BB101 Tutorial Quiz -1

1. **Bacteria can be human pathogens and cause widespread disease (e.g., TB, lung infections, hospital-acquired infections, etc.) and are treated by drugs.**
   Multi-drug resistance in these bacteria is a huge problem. What is an alternative therapy used to combat emerging drug resistance?

2. **In class, we learned that genomes are made of double stranded DNA. Are there other types of genetic material present in organisms? If yes, write the names of these organisms.**

3. **Bacteriophage are viruses that can infect bacteria. Based on your discussions in the tutorial, describe if bacteriophages can be considered alive.**

4. **Based on the percentage of each nitrogenous base given, predict the genome of the given virus. Explain your answer.**
   - **Virus 1: A: 35%, U: 35%, G: 15%, C: 15%**

5. **The virus from question 4 was found to be beneficial in treating bacterial infections in humans. You decide to sequence its genome. Considering the virus genome has 14000 base pairs, calculate the space needed to store this genetic information in bytes. (2 bits for one base, 8 bits= 1 byte)**

BB101 Tutorial Quiz -1 (Model Answers)

6. **Bacteria can be human pathogens and cause widespread disease (e.g., TB, lung infections, hospital-acquired infections, etc.) and are treated by drugs.**
    Multi-drug resistance in these bacteria is a huge problem. What is an alternative therapy used to combat emerging drug resistance?

    Phage therapy using viruses that infect infectious bacteria. (Phage/bacteriophage/virus /viral therapy is right)

7. **In class, we learned that genomes are made of double stranded DNA. Are there other types of genetic material present in organisms? If yes, write the names of these organisms.**
    Yes, viruses

8. **Bacteriophage are viruses that can infect bacteria. Based on your discussions in the tutorial, describe if bacteriophages can be considered alive.**

    There are different characteristics which describe life like order, reproduction, stimuli response, etc. While bacteriophage is capable of many of these aspects it lacks many features as well. They lack the ability to process energy, regulation and growth. It is therefore unclear if viruses are alive or inanimate. (Alive or not alive if they can defend their answer)

9. **Based on the percentage of each nitrogenous base given, predict the genome of the given virus. Explain your answer.**
    - **Virus 1: A: 35%, U: 35%, G: 15%, C: 15%**

    Since the nitrogenous bases in this given virus is AUGC, it must be an RNA virus. Nitrogenous base 'A' always pairs with 'U' in RNA and 'G' pairs with 'C'. Since the percentage of A =U and C=G, it must be a dsRNA virus. (Explanation is a MUST)

10. **The virus from question 4 was found to be beneficial in treating bacterial infections in humans. You decide to sequence its genome. Considering the virus genome has 14000 base pairs, calculate the space needed to store this genetic information in bytes. (2 bits for one base, 8 bits= 1 byte)**

    For virus # 1, the number of base pairs = 14000. Information carrying units (since it is a dsRNA virus is x 2) = 14000x2 = 28000.
    28,000 bases would take 28000x 2bits, which is equal to 56,000 bits.
    56000bits /8 = 7000 bytes or 7 kilobytes.
    (Calculation MUST be shown)