**Name:** _____ **Class:** _____ **Date:** _____ **ID: A**

# Forensic Science Chapter 13

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

____ 1. 2.1 (ch 13) Which of the following is NOT true of DNA?
a. It is shaped like a long tubule dotted with ribosomes.
b. Except in identical twins, it contains genetic information unique to each individual.
c. It includes instructions to produce specific protein molecules.
d. DNA typing had its beginning in 1985 with the work of Alec Jeffreys.

____ 2. 2.1 (ch 13) The specific proteins produced by a cell are directly related to the _____.
a. sequence of sugars and phosphates in the cell.
b. number of mitochondria in the cell
c. length of the chromosomes
d. sequence of nucleotides in the DNA of the cell.

____ 3. 2.1 (ch 13) What is the number of nitrogenous bases needed to code for a specific amino acid?
a. 2
b. 3
c. 5
d. 6

____ 4. 2.1 (ch 13) The individuality of an organism is determined by the organism's _____.
a. amino acids
b. environment
c. nitrogenous bases
d. DNA nucleotide sequence

____ 5. 2.1 (ch 13) In DNA replication, polymerases
a. separate the strands of the double helix.
b. enable the strands to unwind from the helix.
c. help assemble the new DNA strands in proper base sequence.
d. all of the above.

____ 6. 2.2 (ch 13) DNA is a(n)
a. protein.
b. enzyme.
c. polymer.
d. starch.

____ 7. 2.2 (ch 13) The molecular structure of DNA was deduced by _____.
a. Gregor Mendel
b. Francis Crick
c. James Watson
d. both b and c.

____ 8. 2.2 (ch 13) Which nitrogenous base is NOT found in DNA?
a. adenine
b. uracil
c. thymine
d. cytosine

____ 9. 2.2 (ch 13) Which of the following depicts complementary base-pairing in DNA?
a. A-U
b. C-T
c. T-A
d. G-A

____ 10. 2.2 (ch 13) The sequence T-A-C on a DNA molecule indicates _____.
a. where to start synthesis of a protein
b. the beginning of an STR
c. the end of a chromosome
d. a mutation

____ 11. 2.3 (ch 13) During translation, mRNA associates with a _____.
a. DNA molecule
b. ribosome
c. golgi apparatus
d. mitochondria

____ 12. 2.3 (ch 13) During transcription,
a. chromosomes copy themselves in preparation for cell division.
b. messenger RNA copies the directions to make a protein from a portion of a DNA molecule.
c. transfer RNA builds a protein.
d. cells create energy in the form of ATP.

____ 13. 2.4 (ch 13) Information from the Human Genome Project will
a. reveal the location of a gene on a particular chromosome.
b. be useful for diagnosing and treating genetic diseases.
c. help to reveal the role and implications of evolution.
d. all of the above.

____ 14. 2.5 (ch 13) Restriction enzymes
a. limit the amount of protein produced in a cell.
b. reduce the DNA replication rate.
c. cut DNA at specific sites.
d. reduce the time required for PCR.

____ 15. 2.5 (ch 13) Which statement about tandem repeats is NOT true?
a. They are of no forensic interest.
b. Their origin is a mystery.
c. More than 30% of the human genome is composed of these repeating units.
d. It is thought that them may act as spacers between the coded regions of DNA.

____ 16. 2.5 (ch 13) Which statement regarding RFLPs is NOT true?
a. All humans have the same type of repeats.
b. There is little variation in the number of repeats from person to person.
c. Restriction enzymes are used to cut RFLPs from the DNA helix.
d. Typically, a core repeat sequence would consist of 15-30 bases.

____ 17. 2.5 (ch 13) Which of the following is in the correct sequence?
a. Addition of radioactive probe -> gel electrophoresis -> hybridization -> Southern blotting -> addition of restriction enzymes -> visualization of DNA fragments.
b. Extraction of DNA from cells -> gel electrophoresis -> Southern blotting -> hybridization -> visualization of DNA fragments on X-ray film
c. Southern blotting -> gel electrophoresis -> addition of restriction enzymes -> addition of radioactive probe -> visualization of DNA fragments.
d. Extraction of DNA from cells -> hybridization -> Southern blotting -> gel electrophoresis -> visualization of DNA fragments.

____ 18. 2.5 (ch 13) The transfer of DNA fragments onto a nylon membrane is called _____.
a. hybridization
b. Southern blotting
c. polymerization
d. replication

____ 19. 2.5 (ch 13) During gel electrophoresis, the DNA is
a. extracted from the cell nuclei.
b. cut into fragments.
c. separated by fragment size.
d. undergoing hybridization.

____ 20. 2.5 (ch 13) Radioactive probes are used
a. to visualize RFLPs.
b. as primers for DNA polymerase.
c. as molecular scissors.
d. to hold DNA in helical shape.

____ 21. 2.5 (ch 13) STR analysis has replaced RFLP DNA typing because it
a. is less subject to sample degradation.
b. reduces time to obtain results from a sample.
c. requires a smaller sample size.
d. all of the above.

____ 22. 2.5 (ch 13) Which statement is NOT true? Few forensic labs do analysis of mtDNA because:
a. little mtDNA is present in a cell.
b. the analysis procedure is very rigorous.
c. such study takes a long time.
d. it costs much more than nuclear DNA profiling.

____ 23. 2.5 (ch 13) Means to detect the amelogenin gene are included in commercial STR kits used in crime labs because the gene allows determination of
a. age.
b. ethnicity.
c. blood type.
d. gender.

____ 24. 2.5 (ch 13) The discrimination power of mtDNA is _____ the discriminating power of STR analysis.
a. greater than
b. less than
c. the same as

____ 25. 2.5 (ch 13) HV1 and HV2 are
a. types of viruses.
b. restriction enzymes.
c. STR types.
d. regions of mtDNA.

____ 26. 2.5 (ch 13) CODIS is a national system of
a. standards for forensic science evaluators.
b. computers to track the movement of sex offenders released from prison.
c. shared databases of DNA typing information from convicted felons and crime scene evidence.
d. vastly enhanced 911 emergency systems.

____ 27. 2.5 (ch 13) Y-STR markers are useful when multiple males are involved in a sexual assault. If three men are involved in such an attack, the investigators would expect Y-STR analysis to show a maximum of
a. three peaks.
b. four peaks.
c. six peaks.
d. eight peaks.

____ 28. 2.5 (ch 13) STRs normally consist of repeating sequences of
a. 3-7 bases.
b. 8-12 bases.
c. 13-17 bases.
d. 18-22 bases.

____ 29. 6.1 (ch 13) PCR is a technique that
a. provides a statistical analysis of the nitrogenous-base pairings.
b. produces information regarding the sequence of nitrogenous bases.
c. can produce many exact copies of segments of DNA.
d. all of the above.

____ 30. 6.1 (ch 13) The PCR technique requires the use of a thermal cycler to
a. synthesize the protein.
b. copy DNA.
c. hydrolyze polymerase.
d. make probes radioactive.

____ 31. 6.1 (ch 13) In the PCR process, the first step is to heat the DNA strands. This is to permit the
a. double-stranded molecules to separate completely.
b. DNA to coil very tightly in the helical shape.
c. hybridization to take place.
d. process to take place without DNA degradation.

____ 32. 6.1 (ch 13) Each cycle of the DNA Thermal Cycler takes approximately
a. 30 seconds.
b. two minutes.
c. two hours.
d. four hours.

____ 33. 6.1 (ch 13) The separation of STRs using capillary electrophoresis
a. decreases analysis time.
b. automates sampling and data collection.
c. evolved from the flat-gel electrophoresis approach.
d. all of the above.

# Forensic Science Chapter 13
# Answer Section

## MULTIPLE CHOICE

1. A
2. D
3. B
4. D
5. D
6. C
7. D
8. B
9. C
10. A
11. B
12. B
13. D
14. C
15. A
16. B
17. B
18. B
19. C
20. A
21. D
22. A
23. D
24. B
25. D
26. C
27. A
28. A
29. C
30. B
31. A
32. B
33. D

**Forensic Science Chapter 13 [Answer Strip]** **ID: A**

__A__ 1.

__D__ 2.

__B__ 3.

__D__ 4.

__D__ 5.

__C__ 6.

__D__ 7.

__B__ 8.

__C__ 9.

__A__ 10.

__B__ 11.

__B__ 12.

__D__ 13.

__C__ 14.

__A__ 15.

__B__ 16.

__B__ 17.

__B__ 18.

__C__ 19.

__A__ 20.

__D__ 21.

__A__ 22.

__D__ 23.

__B__ 24.

__D__ 25.

__C__ 26.

__A__ 27.

__A__ 28.

__C__ 29.

__B__ 30.

__A__ 31.

__B__ 32.

__D__ 33.