



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). 4 CO2
ATAGATTAGCCGTATTATGCAATGCATTAGCCGAGC
(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