

## Problem Set #2

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### DNA and RNA

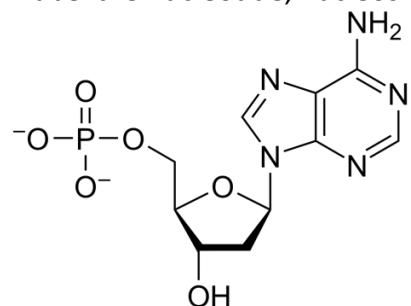
Question 1:

Give the name and the one letter abbreviation of the 5 nucleobases present in DNA and RNA and indicate which bases are used in RNA and which are used in DNA.

Answer:

Question 2:

In the chemical structure below label the nucleotide, nucleoside, and nucleobase.



Question 3:

How many phosphates can a nucleotide have?

Answer:

Question 5:

How many hydrogen bonds does a GC and an AT base pair form?

Answer:

Question 6:

What primarily determines the melting temperature of DNA?

Answer:

Question 7:

Which of these DNA strands will have the highest melting temperature?

- a) AGCTGAGCTGAC
- b) AGATGAGCAGAC
- c) CGCTGCGCTGAC
- d) TGTTGAGCAGAC

Answer:

Question 8:

Write down the complementary DNA sequence for the sequence indicated below and label the 5' and 3' ends.

5' AGTGTGATGA 3'

Answer:

Question 9:

In the image below label the following: major groove, minor groove, phosphate backbone. What structural form of DNA is this?



Answer:

Question 10:

Define the following terms: genome, chromosome, chromatin, ploidy

Answer:

Question 11:

What are histones, what do they form, and what does the resulting structure do?

Answer:

Question 12:

Give a definition for the following terms:

Gene

Promoter

Operator

Enhancer/Silencer

Terminator

5' / 3' UTR

Exon

Intron

Poly-A tail

Answer:

Question 13:

What is a polycistronic operon and do you find these in eukaryotes or prokaryotes?

Answer:

Question 14:

What are the functions of the mRNA 5' cap?

Answer:

Question 15:

What is spliced out during mRNA processing?

Answer:

Question 16:

What part of a tRNA is being aminoacylated?

- a) The acceptor stem
- b) The CCA tail
- c) The anticodon loop
- d) The variable loop

Answer: