PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Branch – BOTANY

PLANT GENETICS AND BREEDING

Time: Three Hours   Maximum: 75 Marks

SECTION-A (10 Marks)
Answer ALL questions
ALL questions carry EQUAL marks   (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Mendel observed that some characters did not assort independently. Later researchers found it to be due to _____. a. Crossing over b. Linkage c. Dominance d. Amitosis	K1	CO1
	2	Alleles that produce independent heterozygous condition are called _____ alleles. a. Supplementary b. Co-dominant c. Epistatic d. Complementary	K2	CO1
2	3	According to chromosome theory of linkage, genes located on the same chromosome are _____. a. Independently assorting b. Segregating c. Linked d. Recessive	K1	CO1
	4	The map of the chromosome which shows identifiable sites is called _____. a. Gene expression b. Genome sequencing c. Chromosome walking d. Genome map	K2	CO3
3	5	The polyploids are characterized by high concentration of _____. a. P^{+++}, Mn^{+++} and K^+ b. Ca^{++}, P^{+++} and K^+ c. Ca^{++}, Mn^{++} and K^+ d. Ca^{++}, Mg^{++} and K^+	K1	CO2
	6	A tandem duplication in the chromosome having genes as ABCD.EF will be _____. a. ABCBCD.EF b. ABCABD.EF c. ABCDBC.EF d. ABCD.BCEF	K2	CO3
4	7	The primary purpose of emasculation in plant hybridization is to _____. a. Remove the stigma b. Prevent self-pollination c. Enhance pollen viability d. Promote cross-pollination	K1	CO3
	8	_____ is the potential benefit of interspecific heterosis. a. Disease susceptibility b. Growth rate c. Stress resistance d. Trait loss	K2	CO4

5	9	25 individuals in a population are homozygous dominant, then the individuals that are expected to be homozygous recessive are ____. a. 100 b. 75 c. 50 d. 25	K1	CO3
	10	_____ is the key advantage of mutation breeding. a. Fast breeding b. New traits c. Genetic variability d. New varieties	K2	CO5

SECTION - B (35 Marks)
Answer ALL questions
ALL questions carry EQUAL Marks   (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Distinguish the significance of dihybrid cross in establishing the law of independent assortment.	K4	CO1
		(OR)		
	11.b.	Compare and contrast multiple allele and pseudo allele.		
2	12.a.	Explain the formulations regarding the chromosome theory of linkage.	K4	CO1
		(OR)		
	12.b.	Explore the characteristic features of cytoplasmic inheritance.		
3	13.a.	Summarize your understanding on chromosomal aberration.	K5	CO2
		(OR)		
	13.b.	Criticize the genetic basis of male sterility in corn.		
4	14.a.	Grade the various techniques involved in plant hybridization.	K5	CO4
		(OR)		
	14.b.	Evaluate the challenges associated with the direct transfer of plants from a controlled environment to natural condition.		
5	15.a.	Depict how Hardy-Weinberg equation is used to estimate allele and genotype frequencies in large, randomly mating population.	K6	CO3
		(OR)		
	15.b.	Compile the details you known on plant breeder rights and regulations for plant variety protection and farmer rights.		

SECTION -C (30 Marks)
Answer ANY THREE questions
ALL questions carry EQUAL Marks   (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Explore the mechanism of CRISPR in gene editing technology.	K4	CO2
2	17	Figure out the multiple factor hypothesis in the genetic basis of (i) kernel color in wheat and (ii) skin color in humans.	K4	CO2
3	18	Justify the importance and practical application of polyploidy in agriculture.	K5	CO4
4	19	Explain the relationship between hybrid vigour and inbreeding depression. Can you add a note on significance of hybrid vigour?	K5	CO3
5	20	Create a detailed plan for developing a cultivar of your choice.	K6	CO3, CO4