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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. Answer the following as directed :   1×7=7

   (a) If an individual of genotype AaBbCcDd is test crossed, how many different phenotypes appear in the progeny?

      (i) 8

      (ii) 16

      (iii) 32

      (iv) 48

               (Choose the correct answer)

(*Turn Over*)

(b) Which of the following is not a feature of quantitative trait?

   (i) Characters of degree

   (ii) Continuous variation

   (iii) Polygenic control

   (iv) Discontinuous variation

            (Choose the correct answer)

(c) In a double monosomic individual, the number of chromosomes can be written as

   (i) 2n–1–1

   (ii) 2n–2

   (iii) 2n+1

   (iv) 2n–1

            (Choose the correct answer)

(d) Hexaploid wheat is an

   (i) allopolyploid

   (ii) autopolyploid

   (iii) amphidiploid

   (iv) None of the above

            (Choose the correct asnwer)

(e) What is the short arm of the chromosome called?

(f) The effective degree of the genes of two sexes is made equal by a mechanism called _____.

            (Fill in the blank)

(g) NBPGR stands for _____.

            (Fill in the blank)

(3)

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

(a) Define codominance by citing one example.

(b) What is the difference between linkage and cytological map?

(c) How does chromosomal duplication play important role in evolution?

(d) Mention the points of difference between chromatin and chromosome.

3. Answer any *three* of the following questions :

5×3=15

(a) Write the procedure of backcross method and discuss the consequences of repeated backcrossing. 3+2=5

(b) Write a short note on Hardy-Weinberg equilibrium.

(c) What is hybrid vigour? Explain how it differs from inbreeding depression.

(d) Write briefly about inversions. Differentiate between pericentric and paracentric inversions.

(e) With the help of appropriate diagrams, briefly describe the Holliday model of genetic recombination.

(Turn Over)

4. Answer any *three* of the following questions :

10×3=30

(a) Describe briefly the multiple factor hypothesis of polygenic inheritance. Are quantitative inheritance obey Mendel's laws? Explain.   7+3=10

(b) Discuss in detail about different types of structural chromosomal aberrations with the help of appropriate diagram.

(c) "The law of independent assortment states that alleles for separate traits are passed independently of one another." Discuss the statement. Mention important reasons of Mendel's success in his experiment.   7+3=10

(d) What are the apparent exceptions of Mendel's two laws? Explain.

(e) Write explanatory notes on (any *two*) :

5×2=10

   (i) Distant hybridization

   (ii) Student's *t*-test

   (iii) Extra chromosomal inheritance

   (iv) Quarantine rules

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