# WEST BENGAL STATE UNIVERSITY

B.Sc. Honours Part-III Examination, 2020

## BOTANY

## PAPER-BOTA-VIII

Time Allotted: 2 Hours | Full Marks: 50

*The figures in the margin indicate full marks.*

### GROUP-A

1. Answer the following in brief:
   (a) Define Apoptosis. 1
   (b) What are the difference between anaphase I and anaphase II? 2
   (c) State the basic principles of TEM. What is resolving power? 1+1

2. Answer any ***two*** questions from the following: 5×2 = 10
   (a) Briefly describe the ultrastructure of nuclear pore complex. 5
   (b) Briefly describe the process of ribosome biogenesis in eukaryotes. 5
   (c) What is Spindle apparatus? Discuss different types of spindle fibres develop during cell cycle with proper diagram. 1+(3+1)

**OR**

3. Answer any ***one*** question from the following: 10×1 = 10
   (a) Briefly describe the structure of the fundamental units of chromatin. How they are packed into higher order structures – explain with suitable diagram. 3+7
   (b) What is constitutive and facultative heterochromatin? Cite example. Distinguish between euchromatin and heterochromatin. Write salient features of cpDNA. $(1\frac{1}{2}+1\frac{1}{2})$ +4+3

### GROUP-B

4. Answer the following in brief:
   (a) What is split gene? 1
   (b) What is missense mutation? 1
   (c) What do you mean by amino-acylation of t-RNA? 2
   (d) Differentiate between dominance and co-dominance. 2
   (e) What is the difference between nullisomes and double monosomes? 2
   (f) Define Genomics. Name one biological database. 1+1

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

(a) What are linkage groups? Briefly describe the Holliday model for homologous recombination. 1+4

(b) Describe the meiotic behavior of reciprocal translocation with diagram. 5

(c) Who discovered the Ac/Ds System? Give a brief account of the Ac-Ds elements in maize. 1+4

(d) With the help of suitable illustrations describe the meiotic behavior of different types of Trisomics. 5

(e) Briefly describe the Nirenberg and Matthaei's experiment to decipher genetic code. 5

**OR**

6. Answer any ***one*** question from the following: 10×1 = 10

(a) Draw and describe the initiation and termination process of transcription in prokaryotes. (3+2)+(3+2)

(b) What do you understand by semiconservative nature of DNA replication? Describe Meselson and Stahl's experiment confirming the semiconservative nature of DNA replicatication. Write down the function of SSB protein and Primase in DNA replication. 2+6+2

(c) What is mutagens? Discuss major types of point mutations with proper examples. Name one base-analogue. 1+8+1

(d) (i) Define Epistasis. What is the difference between dominant and recessive epistasis — Explain with examples. (1+4)+(3+2)

(ii) Describe the balance theory of Bridges in sex determination. How do environment effect sex-determination?

(e) In case of *Drosophila melanogaster* crosses were made to obtain $F_1$ progeny by crossing flies that were homozygous recessive for black bodies (b), vestigial wings (vg) and brown eyes (bw) with wild type flies that had normal bodies ($b^+$), wings ($vg^+$) and eyes ($bw^+$). A test cross was then made by crossing $F_1$ female progeny with triple homozygous recessive male flies. The data obtained from this test cross are as follows: 2+6+1+1

| *Phenotypes* | *Number* |
|---|---|
| Normal | 378 |
| Black, Vestigial, Brown | 370 |
| Vestigial wings, Brown eyes | 88 |
| Black Body | 104 |
| Black body, Vestigial wings | 221 |
| Brown eyes | 234 |
| Black Body, Brown eyes | 32 |
| Vestigial wings | 41 |

Give the gene order and calculate the map distance. Determine the co-efficient of co-incidence and interference.

## GROUP-C

7. Answer the following in brief:

(a) Distinguish between GMS and CMS. 2

(b) What is restorer line? 1

(c) State the laws of Probability. 2

**OR**

8. Answer any ***one*** question from the following: 5×1 = 5

(a) Explain the genetic basis of heterosis. 5

(b) Explain Hardy-Weinberg equilibrium. 5

9. Answer any ***one*** question from the following: 10×1 = 10

(a) Distinguish between — 5+5

(i) Bulk method and Pedigree method

and (ii) Back Cross and Test Cross.

(b) Calculate the mean and standard deviation of the height of plants measures in Cms as follows —

122, 123, 135, 137, 124, 128, 130, 139, 137, 121, 133, 120, 132, 125.

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