



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 3rd Semester Examination, 2020, held in 2021

BOTACOR07T-BOTANY (CC7)

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.*

1. Answer the following questions in brief: 1×6 = 6
 - (a) Define expressivity.
 - (b) What do you mean by complete linkage? How it is related to crossing over?
 - (c) Assume that an organism has $2n = 6$ chromosomes. How many chromosomes would be present in a trisomic organism of this species?
 - (d) Differentiate between multiple allele and polygene.
 - (e) What do you mean by complete linkage? How it is related to crossing over?
 - (f) Distinguish between nullisomics and double monosomics.

2. Answer any **eight** questions from the following: 3×8 = 24
 - (a) Discuss maternal effect with reference to inheritance pattern of shell coiling in snails.
 - (b) Distinguish between true allopolyploid and segmental allopolyploid.
 - (c) Give the molecular mechanism by which alkylating agents cause mutation.
 - (d) What is the basis for the green white colour variegation in the leaves of four o'clock plant (*Mirabilis jalapa*)? If the following cross is made: Variegated (Female) × Green (Male).
 - (e) Briefly discuss the genetic significance of F_2 phenotypic ratios 9:3:4 and 13:3.
 - (f) Distinguish between pericentric and paracentric inversions. What are the meiotic products of paracentric inversion? 2+1
 - (g) Briefly describe the CIB method of detection of sex linked lethal.
 - (h) Why is the DNA repair extremely important? What will happen if RecBCD is mutated in a cell?
 - (i) What is pedigree analysis? Write all the symbols used in pedigree analysis.
 - (j) What is the difference between a transition mutation and a transversion mutation?
 - (k) What are cistron, recon and muton?
 - (l) How many A and a alleles are present in a sample of organisms consisting of 10 AA, 15Aa and 4aa individuals? What are the allele frequencies in this sample?

3. Answer any *two* questions from the following: 5×2 = 10

- (a) A cross was made between purple leaf (pl), glossy seedling (gl) dwarf (t) variety and wild (+++) type. F₁ plants were test crossed and the following proportions were obtained when a sample of 1000 plants were counted:

Wild type	310
Purple leaf, glossy seedling, dwarf	305
Purple leaf	140
Glossy seedling, dwarf	145
Purple leaf, dwarf	42
Glossy seedling	43
Dwarf	09
Purple leaf, glossy seedling	06

Determine the correct order of the genes. Calculate the map distance between the genes, Coefficient of coincidence and Interference.

- (b) With suitable diagram briefly describe the cytological basis of crossing over. 5
- (c) Mention the various types of DNA repair mechanisms known to counteract the effects of UV rays. What is the role of visible light in photoreactivation? 4+1
- (d) Briefly describe the rII locus in T4 phage. How could rII locus be divided into two cistrons? 3+2

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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