

M.Sc. BOTANY
FOURTH SEMESTER
CYTOLOGY, GENETICS AND PLANT BREEDING
MSB-401 A

**SET
A**

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs.

Full Marks: 70

Time: 30 mins.

Marks: 20

(Objective)

Choose the correct answer from the following:

1 × 20 = 20

1. What is the main application of embryo culture?
 - a. Clonal propagation
 - b. Production of embryoids
 - c. Induction of somaclonal variations
 - d. Overcoming hybridization barriers
2. _____ is the advantage for the seed as germplasm conservation.
 - a. Plants are propagated through seeds
 - b. Seed viability over a time
 - c. Conventional material to conserve plant germplasm.
 - d. Seeds occupy a small place
3. Cryoprotectants are used in cryopreservation to.....
 - a. Prevent damage caused to cells by freezing
 - b. To preserve cells from pathogens
 - c. To preserve cells from freezing
 - d. To preserve cells from aggregation
4. Which of the following plant cells show totipotency?
 - a. Cork cells
 - b. Meristem
 - c. Sieve
 - d. Xylem vessels
5. Temperature required for cold storage for germplasm conservation is.....
 - a. 1°C -9°C
 - b. 9°C-15°C
 - c. 15°C-20°C
 - d. 20°C-30°C
6. In Lamarck's view, the key of organic evolution is that each progeny:
 - a. Shows struggle for existence
 - b. Characters acquired by parental generation are inherited
 - c. Is similar to its parents
 - d. Phylogeny is repeated in its ontogeny
7. Which of the following mechanisms will remove uracil and incorporate the correct base?
 - a. Direct repair
 - b. Base excision repair
 - c. Mismatch repair
 - d. Nucleotide excision repair
8. A point mutation that replaces a purine with another purine, or a pyrimidine with another pyrimidine:
 - a. Nonsense mutation
 - b. Silent mutation
 - c. Transition mutation
 - d. Transversion
9. What is the function of enzyme involved in base excision repair?
 - a. Addition of correct base
 - b. Addition of correct nucleotide
 - c. Removal of incorrect base
 - d. Removal of phosphodiester bond

10. The idea of use and disuse of organs was given by:
- Lamarck
 - Morgan
 - Darwin
 - Hugo de Vries
11. Who used the term heterosis for the first time?
- Shull
 - Keith Downey
 - Thomas Andrew Knight
 - Niels Ebbesen Hansen
12. Point mutation is:
- Change in a base of a gene
 - Deletion of a segment of gene
 - Loss of gene
 - Addition
13. If adenine is replaced from guanine then the mutation is.....
- Transcription
 - Transition
 - Transversion
 - Frameshift mutation
14. Which is true about heterosis?
- Superiority of an F1 hybrid over its male parent
 - Superiority of an F1 hybrid over its female parent
 - Superiority of an F1 hybrid over both of its parents
 - None of the above mentioned
15. Which of the following is incorrect with respect to mutation?
- Sudden
 - Continuous
 - Change in chromosomes and genes
 - Leads to variation in DNA
16. Who developed the dominance hypothesis?
- James Crow
 - Charles Davenport
 - Koelreuteris
 - None of the above
17. What was the name of Charles Darwin's most famous book?
- The Origin of Species
 - The Descent Man
 - The Evolution of Species
 - On the Origin of Species by Means of Natural Selection
18. In the following compound which is one of the intercalating agents?
- Ethidium bromide
 - 5-bromouracil
 - 2-Iodouracil
 - 5-methylcytosine
19. Which base is generated by the deamination of 5-methylcytosine?
- Thymine
 - Adenine
 - Guanine
 - Uracil
20. 5-bromouracil is the analog of which base?
- Thymine
 - Guanine
 - Cytosine
 - Uracil

(Descriptive)

Time : 2 hr. 30 mins.

Marks : 50

[Answer question no.1 & any four (4) from the rest]

1. What is heterosis? Discuss the different types of heterosis with formulae. 10
2. What is ploidy? Discuss evolution of polyploidy in *Triticum aestivum* with necessary crosses. 2+8=10
3. Discuss tautomerism and base analogues of transition mutation with illustrations. 5+5=10
4. Discuss the various types of physical mutagens with examples. 10
5. What is evolution? Describe in detail the theory of Natural Selection. 2+8=10
6. Discuss the mechanism of mismatch repair. 10
7. What is embryo rescue and describe the techniques used. Write its applications. 2+6+2=10
8. What is cryopreservation? Describe the process of cryopreservation, its application and limitations. 2+5+2+1=10

= = *** = =