2013

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 monohybrid, 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 : 3 : 4 in F_2 generation, refers to

(i) complementary genes

(ii) supplementary genes

(iii) lethal genes

(iv) epistasis

(c) A trisomic plant contains —— number of chromosomes in its cell.

(i) $3n$

(ii) $2n+2$

(iii) $2n+1$

(iv) $2n+3$

(d) Plasmagenes are found in

(i) nucleus

(ii) cytoplasm

(iii) nucleoplasm

(iv) xylem

(e) The first law of Mendel is known as ——.

(f) Y-linked genes are also called ——.

(g) In extra-chromosomal inheritance, the reciprocal cross except for sex-linked characters produces ——.

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

(a) Define chi-square test and give its formula.

(b) Define linkage and linkage map.

(c) Diagrammatically explain dicentric or anaphase bridge.

(d) What is the definition of quantitative inheritance? Mention the phenotypic ratio obtained in F_2 generation in quantitative inheritance.

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

(a) Define crossing-over. Mention the significance of crossing-over.

(b) What is chromosome theory of linkage? Mention the characteristics of chromosome theory of linkage.

(c) What do you mean by standard deviation? Explain with examples.

(d) What is Hardy-Weinberg law? Mention the salient features of Hardy-Weinberg law.

(e) What is mass selection? How does it differ from pure-line selection? Mention the advantages of mass selection.

4. (a) Define heterosis. Mention different hypotheses to explain genetical basis of heterosis. 10

Or

What is plastid inheritance? Explain plastid inheritance in plants with reference to cytoplasmic inheritance.

(b) "Polyploidy has played a great role in improvement of crop plant." Explain giving examples with reference to autopolyploidy and allopolyploidy. 10

Or

Write the objectives of plant breeding. What is plant introduction? Mention the purposes and procedure of plant introduction.

(c) Explain cytological basis of crossing-over. 10

Or

What is Student's test or '*t*-test'? Describe the application of '*t*-test' for assessing the significance of difference between the sample mean and population mean.

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