

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2026
(Third Semester)

Branch - ZOOLOGY

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	Which of the following statements illustrates the Law of Dominance? a) Alleles of a gene segregate during gamete formation. b) Some alleles mask the expression of others in the F ₁ generation. c) Alleles of different genes assort independently. d) Genes on the same chromosome are inherited together.	K1	CO1
	2	In <i>Mirabilis jalapa</i> flowers, red (RR) × white (rr) produces all pink (Rr) offspring. If two pink flowers (Rr) are crossed, what is the expected ratio of flower colors in the next generation? a) 1 red : 2 pink : 1 white b) 3 red : 1 white c) 2 red : 1 pink : 1 white d) 1 red : 1 pink : 2 white	K2	CO2
2	3	How many alleles control the ABO blood group in humans? a) Two b) Three c) Four d) Five	K1	CO1
	4	Continuous variation in traits such as human skin colour is mainly due to a) Co-dominance b) Incomplete dominance c) Polygenic inheritance d) Lethal alleles	K2	CO2
3	5	Sex in humans is determined by a) Ratio of autosomes to sex chromosomes b) Temperature during fertilization c) Presence of Y chromosome carrying SRY gene d) Hormonal balance in mother	K1	CO1
	6	In a pedigree, a trait transmitted from mother to all offspring, but never from father to child, most likely shows a) Autosomal recessive inheritance b) Y-linked inheritance c) Cytoplasmic (mitochondrial) inheritance d) X-linked dominant inheritance	K2	CO2
4	7	The karyotype of a female with Turner's syndrome is a) 46, XX b) 47, XXY c) 45, X d) 46, XY	K1	CO1
	8	A Barr body represents a) An active Y chromosome in male cells b) A condensed, inactivated X chromosome in female somatic cells c) Mitochondrial DNA d) Autosomal heterochromatin	K2	CO2
5	9	Sickle-cell anemia results from a) Deletion of β-globin gene b) Substitution of valine for glutamic acid in β-globin c) Duplication of α-globin gene d) Trisomy 21	K1	CO1
	10	Continuous variation in traits like human skin colour or height is mainly due to: a) Co-dominance b) Polygenic inheritance c) Sex-linked inheritance d) Lethal alleles	K2	CO2

Cont...

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.	Differentiate between Incomplete dominance and Co-dominance with examples.	K3	CO2
		(OR)		
	11.b.	Apply Mendel's Law of Independent Assortment to explain dihybrid cross results		
2	12.a.	Distinguish between supplementary and duplicate genes with examples.	K3	CO2
		(OR)		
	12.b.	Discuss the role of polygenic inheritance in determining human height.		
3	13.a.	With an example, discuss sex-linked inheritance in man.	K3	CO3/CO4
		(OR)		
	13.b.	Write a short note on extra-chromosomal inheritance with one case study		
4	14.a.	Explain the causes and symptoms of Down's syndrome	K3	CO4
		(OR)		
	14.b.	Write a note on the significance of Barr bodies in genetics and medicine		
5	15.a.	Compare inbreeding and outbreeding with advantages and disadvantages.	K3	CO5
		(OR)		
	15.b.	State the assumptions of the Hardy-Weinberg law.		

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	Evaluate the importance of population genetics in understanding variation and evolution.	K5	CO5
2	17	Analyze the genetic basis of epistasis giving at least one classical examples.	K4	CO2
3	18	Interpret the principles of pedigree analysis and explain how it helps identify genetic disorders.	K4	CO3
4	19	Evaluate the role of Barr body analysis in detecting abnormalities of sex chromosomes.	K5	CO4
5	20	Analyse the pathophysiology, inheritance and public-health importance of sickle-cell anaemia.	K4	CO4

Z-Z-Z

END