2015

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 answer/Fill in the blank : 1×7=7

(a) Chiasma formation occurs at

(i) zygotene

(ii) pachytene

(iii) diplotene

(iv) diakinesis stage of meiosis

(b) The ratio of dihybrid cross is

(i) 9 : 3 : 3 : 1

(ii) 3 : 1

(iii) 15 : 1

(iv) 12 : 3 : 1

(c) A cross made between F_1 hybrid and any of its parents is

(i) backcross

(ii) monohybrid cross

(iii) dihybrid cross

(iv) reciprocal cross

(d) A female whose father was color-blind marries a normal male whose father was also color-blind. What is the % of probability that their son will be color-blind?

(i) 0 (ii) 25

(iii) 50 (iv) 75

(e) Which of the following shows criss-cross pattern of inheritance?

(i) Y-linked dominant gene

(ii) Y-linked recessive gene

(iii) X-linked recessive gene

(iv) X-linked dominant gene

(f) Which of the following is not true of a maternal effect gene?

(i) It is located in the nuclear DNA

(ii) Maternal genotype affects offspring phenotype

(iii) It may control deposition of material into oocytes

(iv) It must be located on the X-chromosome

(g) The formula for arithmetic mean is ——.

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

(a) What is test of significance?

(b) Write the principle of Hardy-Weinberg law.

(c) Define standard deviation.

(d) Write the importance of male sterility in plant breeding.

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

(a) Describe the significance of backcross. How does it differ from testcross?

(b) Explain how Mendel's dihybrid ratio would be converted into *(i)* 9 : 7, *(ii)* 12 : 3 : 1 and *(iii)* 15 : 1.

(c) Explain the different types of emasculation method.

(d) Write the evolutionary significance of chromosomal aberration.

4. *(a)* What is meant by *t*-test of significance? With a suitable example, discuss its uses and application in biological science. 10

Or

Discuss the application of statistics in biological sciences. 10

(b) What is euploidy? Describe the different types of euploid and state one reason of its origin. 10

Or

What do you mean by cytoplasmic inheritance? Point out the differences between cytoplasmic and nuclear inheritances. Giving suitable examples, discuss the role of chloroplasts in cytoplasmic inheritance. 10

(c) Define the term 'hybridization' and mention the condition under which hybridization is essential. Mention the objectives of hybridization and write on the different steps of hybridization procedure. 10

Or

Write explanatory notes on the following : 5×2=10

(i) Heterosis breeding

(ii) Concept of different types of selection

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