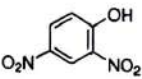




**United International University**  
**School of Science and Engineering**  
Mid-term Examination; Year 2022; Trimester: Spring  
Course: BIO 3105; Title: Biology for Engineers; Sec: A-C  
Full Marks: 30; Time: 1 hr 45 mins

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

1. (a) For a reversible denaturation sketch an irreversible denatured quaternary protein. 1 CO1  
(b) Sketch a diagram showing  $\text{MgCl}_2$  dissolve inside water. 2 CO1  
(c) Sketch Lewis diagram for  $\text{C}_2\text{H}_5\text{COOH}$  and . 3 CO1  
(d) What are the names of the fields in modern biology where you can apply machine learning? 1 CO1  
(e) What are the possible combinations of genetic code where only Thymine is fixed in the second place of the codon? 1 CO1
2. (a) Do you think there is a correlation between mother's age and down syndrome? Give details in a sample diagram. 2 CO3  
(b) Suppose you are visiting Jasper in a Canadian summer. Greasley bear approached your tent when you were camping. How do you think you would respond to the sound of it? Explain using a feature of life. 2.5 CO3  
(c) Which organelle works in your immune system? List its functions. 2.5 CO3
3. (a) Do you think RNA could be your genetic material? Give logic behind your answer. 2.5 CO3  
(b) The brown eye form of the eye color gene (or allele) is dominant, whereas the blue eye allele is recessive. If you see 75% of the second generation children have brown eyes, what were the traits of the actual parents (2 generations before)? 2.5 CO3  
(c) How do you think a DNA of some meters can be fitted inside a cell of nm scale? 2 CO3
4. (a) Give logical explanation on how a degraded ecosystem affects the ecosystem core? 4 CO2  
(b) Give details on how your body structure resembles with your grandfather. Please use the understanding from DNA and/or RNA structure. 4 CO2
5. (a) Give a pictorial view of differences and similarities of Metaphase and Metaphase I. As Kangaroo is diploid dominant, sketch its life cycle showing that dominant factor. 4 CO2  
(b) Explain the possible cause of cancer using a diagram. What could be the apparent reasons behind cancer? 4 CO2

CO1: Define/Justify/Sketch different biological quantities with examples.

CO2: Explain/Show/Discuss the various biological systems.

CO3: Apply the knowledge of biological systems in a real-life problem.