Problem Set #4

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Biochemistry

Question 1:
Name the 3 general processes of the central dogma and provide the name of the enzyme that is performing the respective function. Bonus: do the same for the 2 special processes.

Answer:

Question 2:
In which direction does DNA polymerase elongate and proofread? Explain the terms processivity and synthesis rate and provide a number for these processes.

Answer:

Question 3:
What are Okazaki fragments, where do they occur and why do they exist? How are Okazaki fragments resolved?

Answer:

Question 4:
What separates the two strands of the parental DNA to be replicated?

Answer:

Question 5:
Estimate the DNA synthesis rate based on E. coli with a doubling time of 20 minutes.

Answer:

Question 6:
What are the major steps in transcription?

Answer:

Question 7:
Does RNA polymerase require a primer for transcription?

Answer:

Question 8:
What is the function of E. coli sigma factors?

Answer:

Question 9:
What are the two types of transcriptional termination?

Answer:

Question 10:
What are the 3 sites in the ribosome that a tRNA transitions through? Name the sites and provide a brief description of the process taking place in each site.

Answer:

Question 11:
What is the function of elongation factor TU (EF-TU)?

Answer:

Question 12:
Are stop codons recognized by a specific tRNA or a protein?

Answer:

Question 13:
What are the two main ways in which mutations can arise?

Answer:

Question 14:
Do all single nucleotide mutations result in a change in amino acid?

Answer:

Question 15:
Translate the following DNA sequence into a peptide.

5' AGGGCATGGCTCTCAAGGTGGACTTCGGATAAGCATCA 3'

Answer: