

B.Sc. BIOTECHNOLOGY
Third Semester
PLANT AND ANIMAL BREEDING
(BBT – 12)

Duration: 3Hrs.

Full Marks: 70

Part-A (Objective) =20
Part-B (Descriptive) =50

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins.

Marks: 50

(Answer Question No. 1 and any four from Question Nos. 2–8)

1. Write in brief on any *five* of the following: (2×5=10)
 - a) Domestication
 - b) Land race
 - c) Apomixis
 - d) Self-incompatibility
 - e) DNA
 - f) Telomere
 - g) Cloning in animals
2. Define plant breeding. Outline briefly the history of plant breeding and discuss its significant achievements. (3+7=10)

Or

What is germplasm? Discuss its role in crop improvement citing examples. (4+6=10)
3. What do you mean by molecular marker? Explain the process of RAPD. Differentiate the method, application, advantages and disadvantages of RAPD and RFLP. (2+3+5=10)

4. Describe the steps to be followed in mass selection in self-pollinated crops coupled with progeny test, giving the schematic diagramme, for maintaining the purity of pureline varieties. (10)

Or

What do you mean by mass selection? Explain its importance in breeder's point of value. What are the merits and demerits of mass selection? (2+5+3=10)

5. What is sexual reproduction? Explain with diagram the microsporogenesis and microgametogenesis of bisexual flower. (2+4+4=10)

Or

What is NBPGR? What are the objectives of NBPGR? Briefly describe the organization and its functions. (1+2+7=10)

6. Define artificial insemination. Mention the steps involved in artificial insemination. (5+5=10)

7. Describe with a neat diagram the major approaches for generating transgenic stock. (10)

8. What do you mean by short term and long term culture? Describe with a neat diagram the cloning from adult and fetal cells for the production of dolly. (5+5=10)

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Duration: 20 minutes

Marks – 20

(PART A - Objective Type)

I. Choose the correct answer:

1×15=15

1. The first opening of a flower is known as:
a. anthesis b. blooming c. pollinating
2. Homozygous diploid lines can be obtained through:
a. back crossing b. tissue culture c. mutation
3. For selection of parents, heterogeneous populations can be developed artificially through:
a. grafting b. vegetative propagation c. callus culture
4. The selection method, including individual plant selection and progeny test was first published by:
a. Van Mons b. Gregor Mendel c. Patrick Shireff
5. Resistance/tolerance of the plant species to biotic and abiotic stresses is controlled by the:
a. tissue system b. environmental factors c. genetic factors
6. 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.
7. Reduction cell division occurs in:
a. primordial cells of apical buds.
b. primordial cells of root tips.
c. anthers and ovary of flower.
8. The scope of distant hybridization to sexually incompatible species combinations is extended by:
a. sexual breeding b. somatic hybridization c. controlled pollination
9. The new planting materials (Germplasm) are introduced in India through:
a. NBPGR b. ICAR c. IARI

10. The manifestation of heterosis results in:

- a. purebred b. homozygotes c. hybrid vigor

11. The marker system in which both restriction enzyme and PCR are involved is:

- a. AFLP b. RAPD c. RFLP d. SSR

12. The molecular marker used in DNA finger printing is:

- a. RAPD b. RFLP c. VNTR d. ISSR

13. The temperature at which DNA can be denatured is:

- a. 72° C b. 79° C c. 94° C d. 58° C

14. Random primers are used in:

- a. ISSR b. SNP c. RFLP d. RAPD

15. Annealing in DNA amplication is:

- a. Addition of primer to the template b. Separation of DNA strands
c. Extension by Tag polymerase d. Addition of nucleotides to the primer

III. Fill in the blanks:

1×5=5

1. Stem cells are a class of _____ cells. (differentiated/undifferentiated)
2. _____ hormone is injected in the donor to induce superovulation. (FSH/Prostaglandin)
3. The Inferior females which help in the development of the embryo is known as _____.
(recipient /surrogate)
4. Dolly is an example of _____ culture. (short term /long term)
5. The three unique properties of stem cells culture are _____, _____
& _____. (unspecialized/infinite/differentiated/undifferentiated/Totipotency/self
renewal)
