the operation.
- d) Throw light on the prospects of interspecific hybridization.
- e) Mention the important characteristics that distinguish stem cells from other cell types.
- f) How inbreeding is advantageous over the other methods of breeding?

**3. Define germplasm. What are the different types of materials considered as germplasm? Discuss its importance in plant breeding for crop improvement.**

**1+2+2 = 5**

**4. On what basis breeders select parents for hybridization experiments? Explain the role of molecular markers in selection of parents and progenies.**

**2+3=5**

5. Under what situation the pedigree method of selection is employed? Explain schematically the pedigree method of selection. **2+3=5**

or

Give a historical account on the plant breeding effort of India giving examples of success. **5**

6. Define animal breeding. Briefly describe the process of embryo manipulation for the production of improved breed of animals. **1+4=5**

7. What do you understand by stem cells? What types of stem cells are used in biomedical researches? Briefly discuss about their biomedical applications. **1+1+3=5**

or

Give a brief explanation of the bioethical issues related to stem cell research. **5**

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*(The figures in the margin indicate full marks for the questions)*

**Duration: 20 minutes**

**Marks – 20**

**PART A- Objective Type**

**1. Choose the correct option for the following questions:**

**1×20=20**

- i. Group of animals used for purpose of planned breeding is termed as \_\_\_\_\_.  
a) breeding stock                      b) purebred                      c) genetic bred                      d) hybrid
- ii. The term “somatic stem cell” is applicable for \_\_\_\_\_.  
a) embryonic stem cell                      b) astrocytes                      c) adult stem cell                      d) both a) and b)
- iii. “Coefficient of relationship” 0.5 is observed among \_\_\_\_\_.  
a) full sibs                      b) half sibs                      c) monozygotic twins                      d) none of the above
- iv. \_\_\_\_\_ is done by the repeated use of superior purebred over indigenous non-descript animals.  
a) crisscrossing                      b) top-crossing                      c) grading                      d) rotational crossing
- v. The manifestation of heterosis results in \_\_\_\_\_.  
a) purebred                      b) half-bred                      c) homozygotes                      d) hybrid vigor
- vi. “Like to like” mating is observed in \_\_\_\_\_.  
a) random mating                      b) phenotypic assortive mating  
c) phenotypic disassortive mating                      d) genotypic disassortive mating
- vii. The first human embryonic stem cell lines were developed by \_\_\_\_\_.  
a) John Gearhart                      b) John Enders                      c) James Thomson                      d) Briggs and King
- viii. \_\_\_\_\_ stem cells have the capacity to become a variety of cells, but not all.  
a) multipotent                      b) pluripotent                      c) totipotent                      d) all of the above
- ix. Chimaeras can be created by the technical approach of \_\_\_\_\_.  
a) artificial insemination                      b) embryonic manipulation  
c) genetic engineering                      d) sex selection
- x. The scientific theory of animal breeding was proposed by \_\_\_\_\_.  
a) Sewall Wright                      b) Jay Lush  
c) Charles Henderson                      d) all of the above
- xi. The selection method, including individual plant selection and progeny test was first published by \_\_\_\_\_.  
a) Van Mons                      b) Gregor Mendel  
c) Patrick Shireff                      d) Knight.

- xii. The scope of distant hybridization to sexually incompatible species combinations is extended by \_\_\_\_\_
- a) sexual breeding
  - b) somatic hybridization
  - c) controlled pollination
  - d) somaclonal variation
- xiii. In India, the first Agricultural Research Institute established was \_\_\_\_\_
- a) Indian Council of Agricultural Research
  - b) Indian Agricultural Research Institute
  - c) Imperial Agricultural Research Institute
  - d) Council of Scientific and Industrial Research.
- xiv. The new planting materials (Germplasm) are introduced in India through \_\_\_\_\_
- a) National Bureau of Plant Genetic Resources
  - b) Imperial Council of Agricultural Research
  - c) Indian Council of Agricultural Research
  - d) Agricultural Universities
- xv. For selection of parents, heterogeneous populations can be developed artificially through \_\_\_\_\_
- a) grafting
  - b) vegetative propagation
  - c) callus culture
  - d) micropropagation
- xvi. Homozygous diploid lines can be obtained through \_\_\_\_\_
- a) back crossing
  - b) tissue culture
  - c) mutation
  - d) gene silencing
- xvii. Reduction cell division occurs in \_\_\_\_\_
- a) primordial cells of apical buds
  - b) primordial cells of root tips
  - c) anthers and ovary of flower
  - d) cambium tissues of vascular bundles
- xviii. The improvement of '*desi*' or local varieties of self-pollinated crops can be made by adopting \_\_\_\_\_
- a) pureline selection
  - b) pedigree selection
  - c) individual progeny selection
  - d) mass selection
- xix. Ancestral relationship of a population from cross-pollinated crop can be established through assessment based on \_\_\_\_\_
- a) phenotypic markers
  - b) genotypic markers
  - c) molecular markers
  - d) morphological markers
- xx. Resistance/tolerance of the plant species to biotic and abiotic stresses is controlled by the \_\_\_\_\_
- a) tissue system
  - b) environmental factors
  - c) genetic factors
  - d) biochemical components

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