2022

BOTANY — HONOURS

Paper : CC-10

(Genetics)

Full Marks : 50

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer ***any five*** questions from the following : 2×5

(a) What do you mean by linkage group?

(b) State the types of gametes expected from the genotype AABbCc.

(c) Give example of a tandem and an interspersed repetitive DNA.

(d) What is meant by base-pair substitution?

(e) What is split gene?

(f) What do you mean by basic chromosome number? What is the basic chromosome number of wheat?

(g) What is a homoeotic gene? Give an example.

(h) What are alkylating agents? Give one example.

2. Answer ***any two*** questions from the following :

(a) Explain with an example Polygenic inheritance in plants. 5

(b) What is inversion? Distinguish between the meiotic behaviour of paracentric and pericentric inversion. 1+4

(c) Explain one gene — one polypeptide concept. 5

(d) Define gene interaction. Explain with example the basis of deviation of Mendelian dihybrid ratio 9 : 3 : 4(F_2). 1+4

3. Answer ***any three*** questions from the following :

(a) Describe the Holliday model for recombination with neat diagrams. 10

(b) State the different types of aneuploidy, their origin and meiotic behaviour. 10

(c) In *Solanum lycopersicon*, three linked genes are mottled (m)/normal (M) leaf; Smooth (p) or pubescent (P); purple (Aw) or green (aw) stem. Individuals heterozygous for all these genes were test-crossed and the following results were obtained :

Normal, smooth, purple	18
Mottled, pubescent, green	15
Normal, smooth, green	180
Mottled, pubescent, purple	187
Normal, pubescent, purple	1880
Mottled, smooth, green	1903
Mottled, smooth, purple	400
Normal, pubescent, green	417

Draw the linkage map showing the order and the distances between the 3 loci.

Calculate the coefficient of coincidence. 2+6+2

(d) Define Mutation. Explain the mechanism of induced mutation by (i) 5-Bromouracil (ii) Proflavin (iii) UV-rays. 1+3+3+3

(e) Write notes on ***(any two)*** : 5+5

(i) Origin of common cultivated wheat through allopolyploidy

(ii) Overlapping gene

(iii) Co-dominance and Incomplete dominance.
