2014

BOTANY

(Major)

Paper : 5.3

(Cytogenetics, Plant Breeding and Biometrics)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Choose and write the correct one/Fill in the blanks : 1×7=7

   (a) In case of dihybrid, the test-cross produces F_2 progeny in —— ratio.

   (i) 1:1

   (ii) 1:1:1:1

   (iii) 1:2:1

   (iv) 9:3:3:1

(b) In interaction of genes, the ratio obtained as 9:7 in F_2 generation refers to

(i) complementary genes

(ii) supplementary genes

(iii) epistasis

(iv) lethal genes

(c) In which stage of meiosis-I, crossing-over takes place?

(i) Leptotene

(ii) Zygotene

(iii) Pachytene

(iv) Diplotene

(d) Cytoplasmic inheritance is also known as

(i) maternal inheritance

(ii) extranuclear inheritance

(iii) Both (i) and (ii)

(iv) None of the above

(e) Which of the following is considered as frame shift mutation?

(i) Deletion

(ii) Transition

(iii) Transversion

(iv) Substitution

(f) Variations in the number of entire set of chromosome is known as ——.

(g) A monosomic plant contains —— number of chromosomes in its cell.

2. Answer the following questions : 2×4=8

(a) Define analysis of variance (ANOVA).

(b) What is Hardy-Weinberg law?

(c) Write on the importance of heterosis in plant breeding.

(d) Write on the application of standard deviation in biology.

3. Answer any *three* of the following questions : 5×3=15

(a) Discuss briefly the cytological basis of crossing-over.

(b) What is genic-balance theory of sex determination? Explain.

(c) Briefly discuss the different types of male sterility in plants.

(d) Write on the evolutionary significance of polyploidy.

4. (a) Describe the different methods, which have been used for the production of monosomics. What method in your opinion is the best? 10

Or

Describe with suitable examples, the role of allopolyploidy in improvement of crops.

(b) Describe the role of heterosis in crop improvement. 10

Or

Describe various methods of selection used in plant breeding. What is its importance?

(c) Discuss the modifications in dihybrid ratio (9:3:3:1) due to different kinds of interactions of genes. Can you explain these modifications on the basis of Mendel's law of inheritance? 10

Or

What do you understand by recombination? Discuss various views available to explain the mechanism of recombination.

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