HOMEWORK #11

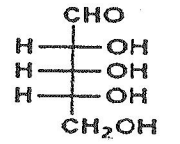
CHEM 121, section 1 Winter 2011 **Printed Name:** _____

Background for the Chapter. 22. Nucleic Acid

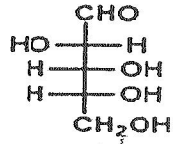
Homework Feb 18, 2011 by 12:15 PM! **Group Name:** _____

1) Give the names of names of pentose sugars written in Fisher projections (linear form) below.

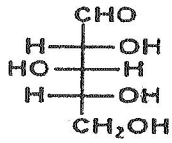
Pentoses



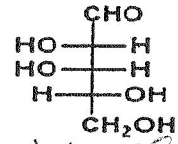
a) ribose



b) arabinose

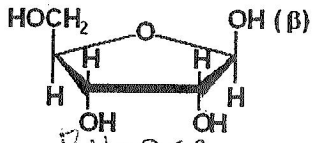


c) xylose

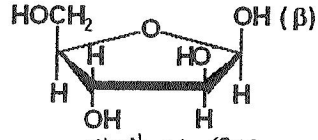


d) lyxose

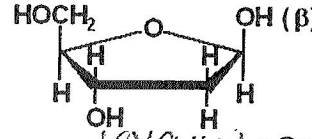
2) Give the names of names of pentose sugars written in Haworth projections (cyclic hemiacetal form) below. (Label the carbon atoms)



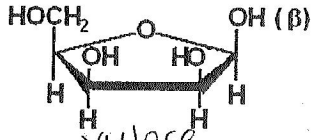
a) Ribose
D-β-Ribofuranose



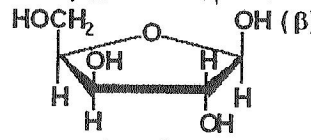
b) arabinose
D-β-arabinofuranose



c) dexoyribose

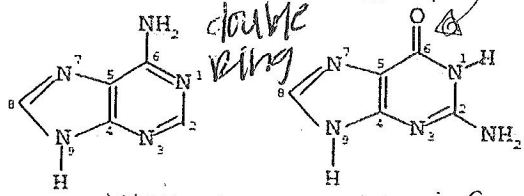


d) xylose

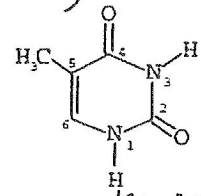


e) lyxose

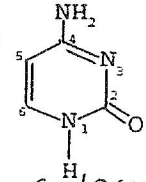
3) Give the names of names of bases and identify them as purines and pyrimidines (Label the atoms in the ring) (purines) (pyrimidines)



double ring



single ring



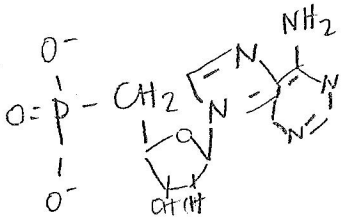
A → T
C → G

a) adenine b) guanine c) thymine d) cytosine

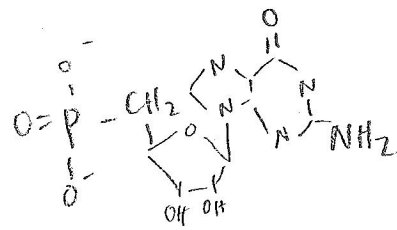
4) a) What is phosphate and phosphate mono/di-esters? one phosphate group attached to sugar → 2 phosphate groups attached to sugar

b) What is a nucleotide? base, sugar, phosphate group.

b) Draw the structure of dAMP and GMP

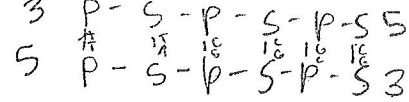


dAMP

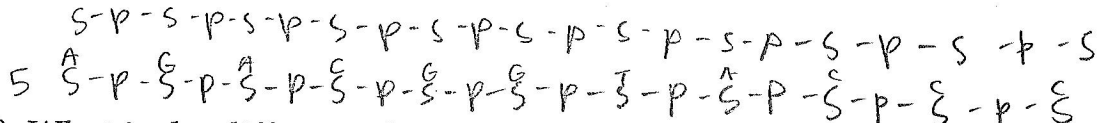


5) (3 pts) Draw the following

a) Backbone of a nucleic acid DNA



b) DNA sequence 5'-TGA CGG TAC CC-3'



6) What is the difference between DNA and RNA?

	DNA	RNA
number of strands	2	1
sugar used	deoxyribose	ribose
bases used	AGTC	AGCU
base pairs	A-T → G-G	A-U → G-C
possible locations	nucleus	cytoplasm
full name	deoxyribonucleic acid	ribonucleic acid

7) Write the type of RNA used for each of the following functions:

a) makes up part of the ribosome

ribosomal RNA

b) delivers amino acid to the ribosomes

D-RNA

c) codes for proteins 3 letter triplets that are based on codes for amino acids.

8) Fill in the table:

	Name of process	Location
copying DNA	Replication	nucleus
making RNA from DNA	transcription	nucleus
making protein from RNA	translation	cytoplasm/ribosome

8. What is the name given to the short (610 bp) sequence of bases in the RNA prior to the start of transcription to which the RNA polymerase binds?

heterogenous nuclear RNA hnRNA

9.

(a) How many nucleotides make up a codon? 3

(b) How mant different codons are there? 64

(c) How many different amino acids are there? 20

10. Write the RNA sequence transcribed from the following DNA sequence. **Then** write the amino acid sequence of the protein translated from that RNA.

5'-TGA TTT CGG TAC GAT TAA CAA CCT CGA ATT CC-3'

RNA ACU|AAA|GCC|AUG|CUA|AUU|GUU|GGA|GCU|UAA|GG

Thr Lys Ala initiation code Leu Ile Val Gly Arg Stop

11. What causes the variation in traits that is the basis for evolution?

the mutation

12. Why are frequently-dividing cells more prone to mutation?

opens up DNA code in cell division.

13.

(a) What is gene expression?