Molecular Diagnostics 4th edition Buckingham Test Bank

SKU: 9781719651134-TEST-BANK

Chapter 1: Nucleic Acids

Multiple Choice

1. DNA contains deoxyribonucleotide triphosphates joined together by what type of covalent bond?
   A. Aldehyde
   B. Ester
   C. Phosphodiester
   D. Peptide

ANS: C
OBJ: 1.3

2. Nucleotides in DNA consist of which of the following?
   A. Nitrogen base, deoxyribose, and phosphate
   B. Nitrogen base, ribose, and sulfur
   C. Carbon base, ribose, and phosphate
   D. Carbon base, glucose, and carboxyl

ANS: A
OBJ: 1.1

3. Which of the five ribose carbons of the deoxyribonucleotide are involved in the formation of the DNA chain?
   A. 1' and 5'
   B. 2' and 4'
   C. 3' and 4'
   D. 3' and 5'

ANS. D
OBJ: 1.2

4. In a DNA molecule, one end has a free hydroxyl group. What does the other end have?
   A. A free phosphate group
   B. A free hydroxyl group
   C. A free amino group
   D. A free carboxyl group.

ANS: A
OBJ: 1.2

Copyright © 2026 by F. A. Davis Company

Molecular Diagnostics 4th edition Buckingham Test Bank

5. What type of bonds spontaneously form between two complementary strands of DNA?
   A. Hydrogen bonds
   B. Covalent bonds
   C. Phosphodiester bonds
   D. Hydrophobic bonds

ANS: A
OBJ: 1.2

6. In a double-stranded DNA molecule, base pairing between strands occurs between which of the following?
   A. A purine and a purine
   B. A pyrimidine and a pyrimidine
   C. A purine and a pyrimidine
   D. All types of nucleotide bases

ANS: C
OBJ: 1.4

7. Which of the following is a purine?
   A. Tyrosine
   B. Cytosine
   C. Adenine
   D. Alanine

ANS: C
OBJ: 1.1

8. Which DNA sequence is complementary to 5'GATTCTCAAAGGACT3'?
   A. 5'GATTCTCAAAGGACT3'
   B. 3'GATTCTCAAAGGACT5'
   C. 3'CTAAGAGTTTCCTGA5'
   D. 5'CTAAGAGTTTCCTGA3'

ANS: C
OBJ: 1.5

9. Which term describes the arrangement of the individual strands in the double-stranded DNA molecule?
   A. Parallel
   B. Antiparallel
   C. Tangential
   D. Divergent

ANS: B
OBJ: 1.5

 Copyright © 2026 by F. A. Davis Company

Molecular Diagnostics 4th edition Buckingham Test Bank

10. What is the process of separating the two DNA strands of double-stranded DNA into two single strands called?
    A. Denaturation
    B. Renaturation
    C. Depolymerization
    D. Hybridization

ANS: A
OBJ: 1.4

11. Which of the following describes DNA replication?
    A. Conservative
    B. Semiconservative
    C. Nonconservative
    D. Dispersive

ANS: B
OBJ: 1.4

12. DNA replication requires the presence of which of the following?
    A. DNA template
    B. Ribosomes
    C. Amino acids
    D. Messenger RNA

ANS: A
OBJ: 1.5

13. DNA replication of the lagging strand proceeds in what manner?
    A. Continuously
    B. After completion of the leading strand
    C. Discontinuously
    D. Synthesis proceeds 3' to 5'

ANS: C
OBJ. 1.4

14. In DNA replication, the template is copied in which direction?
    A. Reading goes 5′ to 3′.
    B. Reading goes 3′ to 5′.
    C. Both strands are read bidirectionally.
    D. Reading proceeds from the -OP to the -OH end.

ANS: B
OBJ: 1.4

 Copyright © 2026 by F. A. Davis Company

Molecular Diagnostics 4th edition Buckingham Test Bank

15. What does synthesis of the lagging DNA strand produce?
    A. Kornberg fragments
    B. Southern fragments
    C. Okazaki fragments
    D. Klenow fragments

ANS: C
OBJ: 1.4

16. Which of the following provides a substrate for DNA polymerase?
    A. RNA primer hydroxyl group
    B. Dideoxynucleotide
    C. Uracil
    D. RNA primer phosphate group

ANS: A
OBJ: 1.3

17. Where does DNA replication begin and end?
    A. Origin of replication; end of the molecule
    B. Promoter; termination site
    C. Start codon; stop codon
    D. Start codon; termination site

ANS: A
OBJ: 1.4

18. Which of the following enzymes will untangle DNA?
    A. Polymerase
    B. Helicase
    C. Kinase
    D. Phosphatase

ANS: B
OBJ: 1.6

19. Restriction endonucleases are enzymes that do which of the following?
    A. Degrade viral proteins
    B. Digest DNA
    C. Have no laboratory applications
    D. Degrade lipids

ANS: B
OBJ: 1.6

 Copyright © 2026 by F. A. Davis Company

Molecular Diagnostics 4th edition Buckingham Test Bank

20. Enzymes that recognize palindromic sequences of DNA, cut within the recognition sequence, do not have methylating activity and are used frequently in the laboratory are which type of restriction enzymes?
    A. Type I
    B. Type II
    C. Type III
    D. Type IV

ANS: B
OBJ: 1.6

21. Which of the following is a palindromic enzyme recognition site?
    A. GAATTC
    B. GAATTG
    C. GAAAAG
    D. GATCAG

ANS: A
OBJ: 1.6

22. An exonuclease will catalyze what type of reaction?
    A. Polymerization of nucleotides into long strands
    B. Separation of complementary DNA strands
    C. Dissociation of phosphodiester bonds at the ends of DNA molecules
    D. Formation of circular DNA molecules from linear ones

ANS: C
OBJ: 1.6

23. What reactions are catalyzed by DNA methyltransferase?
    A. Addition of methyl groups to nitrogen bases
    B. Addition of methyl groups to ribose sugars
    C. Addition of methyl groups to proteins
    D. Removal of methyl groups from DNA

ANS: A
OBJ: 1.6

24. What is the function of DNA ligase?
    A. To synthesize DNA
    B. To cut DNA within the double helix
    C. To chew DNA from the ends
    D. To join two ends of DNA together

ANS: D
OBJ: 1.6

 Copyright © 2026 by F. A. Davis Company

Molecular Diagnostics 4th edition Buckingham Test Bank

25. What is the fertility factor (F) observed by Hayes and Lederberg?
    A. A chemical that encourages bacterial mating
    B. A virus
    C. A plasmid
    D. A polysaccharide on the cell surface

ANS: C
OBJ: 1.10

26. Recombination by transformation would be prevented by which treatment?
    A. Protease
    B. Ribonuclease
    C. Deoxyribonuclease
    D. Phosphorylase

ANS: C
OBJ: 1.10

27. What is the movement of DNA from one bacterium to another through the activity of bacteriophages called?
    A. Conjugation
    B. Transformation
    C. Transduction
    D. Crossing over

ANS: C
OBJ: 1.10

28. In sexual recombination, new combinations of genes are created by which of the following processes?
    A. Polymerization
    B. Crossing over
    C. Exonuclease digestion
    D. Methylation

ANS: B
OBJ: 1.11

29. Which of the following promote bacterial resistance to common antibiotics?
    A. Helicases
    B. R factors
    C. Endonucleases
    D. Methylases

ANS: B
OBJ: 1.10

 Copyright © 2026 by F. A. Davis Company

Molecular Diagnostics 4th edition Buckingham Test Bank

30. Recombination between a plasmid and the bacterial chromosome will result in which of the following?
    A. Rapid degradation of the chromosome
    B. Elimination of plasmid genes
    C. Immediate cellular replication
    D. Integration of plasmid genes

ANS: D
OBJ: 1.11

31. When an RNA molecule folds, what does adenine base pair with?
    A. Thymine
    B. Cytosine
    C. Uracil
    D. Guanine

ANS: C
OBJ: 1.7

32. How are RNA and DNA structurally similar?
    A. They both have ribose as their sugar moiety.
    B. They both mostly consist of a single strand that folds on itself.
    C. They both consist of two complementary strands.
    D. They both are polymers of nucleotide bases.

ANS: D
OBJ: 1.7

33. RNA is synthesized by RNA polymerase. What is it degraded by?
    A. Helicase
    B. Polymerase
    C. Ribonuclease
    D. Methylase

ANS: C
OBJ: 1.7

34. The large ribosome subunit in prokaryotes consists of ribosomal proteins and which of the following?
    A. 16S rRNA
    B. 18S rRNA
    C. 23S rRNA and 5S rRNA
    D. 28S rRNA, 5S rRNA, and 5.8S rRNA

ANS: C
OBJ: 1.8

 Copyright © 2026 by F. A. Davis Company

Molecular Diagnostics 4th edition Buckingham Test Bank

35. Messenger RNA is different from other types of RNA because messenger RNA has which of the following?
    A. A 3' polyA tail
    B. Introns and exons
    C. A 3' methylated cap
    D. A cruciform structure

ANS: A
OBJ: 1.8

36. What is synthesis of RNA guided by a DNA template called?
    A. Translation
    B. DNA replication
    C. Transcription
    D. Reverse transcription

ANS: C
OBJ: 1.7

37. What is synthesis of DNA guided by an RNA template called?
    A. Translation
    B. Replication
    C. Transcription
    D. Reverse transcription

ANS: D
OBJ: 1.7

38. In transcription, what is the starting material, what is the ending material, and what is the major enzyme that catalyzes the process?
    A. DNA; RNA; DNA polymerase
    B. RNA; protein; RNA polymerase
    C. RNA; DNA; reverse transcriptase
    D. DNA; RNA; RNA polymerase

ANS: D
OBJ: 1.7

 Copyright © 2026 by F. A. Davis Company

Molecular Diagnostics 4th edition Buckingham Test Bank

39. If the following oligonucleotide of double-stranded DNA was transcribed, what would be the sequence of the RNA?
5'TGCTAGCTA3'
3'ACGATCGAT5'
A. 5'UGCUAGCUA3'
B. 5'ACGAUCGAU3'
C. 3'ACGATCGAT5'
D. 3'ACGAUCGAU5'

ANS: A
OBJ: 1.7

40. Which of the following enzymes performs transcription in bacteria?
A. RNA-dependent DNA methylase
B. DNA-dependent RNA polymerase
C. DNA-dependent DNA polymerase
D. RNA-dependent RNA nuclease

ANS: B
OBJ: 1.7

41. The RNA polymerase holoenzyme consists of which of the following subunits?
A. α3, β, β'
B. α2, β, β', ω, σ
C. α, α', β, β'
D. α2, β, β', ρ, ω

ANS: B
OBJ: 1.7

42. Which component of RNA polymerase is responsible for initiating transcription at the correct site?
A. α
B. β
C. ρ
D. σ

ANS: D
OBJ: 1.7

 Copyright © 2026 by F. A. Davis Company

Molecular Diagnostics 4th edition Buckingham Test Bank

43. Which of the following is involved with termination of transcription in bacteria?
    A. DNA polymerase
    B. Sigma
    C. Rho
    D. PolyA signal

ANS: C
OBJ: 1.7

44. Which of the following is associated with termination of mRNA transcription in eukaryotes?
    A. Ribonucleotide polymerase
    B. Sigma protein
    C. Attenuation by rho
    D. Polynucleotide adenyltransferase

ANS: D
OBJ: 1.7

45. Which of the following types of RNA is directly involved in removing introns from RNA in eukaryotes?
    A. 18S ribosomal
    B. Transfer
    C. Small nuclear
    D. 16S ribosomal

ANS: C
OBJ: 1.9

46. What is the secondary structure of transfer RNA?
    A. Cruciform or inverted L
    B. Heteroduplex
    C. Triple helix or triplex
    D. Ring or inverted C

ANS: A
OBJ: 1.8

47. What is the loop of transfer RNA that interacts with the codon on mRNA in translation called?
    A. D loop
    B. TψC loop
    C. Variable loop
    D. Anticodon loop

ANS: D
OBJ: 1.8

 Copyright © 2026 by F. A. Davis Company

Molecular Diagnostics 4th edition Buckingham Test Bank

48. One mechanism of intron removal results in which byproduct?
    A. Dinucleotides
    B. PolyA tails
    C. Lariats
    D. Okazaki fragments

ANS: C
OBJ: 1.9

49. Capping of RNA involves which type of connection?
    A. 3'RNA-5' cap
    B. 5'RNA-3' cap
    C. 5'RNA-5' cap
    D. 3'RNA-3' cap

ANS: C
OBJ: 1.9

50. Thalassemias arise from changes in what part of the beta globin gene?
    A. 3' untranslated region
    B. PolyA tail
    C. Splice-recognition site
    D. Ribosome-binding site

ANS: C
OBJ: 1.9

 Copyright © 2026 by F. A. Davis Company

Molecular Diagnostics 4th edition Buckingham Test Bank