BIO319 Fall 2021 Exam 2

Name:

Instructions: Each of the 20 questions on this exam is worth 5 points. Questions that may have multiple answers are indicated by the phrase "**Choose all that are correct.**" This exam is "open book and open notes" and you may use a calculator. However, you must complete the exam on your own. Giving or receiving help on the exam is a form of cheating and is in violation of UB's Academic Integrity Policy. Anyone found to be involved in offering or receiving help on the exam, in any form, will receive an automatic "F" in the course.

1. The sequence of one strand of DNA is 5'-ATGGCCAGA-3'. What is the sequence of the complementary strand?

a) 5'-ATGGCCAGA-3'

b) 5'-TCTGGCCAT-3'

c) 5'-AGACCGGTA-3'

d) 5'-TACCGGTCT-3'

2. A sample of double-stranded DNA has 24% thymidine. Which of the following statements are correct? **Choose all that are correct.**

a) 76% of the sample is expected to be adenosine.

b) 26% of the sample is expected to be guanosine.

c) 24% of the sample is expected to be adenosine.

d) 52% of the sample is expected to be guanosine.

e) 24% of the sample is expected to be cytidine.

3. Which of the following enzymatic reactions can DNA polymerase III perform? **Choose all that are correct.**

a) 3' to 5' DNA polymerase

b) 5' to 3' DNA polymerase

c) 3' to 5' exonuclease

d) 5' to 3' exonuclease

e) 3' to 5' endonuclease

f) 5' to 3' endonuclease

4. Which of the following statements about DNA polymerase I are true? **Choose all that are correct.**

a) DNA polymerase I can covalently link two deoxynucleoside triphosphates together.

b) DNA polymerase I synthesizes the leading strand in the 5' to 3' direction.

c) DNA polymerase I synthesizes most of the DNA during bacterial replication.

d) DNA polymerase I can proofread using its 3' to 5' exonuclease activity.

e) DNA polymerase I degrades RNA primers with its 5' to 3' exonuclease activity.

f) None of the above.

5. Which of the following statements correctly describe lagging strand DNA synthesis? **Choose all that are correct.**

a) Okazaki fragments are synthesized 3' to 5'.

b) Replication fork movement and Okazaki fragment synthesis proceed in opposite directions.

c) The lagging strand is synthesized continuously.

d) Lagging strand synthesis does not require primase.

e) DNA polymerase I covalently links Okazaki fragments together.

f) DNA ligase covalently links Okazaki fragments together.

6. Which of the following is synthesized 3' to 5'? **Choose all that are correct.**

a) the leading strand

b) the lagging strand

c) mRNA

d) telomeres

e) RNA primers

f) none of these

7. The sequences below are several examples of a new promoter element that you've identified. What is the consensus sequence of the promoter element you've identified?

GGTGTAGGT
GAAGTAGGT
GGAGTCCGT
GGAGTAGGT
GCAGTAGGT
GGATTACGA

a) GGTGTAGGT

b) GATTTCCGA

c) CCACATCCA

d) ACCTACACC

e) GGAGTAGGT

8. Which of the following statements about transcription of DNA to RNA are true? **Choose all that are correct.**

a) Bacterial RNA polymerases require a sigma factor to bind to a promoter.

b) RNA polymerase does not need a primer to initiate transcription.

c) RNA is synthesized in the 3' to 5' direction.

d) Transcription terminates at a stop codon.

e) The 5' end of the RNA molecule is produced first.

f) RNA polymerase uses the coding DNA strand as a template for RNA synthesis.

g) DNA scrunching is a key step in both abortive initiation and promoter escape.

h) Transcription is processive due to the clamp subunit of RNA polymerase.

9. A pair of mutations changes the -10 element of a promoter from 'GATGGT' to 'GATAAT'. How do you expect that the strength of this promoter will change?

a) The promoter will become stronger.

b) The promoter will become weaker.