

**PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)**

**BSc DEGREE EXAMINATION MAY 2024
(Second Semester)**

Branch - **BIOTECHNOLOGY**

GENETICS

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	When alleles of two contrasting characters are present together, one of the character express and the other remains hidden. This is the _____. a) Law of purity of gametes b) Law of segregation c) Law of dominance d) Law of independent assortment	K1	CO1
	2	Genes for colour blindness in man are located on _____. a) X chromosome only b) Y chromosome only c) Either X or Y chromosome d) Bothe X and Y chromosome	K2	CO1
2	3	Which of the histones below binds to linker DNA? a) H1 b) H3 c) H2A d) H2B	K1	CO2
	4	Chromosome component in the person affected from Klinefelter syndrome will be _____. a) 44 + XX b) 44 + XXY c) 44 + XY d) 44 + XO	K2	CO2
3	5	Where are the genes for cytoplasmic male sterility in plants located? a) Chloroplast genome b) Cytosome c) Mitochondrial genome d) None of these	K1	CO3
	6	Which one of the following is the genetic basis of heterosis? a) Hybridization b) Dominance theory c) Mutation d) Duplication	K2	CO3
4	7	Which of the following is a type of autosomal recessive genetic disorder? a) Haemophilia b) Skeletal dysplasia c) Sickle cell anaemia d) colour blindness	K1	CO4
	8	Which one of the following is the most common disease of amino acids metabolism? a) Honocyteinuria b) Albinism c) Phenylketonuria d) Maple syrup urine disease	K2	CO4
5	9	Which option correstly represents Hardy Weinberg Equation? a) $p^2 + q^2 = 1$ b) $p^2 + q^2 = 1$ c) $p^2 + q^2 = 0$ d) $p^2 + 2pq + q^2 = 1$	K1	CO5
	10	Genetic drift is _____. a) Random changes in gene frequency in a population b) Generational fluctuations in gene frequencies that produce no effect c) Change due to interbreeding with other species populations d) The effect of mutation as they spread through neighboring populations	K2	CO5

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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.	What is co-dominance? Explain with reference to human blood group system.	K2	CO1
		(OR)		
	11.b.	How is sex determined in humans? Discuss.		
2	12.a.	Outline the role of histone modification in the control of gene expression in eukaryotes.	K3	CO2
		(OR)		
	12.b.	Explain the causes and types of retinoblastoma.		
3	13.a.	Analyze the role of organellar genes in plant adaptation.	K4	CO3
		(OR)		
	13.b.	Describe the phenotypic consequences of aneuploidy in plants.		
4	14.a.	Analyze the autosomal recessive inheritance with an example of Sickle cell anaemia.	K4	CO4
		(OR)		
	14.b.	Examine the multifactorial inheritance with reference to congenital malformations.		
5	15.a.	Explain about gene flow between populations.	K3	CO5
		(OR)		
	15.b.	Differentiate between assortative and disassortative mating.		

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	Explain suitable example about Mendel's law of independent assortment.	K4	CO1
2	17	Illustrate the different types of structural aberrations of chromosomes with suitable examples.	K4	CO2
3	18	Explain the mechanism of polyploidy and add a note on its advantages and disadvantages.	K4	CO3
4	19	Analyze the types of inborn errors of metabolism.	K4	CO4
5	20	Analyze the assumption and principle of Hardy-Weinberg equilibrium.	K4	CO5