1. Using the Following Diagram of DNA Replication, identify each of the numbered molecules/pieces involved in Replication!

Write your answers in your notebook.

Here is the word bank for ya:

Leading strand Ligase Helicase DNA Polymerase I RNA Primase

Lagging strand Okazaki Fragment DNA Polymerae III

SSBPs (single stranding binding proteins) Parent DNA Direction of Replication



1. In the semiconservative replication of DNA, progeny DNA molecules consist of:
2. one-half of the molecules with two parental strands and one-half of the molecules with two new strands
3. all molecules with interspersed parental and new segments
4. all molecules with one parental and one new strand
5. all molecules with two new strands
6. What kind of chemical bond is broken when helicase does its job?
7. hydrogen
8. ionic
9. covalent
10. phosphodiester
11. What is meant by the description "antiparallel" regarding the strands that make up DNA?

a. The twisting nature of DNA creates nonparallel strands.

b. The 5' to 3' direction of one strand runs counter to the 5' to 3' direction of the other strand.

c. Base pairings create unequal spacing between the two DNA strands.

d. One strand is positively charged and the other is negatively charged.

 5. In In E. coli, there is a mutation in a gene called dnaB that alters the helicase that normally acts at the origin. Which of the following would you expect as a result of this mutation?

a. No proofreading will occur.

b. No replication fork will be formed.

c. The DNA will supercoil.

d. Replication will occur via RNA polymerase alone

1. Which enzyme catalyzes the elongation of a DNA strand in the 5' → 3' direction?

a. primase

b. DNA ligase

c. DNA polymerase III

d. topoisomerase

e. helicase

1. What determines the nucleotide sequence of the newly synthesized strand during DNA replication?

a. the particular DNA polymerase catalyzing the reaction

b. the relative amounts of the four nucleoside triphosphates in the cell

c. the nucleotide sequence of the template strand

d. the primase used in the reaction

e. the arrangement of histones in the sugar phosphate backbone

1. What is the function of DNA polymerase III?

a. to unwind the DNA helix during replication

b. to seal together the broken ends of DNA strands

c. to add nucleotides to the end of a growing DNA strand

d. to degrade damaged DNA molecules

e. to rejoin the two DNA strands (one new and one old) after replication

 9. Which of the following covalently connects segments of DNA?

a. helicase

b. DNA polymerase III

c. ligase

d. DNA polymerase I

e. primase

 10. A new DNA strand elongates only in the 5' to 3' direction because

a. DNA polymerase begins adding nucleotides at the 5' end of the template.

b. Okazaki fragments prevent elongation in the 3' to 5' direction.

c. the polarity of the DNA molecule prevents addition of nucleotides at the 3' end.

d. replication must progress toward the replication fork.

e. DNA polymerase can only add nucleotides to the free 3' end.

 11. What is the function of topoisomerase?

a. relieving strain in the DNA ahead of the replication fork

b. elongation of new DNA at a replication fork by addition of nucleotides to the existing chain

c. the addition of methyl groups to bases of DNA

d. unwinding of the double helix

e. stabilizing single-stranded DNA at the replication fork

 12. What is the role of DNA ligase in the elongation of the lagging strand during DNA replication?

a. synthesize RNA nucleotides to make a primer

b. catalyze the lengthening of telomeres

c. join Okazaki fragments together

d. unwind the parental double helix

e. stabilize the unwound parental DNA