



PG
M.Sc. Semester-I Examination, 2023
(AGRICULTURE) IN GENETICS AND PLANT BREEDING
PAPER: GPB 501
(PRINCIPLES OF GENETICS)

Full Marks: 50

Time: 2 Hours

The figures in the right-hand margin indicate full marks.
 Candidates are required to give their answers in their own words as far as practicable.

GROUP-A**1. Answer any FIVE:****2X5 = 10**

- a) Differentiate euchromatin from heterochromatin.
- b) Define linkage.
- c) What is allele frequency?
- d) Define IS element.
- e) Mention the importance of 'Kornberg enzyme'.
- f) Define spliceosomes.
- g) What are split genes?
- h) What do you mean by epigenetic regulation?

GROUP-B**2. Answer any FOUR:****5X4 = 20**

- a) Explain the chromosomal theory of inheritance.
- b) Briefly discuss the molecular mechanism of histone methylation.
- c) Define miRNA. Briefly discuss the molecular basis of ribozyme mechanisms.
(1+4)
- d) Define lethal gene. Explain the recessive epistasis. 1+4
- e) What is mutagen. Briefly discuss the molecular basis of mutation. 1+4
- f) Define consensus sequence. Mention the molecular mechanism of transcription initiation in prokaryotes. 1+4
- g) Briefly discuss the DNA repair mechanism in prokaryotes?

GROUP-C**3. Answer any TWO questions from the following:****10X2 = 20**

- a) Explain the Hardy-Weinberg equilibrium. Briefly discuss the role of different factors affecting allele frequency. Define genetic drift. 3+5+2

(P.T.O.)



(2)

- b) What is extra-chromosomal inheritance? Why it is also designated as maternal inheritance? Discuss about two different patterns of extrachromosomal inheritance with suitable examples. 2+2+6
- c) Differentiate leading strand from lagging strand. Discuss about the different types of enzymes and their activity during DNA replication in prokaryotes. Schematically represent the molecular mechanism of telomere replication. 2+4+4
- d) What is cDNA library? Briefly mention the mechanism of PCR based cloning. Discuss the sanger method of DNA sequencing. 2+3+5
