

# BIOL-8 Practice Test 03

## Module 7: Genetics (DNA, RNA, Protein Synthesis)

**Instructions:** This practice test covers material from Module 7. Answer all questions to the best of your ability.

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### Part A: Multiple Choice

#### Module 7: Genetics & Central Dogma

1. Which of the following is NOT part of a DNA nucleotide? A) Phosphate group B) Deoxyribose sugar C) Nitrogenous base D) Amino acid
2. In DNA, Adenine (A) always pairs with: A) Cytosine (C) B) Guanine (G) C) Thymine (T) D) Uracil (U)
3. The bond that holds the two DNA strands together between bases is a: A) Covalent bond B) Hydrogen bond C) Ionic bond D) Peptide bond
4. DNA replication is described as "semiconservative" because: A) It happens in half the time of transcription B) Each new DNA molecule contains one old strand and one new strand C) Only half the DNA is copied D) It requires no enzymes
5. Which enzyme is responsible for unzipping the DNA double helix during replication? A) DNA Polymerase B) Ligase C) Helicase D) Primase
6. The flow of genetic information according to the Central Dogma is: A) Protein → RNA → DNA B) DNA → RNA → Protein C) RNA → DNA → Protein D) DNA → Protein → RNA
7. Transcription produces: A) A new DNA strand B) An mRNA molecule C) A protein sequence D) A ribosome

8. Where does transcription occur in a eukaryotic cell? A) Nucleus B) Ribosome C) Cytoplasm D) Golgi apparatus
9. Which nitrogenous base is found in RNA but NOT in DNA? A) Adenine B) Cytosine C) Guanine D) Uracil
10. Determine the mRNA sequence meant to match this DNA template: **3'-TAC GGA-5'** A) 5'-ATG CCT-3' B) 5'-AUG CCU-3' C) 5'-UTC CCU-3' D) 5'-AUG GGA-3'
11. Translation is the process of: A) Copying DNA B) Making mRNA from DNA C) Synthesizing a polypeptide (protein) from an mRNA code D) Folding a protein
12. Translation occurs at the: A) Nucleus B) Mitochondria C) Ribosome D) Smooth ER
13. A sequence of three nucleotides on mRNA that codes for an amino acid is called a: A) Gene B) Codon C) Anticodon D) Chromosome
14. The function of tRNA is to: A) Carry the genetic code from the nucleus B) Form the structure of the ribosome C) Bring the correct amino acid to the ribosome D) Unzip DNA
15. A mutation that changes a single nucleotide but does NOT change the amino acid is called a: A) Missense mutation B) Nonsense mutation C) Silent mutation D) Frameshift mutation
16. Which type of mutation typically has the most disastrous effect on the resulting protein? A) Substitution of the third base in a codon B) Silent mutation C) Frameshift mutation (insertion or deletion) D) Point mutation at the end of a gene
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## **Part B: Fill in the Blank**

17. The sugar found in DNA is \_\_\_\_, while the sugar in RNA is \_\_\_\_.
18. The enzyme \_\_\_\_ builds the new DNA strand during replication.
19. A \_\_\_\_ mutation introduces a premature stop codon.
20. The transfer of information from DNA to mRNA is called \_\_\_\_.

21. The region of DNA where RNA polymerase binds to start transcription is the \_\_\_\_.

22. \_\_\_\_ are the building blocks of proteins.

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### **Part C: Short Answer**

23. Compare and contrast DNA and RNA. List at least three structural differences.

24. Explain the role of mRNA, tRNA, and rRNA in protein synthesis.

25. If a DNA coding strand has the sequence **ATG-CCC-GAT**, what is the mRNA sequence? Use the genetic code to determine the amino acid sequence (use general names if you don't have a chart, e.g., "Start...").

26. Why is a frameshift mutation often more damaging than a substitution mutation?

*End of Practice Test 03*