AP Protein Synthesis Quiz

Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

1. We now know that the one gene-one enzyme hypothesis is not entirely accurate because
   a. many genes code for proteins that are not enzymes.
   b. a single gene codes for a single polypeptide chain, and many enzymes are made up of more than one polypeptide chain.
   c. many genes code for RNA molecules that have no enzymatic activity.
   d. A and B only
   e. A, B, and C

2. Which of the following represents a similarity between RNA and DNA?
   a. Both are double-stranded.
   b. the presence of uracil
   c. the presence of an OH group on the 2’ carbon of the sugar
   d. nucleotides consisting of a phosphate, sugar, and nitrogenous base
   e. Both are found exclusively in the nucleus.

3. Using RNA as a template for protein synthesis instead of translating proteins directly from the DNA is advantageous for the cell because
   a. RNA is much more stable than DNA.
   b. RNA acts as an expendable copy of the genetic material, allowing the DNA to serve as a permanent, pristine repository of the genetic material.
   c. many mRNA molecules can be transcribed from a single gene, increasing the potential rate of gene expression.
   d. B and C only
   e. A, B, and C

4. A particular triplet of bases in the template strand of DNA is AGT. The corresponding codon for the mRNA transcribed is
   a. AGT.
   b. UGA.
   c. TCA.
   d. ACU.
   e. either UCA or TCA, depending on wobble in the first base
**Use the table of codons below to answer the following questions.**

<table>
<thead>
<tr>
<th>First Base</th>
<th>Second Base</th>
<th>Third Base</th>
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</thead>
<tbody>
<tr>
<td>U</td>
<td>UU</td>
<td>UGU</td>
</tr>
<tr>
<td>U</td>
<td>UUC</td>
<td>UGA</td>
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<tr>
<td>U</td>
<td>UUA</td>
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<td>U</td>
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<td>C</td>
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<td>C</td>
<td>CUA</td>
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<td>C</td>
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<tr>
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<td>G</td>
<td>GUG</td>
<td>GCG</td>
</tr>
</tbody>
</table>

5. A possible sequence of nucleotides in the template strand of DNA that would code for the polypeptide sequence phe-leu-ile-val would be
   a. 5' TTG-CTA-CAG-TAG 3'.
   b. 3' AAC-GAC-GUC-AUA 5'.
   c. 5' AUG-CTG-CAG-TAT 3'.
   d. 3' AAA-AAT-ATA-ACA 5'.
   e. 3' AAA-GAA-TAA-CAA 5'.

6. What is an anticodon part of?
   a. DNA
   b. tRNA
   c. mRNA
   d. a ribosome
   e. an activating enzyme
7. The figure below represents tRNA that recognizes and binds a particular amino acid (in this instance, phenylalanine). Which codon on the mRNA strand codes for this amino acid?

a. UGG  
b. GUG  
c. GUA  
d. UUC  
e. CAU

8. What are ribosomes composed of?
   a. rRNA only  
b. proteins only  
c. both rRNA and protein  
d. mRNA, rRNA, and protein  
e. mRNA, tRNA, rRNA, and protein

9. The function of the ribosome in polypeptide synthesis is to
   a. hold mRNA and tRNAs together.  
b. catalyze the addition of amino acids from tRNAs to the growing polypeptide chain.  
c. move along the mRNA and eject tRNAs during the translocation process.  
d. A and B only  
e. A, B, and C
10. During translation, chain elongation continues until what happens?
   a. No further amino acids are needed by the cell.
   b. All tRNAs are empty.
   c. The polypeptide is long enough.
   d. A stop codon is encountered.
   e. The ribosomes run off the end of mRNA.
AP Protein Synthesis Quiz
Answer Section

MULTIPLE CHOICE

1. ANS: E  TOP:  Concept 17.1
2. ANS: D  TOP:  Concept 17.1
3. ANS: D  TOP:  Concept 17.1
4. ANS: D  TOP:  Concept 17.1
5. ANS: E  TOP:  Concept 17.1
6. ANS: B  TOP:  Concept 17.4
7. ANS: D  TOP:  Concept 17.4
8. ANS: C  TOP:  Concept 17.4
9. ANS: E  TOP:  Concept 17.4
10. ANS: D  TOP:  Concept 17.4