

## DNA and Genetic Engineering Midterm Review

### Chapter 12 Review Questions:

- |      |      |      |      |      |
|------|------|------|------|------|
| 1. C | 2. D | 3. B | 4. C | 5. A |
| 6. D | 7. B | 8. C | 9. B |      |

11. Genes carry information from one generation to the next, determine heritable characteristics, and are replicated easily.

12. DNA is a long molecule made up of nucleotides. Each nucleotide has three parts: a 5-carbon sugar called deoxyribose, a phosphate group, and a nitrogenous base (adenine, guanine, cytosine or thymine).

13. The two strands of DNA are held together by hydrogen bonds between certain bases – A and T, and G and C – which explained Chargaff's rules.

14. Base pairing is the principle that hydrogen bonds form only between certain base pairs – A and T, and G and C. In DNA replication, base pairing ensures that the complementary strands produced are identical to the original strands.

16. DNA separates into two strands, then produces two new complementary strands following the rules of base pairing. Each new DNA molecule has one strand from the original molecule and one new strand.

20. An anticodon consists of the three bases on the tRNA molecule that are complementary to an mRNA codon. Anticodons determine which tRNA binds to the codon on mRNA, and thus which amino acid is attached to the polypeptide chain.

21. GAU; CUA

22. Proteins are responsible for catalyzing and regulating chemical reactions, as well as regulating the rate and pattern of growth. These actions help determine and organism's characteristics.

23. Gene and chromosomal; both change the DNA sequence that affects genetic information. Gene mutations involve a change in one or several nucleotides in a single gene, whereas chromosomal mutations involve changes in the number or structure of whole chromosomes.

29. UGGCAGUG; AGCGUGCA

33. Chromosomal mutations that occur during meiosis affect the gametes and could appear in the offspring. Mitotic chromosomal mutations will only affect a few body cells in that individual.

Chapter 13 Review Questions:

4. A

5. A

9. A

10. A

13. The condition in which cells have many sets of chromosomes; it may instantly produce new plant species that are larger and stronger.

16. Gel electrophoresis enables scientists to separate and analyze DNA fragments, to compare genomes of different individuals and organisms, and to identify a specific gene.

18. A short piece of complementary DNA (a primer) is added to both ends of the DNA fragment to be copied. The DNA is heated to separate the two strands, and then cooled. DNA polymerase makes copies of the region between the two primer sequences. The copies also serve as templates to make more copies.

25. They can be produced relatively inexpensively in large quantities; they are the actual human protein; and they are pure.

26. No, the change involves body (somatic) cells, not germ cells.

31. The blood proteins that people need could be produced by bacteria that have been transformed with the human gene that encodes the needed protein.