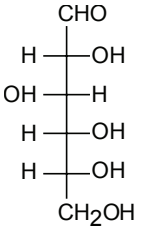
Chem 250 In-class Quiz #3

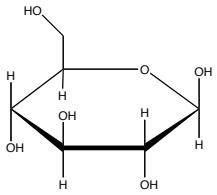
This exam is composed of **20** questions. Please scan them all before starting.

As discussed in the course syllabus, honesty and integrity are absolute essentials for this class. In fairness to others, dishonest behavior will be dealt with to the full extent of University regulations.

I hereby state that all answers on this exam are my own and that I have neither gained unfairly from others nor have I assisted others in obtaining an unfair advantage on this exam.



D-glucose



β-D-Glucose

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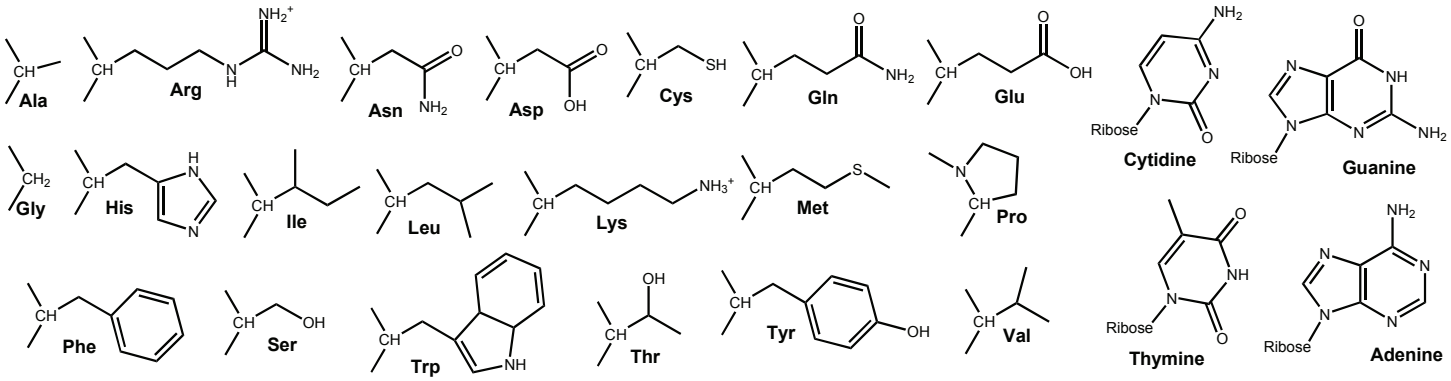
Signature

PERIODIC TABLE OF THE ELEMENTS

1A	2A	3B	4B	5B	6B	7B	8B	8B	8B	1B	2B	3A	4A	5A	6A	7A	8A
1 H 1.008																	2 He 4.003
3 Li 6.939	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.31											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.90	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.71	29 Cu 63.55	30 Zn 65.39	31 Ga 69.72	32 Ge 72.61	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (99)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3
55 Cs 132.9	56 Ba 137.3	57 La 138.9	72 Hf 178.5	73 Ta 181.0	74 W 183.8	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra 226.0	89 Ac 227.0	104 Unq (261)	105 Unp (262)	106 Unh (263)	107 Uns (262)	108 Uno (265)	109 Une (266)									



1. (5 points) DNA and RNA can be best characterized as

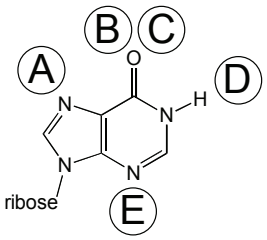
   1) nonpolar 2) polar 3) charged

   4) all of the above

2. (5 points) Which is more likely to have enzyme-like activity?

   1) DNA 2) RNA 3) they have the same likelihood

3. (5 points) In the (unnatural) inosine base at right, which most completely lists the H–bond acceptors?



   1) B, C, and D 2) A, B, C, and E

   3) A and E 4) D only

   5) C, D, and E

4. (5 points) DNA and RNA polymerase active sites distinguish Watson-Crick base pairs from other base pairs by

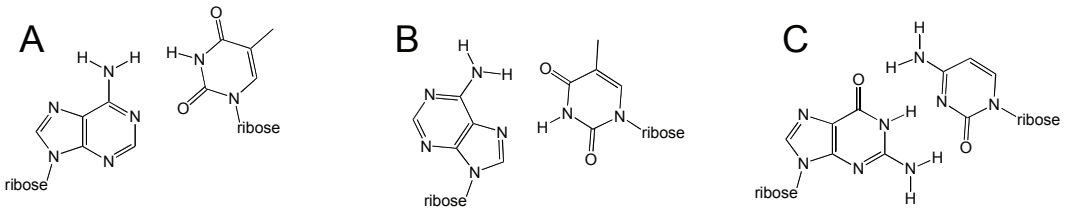
   1) the intrinsic strength of the base pair

   2) interactions in the major groove

   3) interactions with the sugar and phosphate backbone

   4) interactions in the minor groove

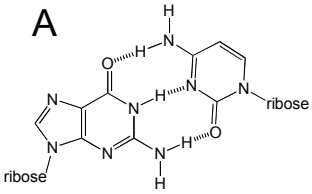
   5) channeling with the spirit of Francis Crick



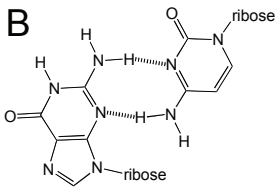
5. (5 points) Which of the above has the weakest interaction?

   1) A 2) B 3) C 4) they all show good pairing

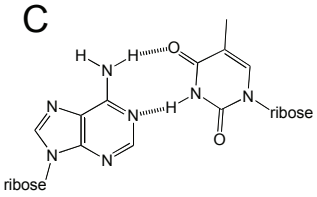
A



B



C



6. (5 points) Which base pair above is ***not*** a Watson-Crick pair?

   1) A 2) B 3) C 4) they are all Watson-Crick

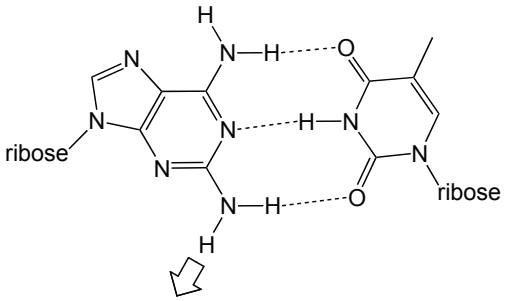
7. (5 points) Which base pair above represents good base pairing?

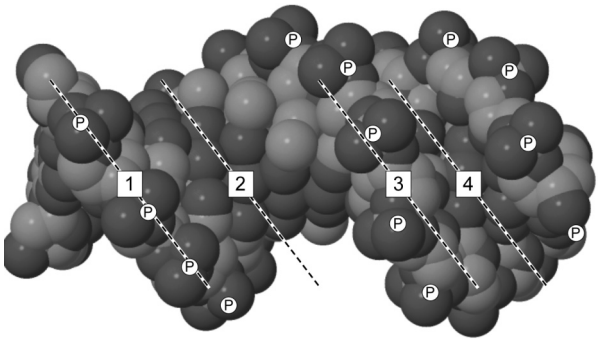
   1) A 2) B 3) C 4) they all display good pairing

8. (5 points) Which amino acid is best for recognizing an AT base pair via major groove interactions?

   1) Gln 2) Ser 3) Lys 4) Arg 5) Pro

9. (5 points) Match the base functional group highlighted by the arrow with its location in duplex DNA





   1) 1 2) 2 3) 3 4) 4 5) none of these

10. (5 points) Consider the duplexes at right:

    1) (A) is more stable than (B)

    2) (B) is more stable than (A)

    3) They have the same stability

(A)
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5'-ATTATTATATTA-3'
3'-TAATAATATAAT-5'
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(B)
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5'-GCG-3'
3'-CGC-5'
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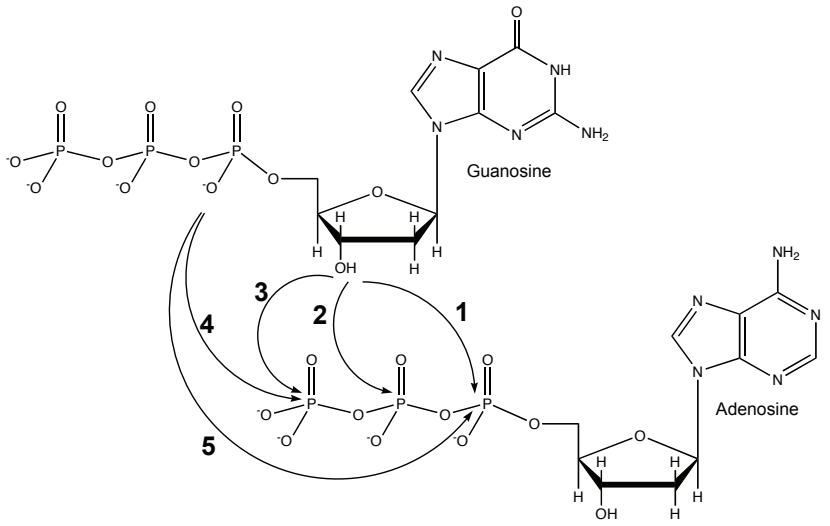
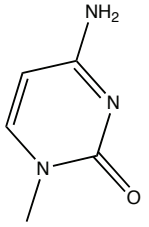
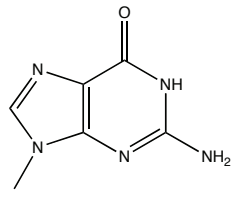
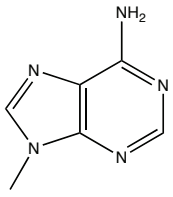
-11. (5 points) Which arrow below represents the nucleophilic attack that would be required in formation of the GA dinucleotide?

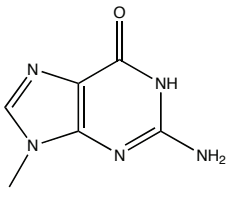


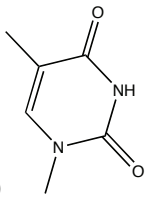
12. (5 points) Consider the base at right. With which of the following bases below will it form the ***lowest*** energy base pair?



1) 

2) 

3) 

4) 

13. (5 points) In eukaryotes, genes contain

1) introns and exons 2) introns and ribozymes 3) exons and gluons

4) introns and promoters 5) klingons and muggles

14. (5 points) Which came first?

1) DNA 2) RNA 3) protein 4) the chicken

15. (5 points) Mutation of the codon ACU to the codon ACC is most likely to:
(you are expected to *guess* (intelligently) here, not know precisely what these code for)
1) Substantially disrupt the encoded protein's structure
2) Not have a large impact on the encoded protein's structure
3) Switch the encoded protein from helical to beta sheet
4) Terminate the protein's synthesis prematurely

16. (5 points) The tRNA anticodon:
1) inhibits encoding of protein at a specific codon
2) binds selectively to a 3 base sequence in mRNA
3) inhibits tRNA function
4) provides feedback inhibition in the synthesis of tRNA
5) none of the above

17. (5 points) RNA splicing refers to
1) Rejoining of broken mRNA transcripts
2) Removal of introns and rejoining of exon sequences in mRNA
3) Covalently attaching more than two RNA molecules into a star pattern
4) Changing one base to another in the maturation of mRNA
5) none of the above

18. (5 points) Exons in RNA are best described as
1) Ultrastable elements in otherwise unstable mRNA
2) Sometimes encoding independently folded domains within a protein
3) Usually junk regions, not of any importance
4) Places to fill up your tank
5) none of the above

19. (5 points) If the final, edited segment of RNA encoding a protein is 981 bases in length, how many amino acids are in the protein?
1) 327 2) 981 3) 2,943 4) 297 5) 2,673

20. (5 points) What is the course number of this class?
1) 111 2) 250 3) 496 4) 728