United International University

School of Science and Engineering

Final Examination; Year 2022; Trimester: Fall

Course: BIO 3105; Title: Biology for Engineers; Sec: A-C

Full Marks: 40; Time: 2 hrs

---

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

1.	(a)	Describe/ State the steps of rDNA technology.	2	CO1
	(b)	What is the importance of transgenic animals.	2	CO1
	(c)	What is the importance of BMI?	2	CO1
	(d)	Differentiate between food chain and food web.	2	CO1
	(e)	Describe the types of the vaccines used against COVID-19.	2	CO1
2.	(a)	Suppose you have a restriction enzyme that has a recognition sequence GCCG. How you would complete the rDNA for a given sequence of one strand as below show in a pictorial view (You need to complete the DNA with a complementary strand before starting the process). ATAGATTAGCCGTATTATGCAATGCATTAGCCGAGC	4	CO2
	(b)	Our environment is comprising of land, river, ocean, and many more. From your knowledge on the ecosystems differentiate these in a systematic way.	3	CO2
	(c)	Suppose a severe pathogen invaded our body. Justify how your defense mechanisms would work in this case.	3	CO2
3.	(a)	Early diagnosis is very important to treat severe diseases, do you have any idea how biotechnology can help us in such processes? Briefly discuss this process.	3	CO3
	(b)	What should be the change in energy flow for a typical ecosystem where there are 3 levels of consumers and only one producer? Show with the help of energy-time graph.	3	CO3
	(c)	Do you think we need a change in diet for a 95 kg 130 cm pregnant woman? Give reasons and possible changes you want to recommend in diet. This person has gestational diabetes (diabetes in pregnancy period).	4	CO3
4.	(a)	Do you think we need a protocol to monitor biopiracy? Explain some basic points that you think we should include in the protocol.	5	CO4
	(b)	Give the equations for chemosynthesis and photosynthesis. Which one of these two do you think vital for ecosystems on earth? Explain the reasons in brief.	5	CO4
5.	(a)	Explain the relationship between food and mental stress. Please comment on the steps we should take regarding this matter.	5	CO4
	(b)	Discuss the significances of having both positive and negative feedback in our homeostasis control. Explain how insulin to restore homeostatic control in the blood sugar.	5	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.