**Assignment – I**

**Deadline: 17th Aug’20**

1. What does our microbiome do?
2. Why does DNA form a helical structure and not a simple ladder of matching bases on the two strands?
3. What is the role of Sugar and Phosphate in DNA molecule?
4. Briefly explain the similarities between transcription and DNA replication.
5. Contrast transcription and translation. Name at least three differences between the two processes.
6. (i) Referring to the genetic code (the codon usage table), what would be the amino acid sequence of the polypeptide encoded by the following mRNA sequence?

5’ AUGGUGGCCUAUCAUUAGGGGCUU 3’

(ii) What would be the effect on translation of the above sequence of a single base (point) mutation which gave rise to an A instead of a U at the twelfth base?

(iii) What would be the effect on translation of the sequence in(i) above , if an extra C were inserted between the third and fourth bases, i.e , between the two Gs at position 3 and 4 ?

1. Find out if BamHI is a good restriction endonuclease for cutting the SARS-COV-2 genome? Give reasons.
2. Construct a restriction map of a linear fragment of DNA, using the following data. Your map should indicate the relative positions of the restriction sites along with distances from the ends of the molecule to the restriction sites and between restriction sites:   
   Draw your answer on paper and upload.

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| **DNA** | **Sizes of Fragments (bp)** |
| uncut DNA | * 10,000 |
| DNA cut with EcoRI | * 8000, 2000 |
| DNA cut with BamHI | * 5000, 5000 |
| DNA cut with EcoRI + BamHI | * 5000, 3000, 2000 |
|  |  |

1. Your cloning vector has restriction recognition sites for two restriction endonucleases, EcorI and BamHI. However, the DNA to be manipulated does not have recognition sites for these two restriction endonucleases. How would you construct a recombinant DNA for the given DNA?