

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2022
(Fourth Semester)

Branch – BOTANY

GENETICS AND GENETIC IMPROVEMENT OF CROPS

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (10 x 1 = 10)

- 1 The inheritance of fruit colour in *Cucurbita pepo* gives the ratio of
(i) 9:7 (ii) 12:3:1 (iii) 9:3:4 (iv) 13:3
- 2 The genotypic ratio of Mendel's monohybrid cross is
(i) 3:1 (ii) 1:2:1 (iii) 9:7 (iv) 9:3:4
- 3 Alleles of different genes on the same chromosome can occasionally be separated by a process called
(i) crossing over (ii) epistasis
(iii) pleiotropy (iv) continuous variation
- 4 Crossing over occurs during _____ of prophase –I of meiosis -I
(i) leptotene (ii) zygotene (iii) pachytene (iv) diplotene
- 5 The mutation in which the replacement of certain nitrogen base by another base is called
(i) deletion (ii) insertion (iii) substitution (iv) inversion
- 6 Genes for cytoplasmic male sterility in plants are generally located in
(i) mitochondrial genome (ii) cytosol
(iii) nuclear genome (iv) chloroplast genome
- 7 A _____ is a group of individuals obtained from a single self- fertilized homozygous plant.
(i) clone (ii) ecotype (iii) mutant (iv) pureline
- 8 The resistance of a crop towards different races of the pathogens is known as
(i) polygenic inheritance (ii) vertical resistance
(iii) horizontal resistance (iv) disease escape
- 9 The oldest method of sugarcane improvement is
(i) clonal selection (ii) hybridization
(iii) tissue culture (iv) mutation breeding
- 10 Improved dwarf wheat variety with higher percentage of lysine or protein is
(i) Kalyan (ii) Sonalika (iii) Lerma Rojo (iv) Sharbati Sonara

Cont...

SECTION - B (35 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 7 = 35)

- 11 a) State and explain the laws of Mendel.
(OR)
b) With suitable example explain supplementary genes.
- 12 a) Write an explanatory note on ploidy and their genetic implications.
(OR)
b) Comment on multiple alleles with reference to blood groups in human being.
- 13 a) Briefly describe the chromosomal mutations.
(OR)
b) Explain the plastid inheritance seen in *Mirabilis*.
- 14 a) Outline the advantages and disadvantages of mass selection.
(OR)
b) Describe the emasculation technique of plant breeding.
- 15 a) Explain the ploidy breeding with reference to wheat improvement.
(OR)
b) Enumerate the methods to breed for improved varieties of Cotton.

SECTION - C (30 Marks)

Answer any THREE Questions

ALL Questions Carry EQUAL Marks (3 x 10 = 30)

- 16 Elucidate the interaction of complementary genes with an example.
- 17 Write an elaborate note on the tetrad analysis in *Neurospora*.
- 18 Examine the cytoplasmic inheritance with reference to antibiotic resistance in *Chlamydomonas*.
- 19 Enumerate the steps involved in pure line selection.
- 20 Highlight the methods employed in breeding for Sugarcane improvement.

Z-Z-Z

END