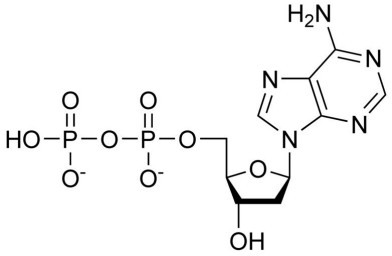
CHE 102 - Practice Exam - Nucleic Acids - S22 - ver 1 Score: _____/??

Name: _____ Class: _____ Date: _____

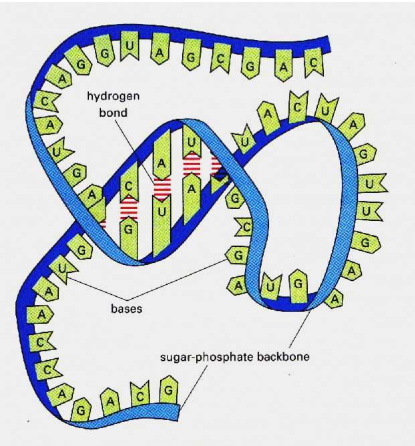
Read each question carefully. Some questions have multiple parts. Answer all questions with complete sentences.

1. Draw an example of each of the following molecules. Answer any additional questions given.
   (a) Draw a picture of Adenosine. What is the difference between Adenosine and Deoxyadenosine?
   (b) Uridine-5'-diphosphate (just draw a U for uridine)
   (c) dTMP (just draw a T for thyamine)
   (d) Draw a picture of 3'-dADP. Circle any ether bonds. Put a square around any high energy phosphate bonds.
   (e) Draw a picture of 5'-CDP. Circle any ether bonds. Put a square around any high energy phosphate bonds.
   (f) Draw a RNA fragment consisting of C and G (just draw a C for cysteine and a G for guanine)
2. Answer the following questions about the molecule pictured below:



   2(a) Give the full name for the molecule.
   2(b) Give the abbreviation for the molecule.
   2(c) Is this an example of a nucleoside or nucleotide? Explain.
   2(d) Circle the ether like bond(s). Place a square around the high energy phosphate bond(s)
3. Draw a picture of 5'-dGMP. Put a square around any high energy phosphate bonds. What type of reaction occurred to make the molecule from its parts?
4. Draw a picture of 3'-dUMP. Circle any ether bonds. Put a square around any high energy phosphate bonds. What type of reaction occurred to make the molecule from its parts?
5. Sketch a portion of RNA showing the linkage between two base pairs.
6. Sketch a portion of DNA (including the backbone) showing the structure of TTT (you may abbreviate the bases as shown in class).
7. DNA forms a double helix. What holds the two strands together? Explain.
8. What is meant by the term: "complementary" base pairs? Which base pairs are complementary? What makes them complementary? How does this effect the structure of DNA?

9. Is the following a small portion of DNA or RNA? Explain.



10. How is the direction in which a protein is built controlled? (ie Why do we always build from the N-terminal end to the C-terminal end?)

11. Sketch a picture of tRNA and answer the following questions:
    (a) Its overall purpose.
    (b) What is responsible for its very specific structure.
    (c) How each part (3 total) of its structure supports the purpose.

12. What is the general purpose for each of the following molecules:
    (a) DNA
    (b) mRNA
    (c) tRNA
    (d) rRNA

13. What do the abbreviations DNA and RNA stand for, and what are (5) differences between DNA and RNA?

14. What process (Replication, Transcription, or Translation) is best described by the following "reactions":
    (a) DNA $\longrightarrow$ RNA
    (b) DNA $\longrightarrow$ 2 DNA
    (c) RNA + AA $\longrightarrow$ Protein

Table 31.3 The Genetic Code for Messenger RNA

First nucleotide	Second nucleotide	Third nucleotide and amino acid coded			
		U	C	A	G
U	U	Phe	Phe	Leu	Leu
	C	Ser	Ser	Ser	Ser
	A	Tyr	Tyr	TC*	TC*
	G	Cys	Cys	TC*	Trp
C	U	Leu	Leu	Leu	Leu
	C	Pro	Pro	Pro	Pro
	A	His	His	Gln	Gln
	G	Arg	Arg	Arg	Arg
A	U	Ile	Ile	Ile	Met
	C	Thr	Thr	Thr	Thr
	A	Asn	Asn	Lys	Lys
	G	Ser	Ser	Arg	Arg
G	U	Val	Val	Val	Val
	C	Ala	Ala	Ala	Ala
	A	Asp	Asp	Glu	Glu
	G	Gly	Gly	Gly	Gly

*Termination or nonsense codon

15. Translate the following mRNA strand (UUUCAUAAG) into 1) corresponding DNA strand 2) tRNA and 3) the resulting Amino Acid sequence.

16. What amino acid is coded for by the following: (a) DNA - TAT (B) mRNA - CAU.

17. What amino acid is coded for by the following:

    (a) DNA - TCC

    (b) mRNA - UCC

18. Translate the following DNA sequence: TAT-GCG-AAA-TTT
    (a) mRNA strand:

    (b) Amino Acid sequence:

19. Describe the biosynthesis of proteins (Initiation, Elongation, and Termination.