United International **University**

School of Science and Engineering

Mid-term Examination; Year 2023; Trimester: Summer
Course: BIO 3105; Title: Biology for Engineers; Sec: A-C
Full Marks: 30; Time: 1 hr 45 mins

*There are Five Questions, **1, 2, and 3 are mandatory** to answer, and answer **4 or 5** (anyone).*

1.	(a) Why animal cell membrane is flexible?	1	CO1
	(b) Mention the characteristics of genetic code.	2	CO1
	(c) Differentiate between Prokaryotic and Eukaryotic cell.	2	CO1
	(d) Name the nitrogenous base of DNA and RNA.	2	CO1
2.	(a) Apply your input as a computer science engineer in tissue engineering? Design a probable project in that area with a few words.	3	CO2
	(b) The dominant gene for eyes creates a black eye, while a recessive gene creates ash one. If you see 75% of the second-generation children have black eye, determine the phenotype and genotype.	2	CO2
	(c) Predict the reasons for chromosomal anomalies. Give some examples for numerical chromosomal anomalies.	3	CO2
3.	(a) Design the Anaphase of Mitosis and Meiosis I in cell division with mentioning the difference.	3	CO3
	(b) Protein, phospholipid and cholesterol are an integral part of cell membrane. Would you implement the ways of transport of the nutrients across cell membranes.	3	CO3
	(c) Calculate the length of DNA double helix in a typical mammalian cell; taken the distance between two consecutive base pairs as 0.34 nm (0.34×10^{-9} m) and the total number of bp 6.6×10^{9}m.	2	CO3
4.	(a) Give logical explanation how structural changes effects the ecosystem?	3	CO4
	(b) Cell structure: Clarify that Golgi Bodies acts as Packaging centres.	4	CO4
5.	(a) Justify DNA is a stable genetic material in comparison to RNA.	3	CO4
	(b) Explain the importance of check points.	4	CO4

CO1: Describe different biological quantities.
CO2: Apply the knowledge of biological systems in a real-life problem.
CO3: Design several biological systems with constraints.
CO4: Explain several procedures for solving biological systems within constraints.