

Name: \_\_\_\_\_

TA: \_\_\_\_\_

## Question 2 (30 points)

### a) Transcription

i. is the process that transfers information from \_\_\_\_\_ to \_\_\_\_\_.

ii. in eukaryotic organisms, transcription occurs in the

Nucleus

Ribosome

Membrane

### b) Translation

i. is the process that transfers information from \_\_\_\_\_ to \_\_\_\_\_.

ii. in eukaryotic organisms, translation occurs in the

Nucleus

Ribosome

Membrane

The following sequence of DNA encodes a hypothetical polypeptide called Playdo in a hypothetical bacteria *E. hypotheticalus*. Transcription starts at and includes the C/G base pair in bold. The underlined T/A base pair indicates the terminator.

5' - TT**CCC**CTATGGATGGTCATCTACGATGCCCCATCACTAAAGCTTG - 3'  
3' - AAGGGGATACCTACCAGTAGATGCTACGGGGGTAGTGATTTCGAAC - 5'

c) What are the first 6 bases of the transcribed RNA? Be sure to label the 5' and 3' ends.

d) What are the first 3 amino acids of the subsequent polypeptide? Be sure to label the N- and C- termini.

e) How many total amino acids are encoded in this polypeptide?

~~You identify a strain of bacteria containing a mutant tRNA that is capable of adding a tryptophan residue when it recognizes the codon UAG in the mRNA.~~

~~f) What is the sequence of the anticodon of the mutant tRNA? Be sure to label the 5' and 3' ends.~~

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TA: \_\_\_\_\_

## Question 2 (30 points)

### a) Transcription

i. is the process that transfers information from DNA to RNA.

ii. in eukaryotic organisms, transcription occurs in the

Nucleus                      Ribosome                      Membrane

### b) Translation

i. is the process that transfers information from RNA to protein.

ii. in eukaryotic organisms, translation occurs in the

Nucleus                      Ribosome                      Membrane

The following sequence of DNA encodes a hypothetical polypeptide called Playdo in a hypothetical bacteria *E. hypotheticus*. Transcription starts at and includes the C/G base pair in bold. The underlined T/A base pair indicates the terminator.

5' - TT**CCCCTATGGATGGTCATCTACGATGCCCCATCACTAAAGCTT**G - 3'  
3' - AA**GGG**GATACCTACCAGTAGATGCTACGGGGGTAGTGATTT**CGA**AC - 5'

c) What are the first 6 bases of the transcribed RNA? Be sure to label the 5' and 3' ends.

5'-CCCCUA-3'

d) What are the first 3 amino acids of the subsequent polypeptide? Be sure to label the N- and C- termini.

N-Met-Asp-Gly-C

e) How many total amino acids are encoded in this polypeptide?

The gene encodes 10 amino acids. The 11<sup>th</sup> in-frame codon is the stop codon UAA.

~~You identify a strain of bacteria containing a mutant tRNA that is capable of adding a tryptophan residue when it recognizes the codon UAG in the mRNA.~~

~~f) What is the sequence of the anticodon of the mutant tRNA? Be sure to label the 5' and 3' ends.~~

~~3' AUC 5' or 5' CUA 3'~~