

1) The difference between a ribonucleotide and a deoxyribonucleotide is:

- A) a deoxyribonucleotide has an —H instead of an —OH at C-2.
- B) a deoxyribonucleotide has α configuration; ribonucleotide has the β configuration at C-1.
- C) a ribonucleotide has an extra —OH at C-4.
- D) a ribonucleotide has more structural flexibility than deoxyribonucleotide.
- E) a ribonucleotide is a pyranose, deoxyribonucleotide is a furanose.

2) In the Watson-Crick model for the DNA double helix (B form) the A–T and G–C base pairs share which one of the following properties?

- A) The distance between the two glycosidic (base-sugar) bonds is the same in both base pairs, within a few tenths of an angstrom.
- B) The molecular weights of the two base pairs are identical.
- C) The number of hydrogen bonds formed between the two bases of the base pair is the same.
- D) The plane of neither base pair is perpendicular to the axis of the helix.
- E) The proton-binding groups in both base pairs are in their charged or ionized form.

3) Chargaff's rules state that in typical DNA:

- A) $A = G$.
- B) $A = C$.
- C) $A = U$.
- D) $A + T = G + C$.
- E) $A + G = T + C$.

4) The double helix of DNA in the B-form is stabilized by:

- A) covalent bonds between the 3' end of one strand and the 5' end of the other.
- B) hydrogen bonding between the phosphate groups of two side-by-side strands.
- C) hydrogen bonds between the riboses of each strand.
- D) nonspecific base-stacking interaction between two adjacent bases in the same strand.
- E) ribose interactions with the planar base pairs.

5) In nucleotides and nucleic acids, syn and anti conformations relate to:

- A) base stereoisomers.
- B) rotation around the phosphodiester bond.
- C) rotation around the sugar-base bond.
- D) sugar pucker.
- E) sugar stereoisomers.

6) Which of the following is a palindromic sequence?

- A) AGGTCC
TCCAGG
- B) CCTTCC
GCAAGG
- C) GAATCC
CTTAGG
- D) GGATCC
CCTAGG
- E) GTATCC
CATAGG

7) Double-stranded regions of RNA:

- A) are less stable than double-stranded regions of DNA.
- B) can be observed in the laboratory, but probably have no biological relevance.
- C) can form between two self-complementary regions of the same single strand of RNA.
- D) do not occur.
- E) have the two strands arranged in parallel (unlike those of DNA, which are antiparallel).

8) Compounds that generate nitrous acid (such as nitrites, nitrates, and nitrosamines) change DNA molecules by:

- A) breakage of phosphodiester bonds.
- B) deamination of bases.
- C) depurination.
- D) formation of thymine dimers.
- E) transformation of A → T.

9) Match the type of bond with the role below:

<u>Bond type</u>	<u>Role</u>
(a) phosphodiester	___ links base to pentose in nucleotide
(b) <i>N</i> -glycosidic	___ joins adjacent nucleotides in one strand
(c) phosphate ester	___ joins complementary nucleotides in two strands
(d) hydrogen	___ difference between a nucleoside and a nucleotide

10) Why does lowering the ionic strength of a solution of double-stranded DNA permit the DNA to denature more readily (for example, to denature at a lower temperature than at a higher ionic strength)?

11) A solution of DNA is heated slowly until the t_m is reached. What is the likely structure of the DNA molecules at this temperature?