

**Unit 4: DNA Rep. & Protein Synthesis Practice Test**

**Part I: DNA Replication**

- 1) The hereditary material that is present in all cells is
  - A) protein
  - B) RNA
  - C) DNA
  - D) R-strain
  
- 2) What is the relationship among DNA, a gene, and a chromosome?
  - A) A chromosome contains hundreds of genes which are composed of protein
  - B) A chromosome contains hundreds of genes which are composed of DNA
  - C) A gene contains hundreds of chromosomes which are composed of protein
  - D) A gene is composed of DNA, but there is no relationship to a chromosome
  - E) A gene contains hundreds of chromosomes which are composed of DNA
  
- 3) The rules for base pairing in DNA are
  - A) A = C and G = T in amount
  - B) A with C, and G with T
  - C) A with G, and C with T
  - D) A with T, and G with C
  
- 4) The DNA of a certain organism has guanine as 30% of its bases. What percentage of its bases would be adenine?
  - A) 10%
  - B) 20%
  - C) 30%
  - D) 40%
  
- 5) The correct structure of a nucleotide is
  - A) phosphate-5 carbon sugar-nitrogen base
  - B) phospholipid-sugar-base
  - C) phosphate-sugar-phosphate-sugar
  - D) adenine-thymine and guanine-cytosine
  
- 6) Complementary base pairs are held together by
  - A) peptide bonds
  - B) hydrogen bonds
  - C) covalent
  - D) ionic bonds.
  
- 7) For the DNA sequence GCCTAT in one polynucleotide chain, the sequence found in the other polynucleotide chain is
  - A) CGGATA
  - B) GCCATA
  - C) CGGAUA
  - D) ATTTCG
  
- 8) In the comparison of a DNA molecule to a twisted ladder, the uprights of the ladder represent
  - A) nitrogenous bases linked together
  - B) deoxyribose linked to phosphates
  - C) nitrogenous bases linked to phosphates
  - D) hydrogen bonds between bases
  
- 9) In the comparison of a DNA molecule to a twisted ladder, the rungs of the ladder represent
  - A) nitrogenous bases linked together
  - B) deoxyribose linked to phosphates
  - C) deoxyribose linked to sulfates
  - D) nitrogenous bases linked to phosphates
  
- 10) Pick the best choice for the following statement about DNA: **Like a spiral staircase.**
  - A) Deoxyribose
  - B) Phosphate
  - C) Double helix
  - D) Hydrogen bonds

- 11) Semi – conservative DNA replication means
- A) the old DNA is completely broken down
  - B) the old DNA remains completely intact
  - C) A pairs with T and G pairs with C
  - D) each new DNA molecule has  $\frac{1}{2}$  of the old one
- 12) Which of the following are NOT involved in the DNA replication process?
- A) DNA helicase
  - B) DNA ligase
  - C) DNA replicase
  - D) DNA polymerase

## Part II: Protein Synthesis

- 13) The sequence of nitrogen-containing bases on one strand of DNA most directly determines the sequence of
- A) fatty acids in a fat molecule
  - B) amino acids in a protein molecule
  - C) sugars in a polysaccharide molecule
  - D) All of the above choices are correct
  - E) bases in a protein molecule
- 14) When comparing DNA and RNA, we find
- A) no sugar is present in either molecule
  - B) hydrogen bonding is important only in DNA
  - C) only DNA has a backbone of sugars and phosphates
  - D) adenine pairs with different bases in DNA and RNA
  - E) thymine pairs with different bases in DNA and RNA
- 15) Which of these is found in RNA but NOT in DNA?
- A) adenine
  - B) uracil
  - C) thymine
  - D) phosphate groups
  - E) deoxyribose sugar
- 16) The number of consecutive mRNA bases needed to specify an amino acid is
- A) 3
  - B) 4
  - C) 20
  - D) 64
- 17) If a bacterial protein has 30 amino acids, how many nucleotides are needed to code for it?
- A) 30
  - B) 60
  - C) 90
  - D) 120
  - E) 600
- 18) If the sequence of bases in a section of DNA is **TAGGCTAA**, what are the corresponding bases in **mRNA**?
- A) ATCCGATT
  - B) TAGGCTAA
  - C) CGAAUCGG
  - D) AATCGGAT
  - E) AUCCGAUU
- 19) The process of copying genetic information from DNA to RNA is called
- A) translation
  - B) transformation
  - C) replication
  - D) transcription
- 20) Which of the following molecules functions to transfer information from the nucleus to the cytoplasm?
- A) DNA
  - B) mRNA
  - C) tRNA
  - D) proteins
  - E) lipids

Practice Test

- 21) The **anticodon** for AUC is
- A) TAG
  - B) AUC
  - C) GAU
  - D) CUA
  - E) UAG
- 22) Suppose one strand of a "mini-gene" has the following base sequence: **TACCCGGATTCA**  
The polypeptide encoded by this gene has how many amino acids?
- A) 2
  - B) 4
  - C) 6
  - D) 12
- 23) The site of protein synthesis is the
- A) smooth endoplasmic reticulum
  - B) nucleus
  - D) ribosome
  - E) eukaryotic chromosome
- 14) Each new amino acid is attached to the growing chain by
- A) an ionic bond
  - B) a physical bond
  - C) hydrogen bonds
  - D) an RNA bond
  - E) a peptide bond
- 25) The manufacture of proteins from RNA and amino acids is
- A) activation
  - B) transformation
  - C) replication
  - D) transcription
  - E) translation
- 26) Which occurs in the nucleus?
- A) transcription only
  - B) assembly of amino acids into protein
  - C) replication of genetic material
  - D) transcription and replication of genetic material
  - E) translation only
- 27) An **anticodon** is
- A) 4 consecutive nucleotides in tRNA
  - B) 3 consecutive nucleotides in tRNA
  - C) the beginning of a DNA molecule
  - D) 3 consecutive nucleotides in mRNA
  - E) 3 consecutive amino acids in a protein
- 28) All of the following are directly involved in translation **except**
- A) ribosomes
  - B) tRNA
  - C) amino acids
  - D) DNA
  - E) mRNA
- 29) Which of the following contains codons?
- A) ribosomal RNA
  - B) DNA
  - C) messenger RNA
  - D) transfer RNA
  - E) RNA polymerase

- 30) A gene mutation is defined as change in the
- A) nucleotide sequence of RNA
  - B) nucleotide sequence of DNA
  - C) amino acid sequence in protein
  - D) activation of a gene
  - E) structures of ribosomes
- 31) For a mutation to affect evolution, it must occur in
- A) somatic cells
  - B) prokaryotic cells
  - C) diploid cells
  - D) gametes
  - E) eukaryotic cells
- 32) What kind of mutation occurs when one base is changed to another at a single location in the DNA?
- A) insertion
  - B) deletion
  - C) substitution
  - D) nonsense
  - E) neutral
- 33) A random change in a DNA nucleotide base sequence
- A) has no influence on genetic variation
  - B) is never expressed phenotypically
  - C) constitutes a mutation
  - D) is never beneficial to the organism
  - E) will kill the cell when it occurs
- 34) Of the following types of mutations, which is considered the LEAST drastic?
- A) insertion of one base
  - B) deletion of two bases
  - C) a neutral base substitution
  - D) a stop codon
- 35) A "mini-gene" has the following sequence: **TACCCGTGCACG**  
If the T at the beginning of the sequence is deleted, what will be the consequence?
- A) All of the codons after that point will be changed
  - B) Only the amino acid coded for in that codon will be changed
  - C) RNA polymerase will skip that codon, but all the others will be read normally
  - D) RNA polymerase will correct the deletion and a normal protein will be produced
  - E) The first nucleotide is not important, so there will be no change
- 36) How can a gene be mutated with no resulting change in the protein that is produced from that gene?
- A) The mutation is at the active site of the protein
  - B) A codon has changed, but it codes for the same amino acid as the original codon
  - C) An entire codon has been removed
  - D) RNA polymerase can edit the mutation from the mRNA produced during translation
  - E) This is impossible. All mutations, by definition, result in altered proteins
- 37) Gene expression is
- A) how genes are passed from parent to offspring
  - B) the unique set of genes in an individual
  - C) the banding pattern seen on a chromosome
  - D) the flow of genetic information from genes to proteins
  - E) the same as replication