Problem Set 26: Replication, Transcription and Translation

1. What is the name for the process in which a single strand of RNA is synthesized from DNA?

2. What is the name for the process in which the entire genetic code is read and copied into two new DNA double helices?

3. What bases are paired in DNA?

4. What base is found in RNA, but not in DNA?

5. What functional group is free on the 3' side of a polynucleotide, and what functional group is free on the 5' side?

6. In the following problems, information from the DNA informational strand, DNA template strand, and/or mRNA strand is provided. Fill in the missing information as it corresponds to the given information. Include 3' and 5' or N- and C- to show orientation of polynucleotides and proteins.

a. DNA info strand: 5' ATG CCA GTA GGG ACA TTA CCC GAG 3'

DNA template strand: _____

b. DNA info strand: _____

DNA template strand: 3' GTC AAA GTC ATA ACC TCG CCC GGG 5'

c. DNA info strand: 5' ATG CCA GTA GGG ACA TTA CCC GAG 3'

DNA template strand: _____

mRNA strand: _____

protein structure: _____

d. DNA info strand: _____

DNA template strand: _____

mRNA strand: 5' AUG UUU UAU ACG AUC ACC AGU UAA 3'

protein structure: _____

7. Vasopressin, also known as antidiuretic hormone (ADH), is a hormone secreted in response to increased blood osmolarity (a shortage of water). Release of this hormone triggers the kidneys to decrease water output in urine. With only 9 amino acids in its structure, Vasopressin is among the human bodies smallest polypeptides. Given the genetic information shown below, determine the primary sequence of vasopressin. Again, include N- and C- on the polypeptide to show orientation.

DNA info strand: 5' TGT TAC TTT CAA AAT TGC CCT CGT GGG 3'