**Problem Set-1**

1. Which one is the largest component of DNA among the following:
2. Nucleoside b. Purine base
3. **Nucleotide** d. Pentose sugar
4. State TRUE or FALSE for the following statements:

A. One complete turn of a DNA double-helix measures 3.6 nm - **True**

B. DNA is a double stranded right handed helix - **True**

C. DNA is less stable than RNA and protein - **False**

D. DNA is negatively charged - **True**

1. In DNA double helix, the two DNA chains are held together by
2. covalent bonds between the pair of bases
3. **hydrogen bonds between the pair of bases**
4. ionic bonds between the pair of bases
5. none of the above
6. In the study of one experiment, it was found that the value of Tm for DNA is = 60° C. If that DNA sample has 30% GC at the above Tm, then what will be the value of ' Tm' if the GC% increases to 50%?
7. **Increases** b. Decreases c. Remains same d. Can’t be predicted
8. If one DNA sample has 40% AT content, what will be the percentage of Guanine residue in that DNA sample?

**Ans: 60%**

1. The sequence of one strand of DNA is 5’ TCGATCCA 3’. What will be the sequence of the complementary strand (Please include the direction of the strand)

**3’ AGCTAGGT 5’**

1. RNA is chemically less stable than DNA, because of

(A) the uracil base instead of the thymine (B) the presence of the 2’-OH group

(C) the extra carbon atom (D) all of the above

1. In Griffith's experiment **DNA** from smooth strain bacteria caused rough strain bacteria to be transformed.

1. State TRUE OR FALSE for the following statements regarding Griffith’s experiments (S=smooth, R=rough):
2. S strain bacteria killed the mice - **True**
3. R strain bacteria killed the mice - **False**
4. heat-killed S strain bacteria killed the mice - **False**
5. a mixture of heat-killed S strain bacteria and live R strain bacteria killed the mice - **True**

10. Suppose we assign numerical values to each nucleotide base as follows:

(A) A: 0; (B) T: 1; (C) G: 2; (D) C: 3

In that case, the DNA sequence 5’-TATA-3’ will have a numerical value of 68 (in base 10).

(i) Convert the following DNA sequences to their numerical values:

5’-TCCGAC-3’

**Ans: 2019**

(ii) Convert the following binary code to a DNA sequence:

10000101001100

**Ans: GATTACA**