Conference 1 practice problems - Solutions

From the textbook (this is a problem on basic DNA composition)

Ch7: #21 (answers in back)

Follow-up question (not in the book):

What percentage of this DNA molecule is pyrimidines?

Problem on DNA replication (not in the book):

Below is a very small segment of the human genome:

5′ CTGAATCGGGTTGGG 3′

3′ GACTTAGCCCAACCC 5′

In order for the top DNA strand to be replicated, what primer sequence is needed? (write 6 nucleotides)

In order for the bottom DNA strand to be replicated, what primer sequence is needed? (write 6 nucleotides)

For a replication fork moving to the RIGHT of this page, which strand would be the leading strand, and which would be lagging?

For a replication fork moving to the LEFT of this page, which strand would be the leading strand, and which would be lagging?

Two follow-up questions:

a) What is the first protein at the replication fork, and what is its function?

b) By itself, DNA polymerase III can only synthesize a few nucleotides before it dissociates from (falls off) the strand. Yet in reality DNA pol III can synthesize a thousand nucleotides a second! Which protein of the replisome allows DNA pol III to remain on the DNA?

Problems on transcription:

Ch 8, #14 and 17

In Chapter 9, the following are helpful problems: #13, 39, 41 and 43.

In chapter 16, the following problems are good #8, 9, 10 and 31.

Solutions to problems that are not in the book can be found on the solutions page on myWPI!