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Daffodil International University

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 *Mirabilis jalapa*, 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