Exercise 1

1. By convention, the sequence of a single-stranded DNA molecule is written in the 5' (left) 3' (right) direction.

- ✓ What are the chemical groups corresponding to these ends?
- ✓ A DNA sample contains 30.5 % mol of adenine. What are the percentages of thymine, guanine and cytosine?

2. Consider the following DNA fragment:

5'….CTTCA…3'

3'….GAAGT…5'

- ✓ What bonds stabilize this structure?
- ✓ How can this molecule be denatured?

Exercise: 2

1. Consider the single-stranded DNA:

5'-TACGCCTAGCTTACGCAT-3'

- ✓ How many phosphodiester bonds are there in the double strand?
- ✓ How many hydrogen bonds are there in the double strand?

2. Theoretically, if we count the nucleotides in this DNA strand, which assertion is correct?

a) A = C,

b) A+G = C+T ,

c) A+T = G+T ,

d) A = 2C,

e) A = 2T

3. Which bases are likely to pair in the following single-stranded RNA :

5'-AUGGAACGCCUUUACGUUC-3'

4. How many hydrogen bonds are there in the folded strand?

Exercise 3:

1. The following bi-catenary fragment of this DNA is shown below

5' - ATTCAGCATCGAATGCGCTGGCTC - 3'

3' - TAAGTCGTAGCTTACGCGACCGAG – 5'

Account for :

a) The number of phosphodiester bonds in this fragment.
b) The number of N-glycosidic bonds in this fragment.
c) The number of hydrogen bonds in this fragment.

2. After sequencing another strand of this double-stranded DNA, a researcher found that it was composed of 40% guanine.

a) Calculate the ratio: A+T/ G+C
b) The same researcher sequences another double-stranded DNA strand and finds that the A+T/ G+C ratio of this strand is 2.25. Which DNA strand will be more easily denatured, this last strand or the one from the previous question? Justify your answer.

Exercise 4:

Quantitative analysis of the bases making up certain viruses and phages. The results are shown in thetable below. What can we deduce about the structure of their nucleic acid?

Virus/phage	**A**	**T**	**C**	**G**
M13	23,3	35,8	21,1	19,8
T4	20,1	20,0	30,0	30,1
EBV	40,1	39,9	19,2	19,1