

1. Which statement is not true?

- (A) **Each human chromosome contains approximately 10-20 thousand genes.**
- (B) In humans, autosomal chromosomes are the 44 non-sex chromosomes.
- (C) In humans, the homologous chromosomes are the 22 matching pairs of chromosomes, one from the mother and one from the father.
- (D) Two matching genes, one from each parent, are called alleles.

2. During which phase of a cell's cycle do human chromosomes replicate?

- (A) mitosis
- (B) G1
- (C) G2
- (D) **S**

3. When the 46 chromosomes are replicated, each pair of duplicated chromosome is now called _____.

- (A) centromeres
- (B) mitotic chromosomes
- (C) **sister chromatids**
- (D) interphase chromosomes

4. P53 protein checks the DNA during the replication process. The check points include all of the following, except _____.

- (A) before the DNA is replicated to ensure that none of the chromosomes about to be copied are damaged
- (B) after duplication but before the chromosomes are separated
- (C) **during duplication to ensure that duplication is taking place correctly**
- (D) right after mitosis to verify that the old and new DNA were correctly separated

5. During interphase, cyclin (a protein) accumulates and just before replication binds with cyclin-dependant kinase (another protein), which together allow replication to occur. If P53 detects something wrong with the DNA, P53 prevents cyclin from combining with cyclin-dependant kinase. P53 then tries to repair the DNA, but if it can't, it signals to the cell to _____.

- (A) revert back to its pre-replication state
- (B) to activate RNA polymerase
- (C) to completely seal off the nuclear membrane from the cytoplasm
- (D) **undergo apoptosis (cell death)**

6. At the beginning of DNA replication, helicase separates the two strands of DNA, and _____.

- (A) primase begins laying down a strip of complementary DNA nucleotides on each DNA strand
- (B) primase lays down a complementary RNA nucleotide on one strand of DNA and another primase does so on the other strand of DNA**
- (C) primase maintains the separation of DNA strands for DNA polymerase to complete the replication
- (D) primase begins supplying DNA polymerase with complementary nucleotides

7. Which statement about DNA replication is true?

- (A) A single helicase enzyme splits pulls apart the template and coding strands of DNA and continues to pull them apart in both directions.
- (B) A single helicase enzyme splits pulls apart the template and coding strands of DNA but another helicase is needed to continue to pull the two DNA strands apart in both directions.**
- (C) Helicase pulls the complementary strands of DNA apart, but then changes position to continue splitting the DNA strands apart.
- (D) Helicase pulls the complementary strands of DNA apart, but needs single strand binding proteins to continue splitting the two strands of DNA apart.

8. DNA polymerase III replicates double-stranded DNA after helicase pulls the template and coding strands of DNA apart. Which statement about DNA replication is true?

- (A) The template strand of DNA is replicated first, and then the coding strand.
- (B) Both the template and the coding strands are replicated simultaneously in the same direction.
- (C) Both the template and the coding strands are replicated simultaneously in opposite directions, from the 5' to the 3' position in one direction, and from the 3' to the 5' position in the opposite direction.
- (D) Both the template and the coding strands are replicated simultaneously in both directions, but only from the 5' to the 3' position in one direction.**

9. Okazaki fragments _____.

- (A) begin with an RNA primer and only extends to the next RNA primer**
- (B) constitute the terminal fragments of DNA replication
- (C) serve to fill any gaps left in the DNA replication
- (D) prevent DNA from being replicated in both directions

10. Telomeres _____.

(A) consist of repeating thymine and guanine nucleotides at both ends of the template and coding strands of DNA

(B) help helicase locate where to begin splitting the two DNA strands apart

(C) code for the terminal amino acid on a protein

(D) are carefully replicated to allow DNA polymerase III to identify the end of a DNA molecule