



Department of Genetic Engineering and Biotechnology
Faculty of Health and Life Sciences
B. Sc. (Hons.) in Genetic Engineering and Biotechnology
Final Examination Summer 2026

Course Code: 0512-1201

Level and Term: L1, T2

Time: 2 Hours

Section: 261-A

Course Title: Principles of Genetics

Course Teacher Initials: AR

Total Marks: 40

Answer the Following Questions:

			Marks
1	(a) What is chromosomal sex determination? Explain chromosomal sex determination in different organisms with suitable examples.	[CLO1, PLO1, C5]	4.0
	(b) In humans, the presence of the Y chromosome initiates a series of developmental events leading to male differentiation. Analyze how sex determination occurs in humans.	[CLO1, PLO1, C4]	4.0
2	(a) What is mutation? Identify the different types of gene mutations with suitable examples, considering a single nucleotide change that could alter gene function.	[CLO5, PLO2, C3]	4.5
	(b) Gene mutations may cause genetic disorders but can also contribute to genetic variation. Discuss the significance of gene mutations in humans.	[CLO5, PLO1, C6]	3.5
3	(a) What are mutagens? Explain how radiation can cause DNA damage when a cell is exposed to harmful radiation.	[CLO5, PLO1, C2]	4.0
	(b) What is a chemical mutagen? Elaborate on the major types of chemical mutagens and explain how they can alter DNA, with suitable examples.	[CLO5, PLO2, C6]	4.0
4	(a) What is extrachromosomal inheritance? Classify it with suitable examples, considering genetic traits that are inherited independently of nuclear chromosomes.	[CLO6, PLO1, C2]	4.0
	(b) What is a plasmid? Outline how a bacterium carrying an antibiotic-resistance plasmid can transfer this extranuclear DNA to another bacterial cell.	[CLO6, PLO2, C2]	4.0
5	(a) What is cpDNA? Explain how maternal inheritance occurs in plants like <i>Mirabilis jalapa</i> , where leaf colour can be inherited through the cytoplasm.	[CLO6, PLO2, C1]	4.0
	(b) What are the major features of mtDNA? Analyze how mitochondrial genes can affect male fertility in plants.	[CLO6, PLO2, C4]	4.0