

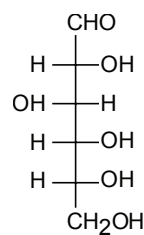
## Chem 250

## Answer Key In-class Quiz #3v1

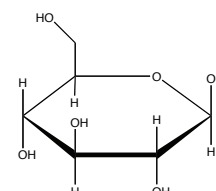
This exam is composed of **20** questions. Please scan them all before starting.

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

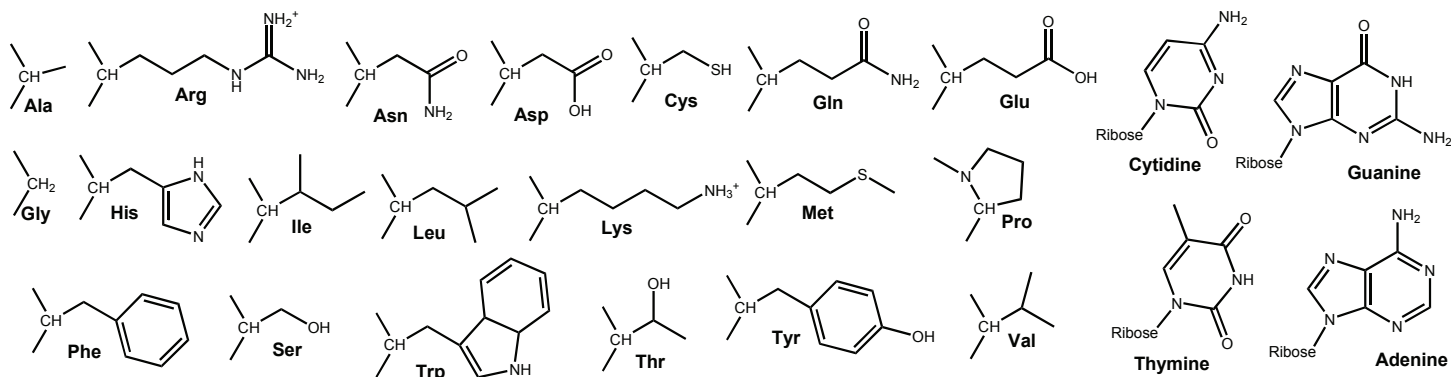


β-D-Glucose

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



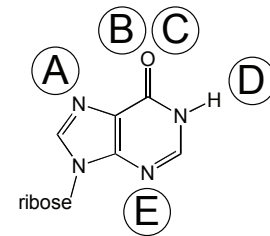
1. (5 points) DNA and RNA can be best characterized as
- 1) nonpolar
  - 2) polar
  - 3) charged
  - 4) all of the above

**(4) (Chptr 25)**

2. (5 points) Which is more likely to have enzyme-like activity?
- 1) RNA
  - 2) DNA
  - 3) they have the same likelihood

**(1) (Chptr 25)**

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



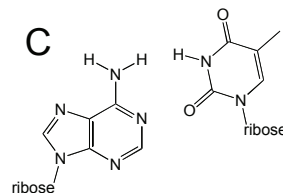
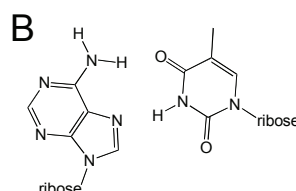
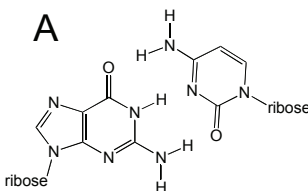
- 1) B, C, and D
- 2) A, B, C, and E
- 3) A and E
- 4) D only
- 5) C, D, and E

**(4) (Chptr 25)**

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

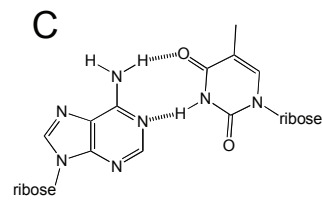
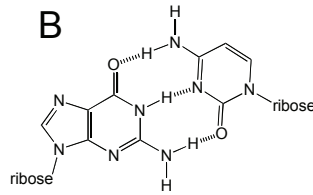
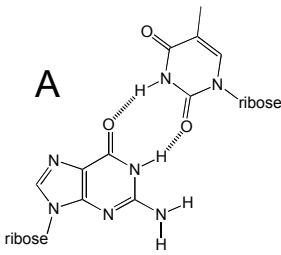
- 1) the intrinsic strength of the base pair
- 2) interactions in the major groove
- 3) interactions in the minor groove
- 4) interactions with the sugar and phosphate backbone
- 5) channeling with the spirit of Francis Crick

**(4) (lecture material in Chptr 25)**



5. (5 points) Which of the above has the weakest interaction?
- 1) A
  - 2) B
  - 3) C
  - 4) they all show good pairing

**(3) C – donors don't match acceptors (Chptr 25)**



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

**(1) (Chptr 25)**

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

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

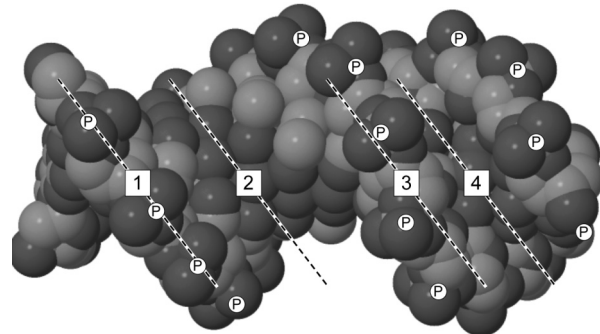
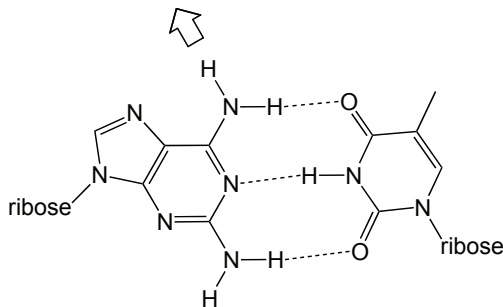
**(4) (Chptr 25)**

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

- 1) Arg                      2) Ser                      3) Lys                      4) Asn                      5) Pro

**(4) (Chptr 25 and 22)**

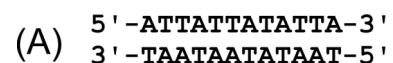
9. (5 points) Match the base functional group highlighted by the arrow with its location in duplex DNA



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

**(2) This is in the major groove (Chptr 25)**

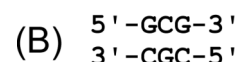
10. (5 points) Consider the duplexes at right:



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

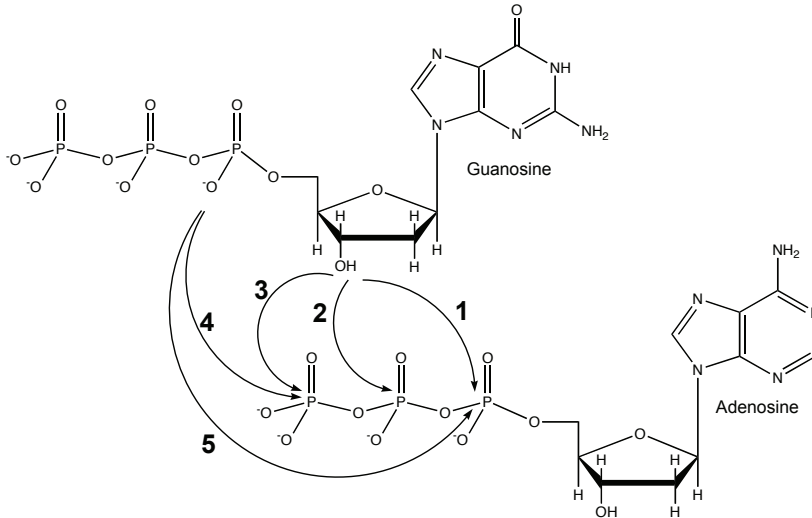
2) (B) is more stable than (A)

3) They have the same stability



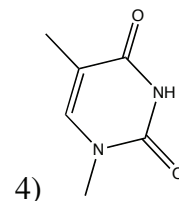
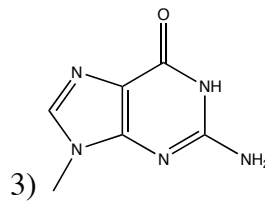
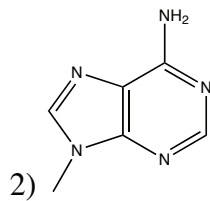
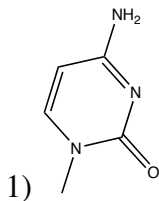
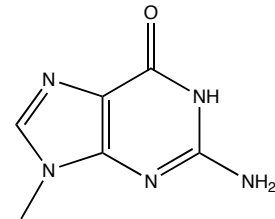
**(1) Hydrophobic burial drives stability– longer gives more (Chptr 25)**

- 11. (5 points) Which arrow below represents the nucleophilic attack that would be required in formation of the GA dinucleotide?



**(1) (Chptrs 25 and 19)**

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



**(1) Chptr 25. Draw the arrows and look for at least a “two-fer” set of interactions. Of all possible combinations, the one shown is the only one that can form *three* simultaneous H-bonds.**

13. (5 points) In eukaryotes, genes contain

1) introns and promoters

2) introns and ribozymes

3) exons and gluons

4) introns and exons

5) klingons and muggles

**(4) (Chptr 26)**

14. (5 points) Which came first?

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

**(1) (Chptr 25)**

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

**(2) Wobble substitutions often lead to the same amino acid. Single base substitutions *anywhere* are most likely to encode at least a similar amino acid. (Chptr 26)**

16. (5 points) The tRNA anticodon:

- 1) inhibits encoding of protein at a specific codon  
2) inhibits tRNA function  
3) provides feedback inhibition in the synthesis of tRNA  
4) binds selectively to a 3 base sequence in mRNA  
5) none of the above

**(4) Major concept (Chptr 26)**

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

**(2) Basic concept (Chptr 26)**

18. (5 points) Exons in RNA are best described as
- 1) Ultrastable elements in otherwise unstable mRNA
  - 2) Usually junk regions, not of any importance
  - 3) Sometimes encoding independently folded domains within a protein
  - 4) Places to fill up your tank
  - 5) none of the above
- (3) (Chptr 26)**
19. (5 points) If the final, edited segment of RNA encoding a protein is 891 bases in length, how many amino acids are in the protein?
- 1) 327            2) 891            3) 2,943            4) 297            5) 2,673
- (4) It's a 3 base codon (Chptr 26)**
20. (5 points) What is the course number of this class?
- 1) 250            2) 111            3) 496            4) 728
- (1)**