Bonus Quiz Chemistry 102

1. Do the following
2. Create a nucleotide below using the pieces given write the structure at biological pH. The base is cytosine

 

1. Name the nucleotide \_\_\_\_\_\_\_\_Deoxycytidine monophosphate\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Using any two nucleotides to construct a dinucleotide at biological pH



1. How do DNA and RNA differ (give 3 examples)

(1) The sugar in RNA is ribose instead of deoxyribose.

(2) RNA is generally single-stranded and not double-stranded.

(3) RNA contains uracil in place of thymine

1. What are the three types of RNA and what are their functions?

mRNA- messenger RNA, contains codons that code for amino acids

tRNA – transfer RNA, brings amino acid to ribosome during translation; has anti-codons that are complementary to mRNA codons

rRNA – ribosomal RNA, combine with proteins to make ribosomes

1. What are introns and exons? How does introns influence protein synthesis?

Introns- sequences of mRNA that do not contain the code for protein

Exons- sequences of mRNA that contain the code for protein

1. What is mRNA splicing and when does it occur?

Introns are removed and exons are spliced together; occurs in the nucleus after transcription takes place

1. Give a detailed explanation of translation. Discuss what happens during initiation, elongation, and termination. Be sure to include ALL molecules that play an important role in this process.

Initiation – small and large ribosomal subunits, mRNA, and the first tRNA carrying the amino acid methionine all come together to form a complex

Elongation – codons are read and tRNAs bring the correct amino acids in the order laid out by the codons. A polypeptide chain is built by peptide bonds forming between amino acids.

Termination – a stop codon is reached on the mRNA and the polypeptide chain breaks away

1. Write the sequence of mRNA that would result from the transcription of the following section of DNA. Write your answer on the blank. Then referring mRNA codons write down the correct amino acid sequence in the polypeptide chain (you can write first 3 letters/abbreviations of amino acids)

DNA strand - TACATAACGGCTATC

mRNA strand - AUG/UAU/UGC/CGA/UAG

Amino acid sequence - Met-Tyr-Cys-Arg-stop.

1. What is a frame shift mutation and explain why a frame shift mutation at the beginning of a gene sequence is more damaging than one at the end of a sequence.

*Frameshift mutation*: reading frame shifted by insertion or deletion mutation

FRAMESHIFTS CHANGE EVERYTHING AFTER THE SHIFT; SO A SHIFT AT THE BEGINNING CHANGES MORE OF THE CODE

