

1. A template strand's sequence is 3' AACCGGTAC 5'. What is the sequence of the strand complementary to this template?
A) 3' AACCGGTAC 5'
B) 5' TTGGCCATG 3'
C) 5' CATGGCCAA 3'
D) 5' GGTTAACGT 3'
E) 3' TTGGCCATG 5'
2. Suppose a cell has 6 chromosomes. At the beginning of G1 phase, _____ DNA molecules are present in this cell. At the beginning of G2 phase, _____ DNA molecules are present in this cell. (NOTE: a DNA molecule, even though it has two strands, is considered to be ONE molecule.)
A) 6, 6
B) 3, 6
C) 6, 12
D) 12, 6
E) 12, 12
3. Based upon the semiconservative model, which is true about the DNA molecules contained by sister chromatids present in G2 phase?
A) Only one sister chromatid contains a newly synthesized DNA molecule; the other sister chromatid has the original DNA molecule
B) Each sister chromatid has a double-stranded DNA molecule
C) Each sister chromatid has a strand of DNA from the original DNA molecule paired with a newly synthesized strand
D) a and b
E) b and c
4. If a PCR tube began with only one DNA molecule, how many DNA molecules are in the tube after 4 PCR cycles?
A) 4
B) 5
C) 8
D) 16
E) 17
5. In DNA replication, what happens to the original, "parent" DNA molecule (parent molecule = the double-stranded DNA molecule present before replication starts)?
A) its two strands stay together, and the copy of the parent molecule consists of two newly synthesized daughter strands
B) the original molecule serves as a template which is eventually destroyed once two new daughter molecules are synthesized
C) the two strands in the original molecule separate, with each serving as a template for a newly synthesized strand
D) none of the above
E) all of the above

6. The leading and the lagging strands differ in that
- A) the leading strand is built continuously, whereas the lagging strand is built in short fragments that are ultimately stitched together.
 - B) the leading strand is built by adding nucleotides to the 3' end of the growing strand, and the lagging strand is built by adding nucleotides to the 5' end.
 - C) the lagging strand is built continuously, whereas the leading strand is built in short fragments that are ultimately stitched together.
 - D) the leading strand is synthesized at twice the rate of the lagging strand.
7. What kind of chemical bond is found between paired nitrogenous bases of the DNA double helix?
- A) ionic
 - B) polar covalent
 - C) nonpolar covalent
 - D) phosphate
 - E) hydrogen
8. What is meant by the description "antiparallel" regarding the strands that make up DNA?
- A) One strand is positively charged and the other is negatively charged.
 - B) One strand contains only nitrogenous bases and the other contains only phosphates.
 - C) The twisting nature of DNA creates nonparallel strands.
 - D) The 5' to 3' direction of one strand runs counter to the 5' to 3' direction of the other strand.
 - E) Base pairings create unequal spacing between the two DNA strands.
9. Which enzyme unzips the DNA double helix in preparation for DNA replication?
- A) helicase
 - B) primase
 - C) single-strand binding proteins
 - D) DNA ligase
 - E) DNA polymerase
10. 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 nucleotides 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