

M.Sc. (Ag.) Examination, 2016
Semester-I
Genetics and Plant Breeding
Course No.: GPB-501
(Principles of Genetics)

Time: Three Hours

Full Marks: 50

Questions are of value or as indicated in the margin

Group-A

1. (a) Answer in brief (any seven) :

1.0×7=7.0

- i) What do you mean by multiple allele? Cite an example of it.
- ii) Define linkage.
- iii) Mention the roles of histone proteins.
- iv) What do you understand by restorer gene?
- v) Define epistasis.
- vi) Write the function of restriction endonuclease.
- vii) State the two important features of vector.
- viii) What is ribozyme?
- ix) Compare Nullisomy and Double Monosomy.
- x) What do you understand by degeneracy of genetic code?

(b) Match the Column 'A' with Column 'B' :

0.5×6=3.0

Column 'A'

Column 'B'

- | | |
|---------------------|-------------------------------------|
| i) Chiasma | a) Chromosome Map |
| ii) Sanger | b) <i>Agrobacterium tumefaciens</i> |
| iii) Centimorgan | c) Hemizygous |
| iv) Pseudodominance | d) Genetic Fine Structure |
| v) Ti Plasmid | e) DNA Sequencing |
| vi) Cistron | f) Crossing Over |

Group-B

Answer any four from the following:

10×4=40

- 2. Distinguish with suitable sketches between the Anaphase-I of Meiosis cell division and Anaphase of Mitosis cell division. Write down the significance of Mitosis cell division. What is G₀ state?
6+2+2=10
- 3. Why is the DNA replication called semiconservative in nature. Explain the roles of various enzymes involved in the DNA replication of Prokaryotes.
3+7=10
- 4. What do you mean by gene cloning? Write the steps of DNA amplification using PCR. Why the Taq Polymerase is important for PCR technique?
2+6+2=10
- 5. Distinguish Autopolyploidy and Allopolyploidy. Write down the roles of Allopolyploidy in the evolution of crop plants.
3+7=10

PTO

6. Write short notes on (**any four**) — 2.5×4=10
- i) Transposable Genetic Element
 - ii) Micro RNA
 - iii) Nucleic Acid Hybridization
 - iv) Epigenetics
 - v) Deviations from Mendel Findings
 - vi) Cytoplasmic Male Sterility
7. Differentiate between (**any five**) : 2×5=10
- i) Paracentric and Pericentric Inversions
 - ii) Test Cross and Back Cross
 - iii) Oncogene and Protooncogene
 - iv) Genomics and Proteomics
 - v) Incomplete dominance and co-dominance
 - vi) B-DNA and Z-DNA
 - vii) Nonsense mutation and Frameshift mutation
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