Chapter 10 Directed Reading Name _____

Section 1: From Genes to Proteins

_____ **1.** ribonucleic acid (RNA)
_____ **2.** uracil
_____ **3.** transcription
_____ **4.** translation
_____ **5.** gene expression

a. the entire process by which proteins are made
b. a molecule made of linked nucleotides
c. the process of reading instructions on an RNA molecule to put together the amino acids that make up a protein
d. the process of transferring a gene's instructions for making a protein to an RNA molecule
e. a nitrogen base used in RNA instead of the base thymine found in DNA

6. Transcription begins when [RNA / RNA polymerase] binds to the gene's promoter.
7. RNA polymerase adds complementary [DNA / RNA] nucleotides as it "reads" the gene.
8. In eukaryotes, transcription takes place in the [nucleus / cytoplasm].
9. What are two differences between transcription and DNA replication?
_____
10. What determines where on the DNA molecule transcription begins and where it ends?
_____
11. RNA, messenger RNA _____
12. codons, genetic code_____

Study the following six steps in the synthesis of proteins. Determine the order. Write the number

_____**13.** The codon in the vacant A site receives the tRNA molecule with the complementary anticodon. The tRNA carries the amino acid specified by the codon.
_____**14.** Steps 2–5 are repeated until a stop codon is reached. The newly made protein is released into the cell.
_____**15.** The tRNA at the P site detaches, leaves behind its amino acid, and moves away from the ribosome.
_____**16.** Enzymes help form a peptide bond between the amino acids of adjacent tRNA molecules.
_____**17.** The tRNA (with its protein chain) in the A site moves over to fill the empty P site. A new codon is present in the A site, ready to receive the next tRNA and its amino acid.
_____**18.** An mRNA, two ribosomal subunits, and a tRNA carrying a modified form of the amino acid methionine bind together. The tRNA bonds to the "start" codon AUG.

Section 2: Gene Regulation and Structure

1. To break down lactose, Escherichia coli need three different_____, each of which is coded for by a different gene.
2. The three genes are located next to each other, and all are controlled by the same_____ site.
3. The piece of DNA that overlaps the promoter site and serves as the on-off switch is called a(n)_____
4. The group of genes that codes for enzymes involved in the same function, their promoter site, and the operator all function together as a(n)_____ .
5. The operon that controls the metabolism of lactose is called the_____ .
6. A(n)_____ is a protein that binds to an operator and physically blocks RNA polymerase from binding to a promoter site.
7. What are enhancers?_____
8. Why is there more opportunity for gene regulation in eukaryotic cells than in prokaryotic cells?
_____
9. Why have no operons been found in eukaryotic cells? _____
10. When can gene regulation occur in eukaryotic cells? _____
11. What are introns and exons? _____
12. What happens to mRNA that includes introns? _____
13. What might be the evolutionary advantage of genes being interrupted by introns?
_____
14. Mutations can only be passed on to offspring if they occur in [gametes / body cells].
15. Mutations that change one or just a few nucleotides in a gene on a chromosome are called [random / point] mutations.
16. If a mutation causes a gene containing the nucleotide sequence ACA to become ACT, the mutation is called a [substitution / deletion] mutation.
17. If a mutation causes a sequence of nucleotides to change from ACGAGA to ACGGA, the mutation is called a(n) [insertion / deletion] mutation.
18. If a mutation causes a sequence of nucleotides to change from ACGAGA to ACGAGGA, the mutation is called a(n) [insertion / deletion] mutation.