United International University

School of Science and Engineering

Final Examination; Year 2025; Trimester: Spring
Course: BIO 3105/3107; Title: Biology for Engineers/Biology;
Sec: All
Full Marks: 40; Time: 2 hours

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

1.	a. How can you produce insulin in *E.coli* bacteria using recombinant DNA technology?	4	CO4
	b. Discuss the correlation between memory cells and secondary immune response.	2	CO1
	c. "Our diet influences our mental health" – Justify the statement.	2	CO3
	d. Immune system becomes underactive in some people. Interpret the reasons behind underactivity.	2	CO2
2.	a. Polymerase chain reactions amplify DNA fragments into million copies. Illustrate the workflow.	4	CO3
	b. "Healthy diets can prevent NCDs"- do you agree? Comment on the statement.	2	CO2
	c. The recurrence of SARS-COV2 infections is becoming a major threat. Describe how vaccination can prevent ~~this infection?~~	4	CO4
3.	a. What do you understand by innate and adaptive immunity? Compare and contrast.	4	CO4
	b. How can gene therapy be used to treat genetic disorders?	2	CO2
	c. Explain the concept of balanced diet with diagram.	2	CO1
	d. "Restriction enzyme makes a cut in specific sequence of DNA" – explain the mechanism.	2	CO1
4.	a. Gel electrophoresis separates DNA according to its' size. Summarize the technique.	5	CO4
	b. What is meant by the food pyramid? Explain how your calorie consumption fits within the dietary pyramid.	5	CO3
5.	a. Assume an individual weighs 85 kg and has a height of 160 cm. Calculate their Body Mass Index (BMI) and interpret the result. Based on this, what dietary recommendations would you suggest for the individual.	5	CO2
	b. "Agricultural application of Biotechnology has a huge prospect in Bangladesh" – give your opinion on this aspect.	5	CO1

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