

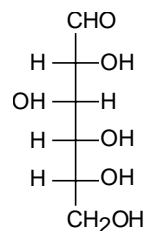
## Chem 250

## In-class Quiz #3

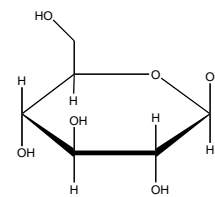
This exam is composed of **20** questions. Please scan them all before starting.

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

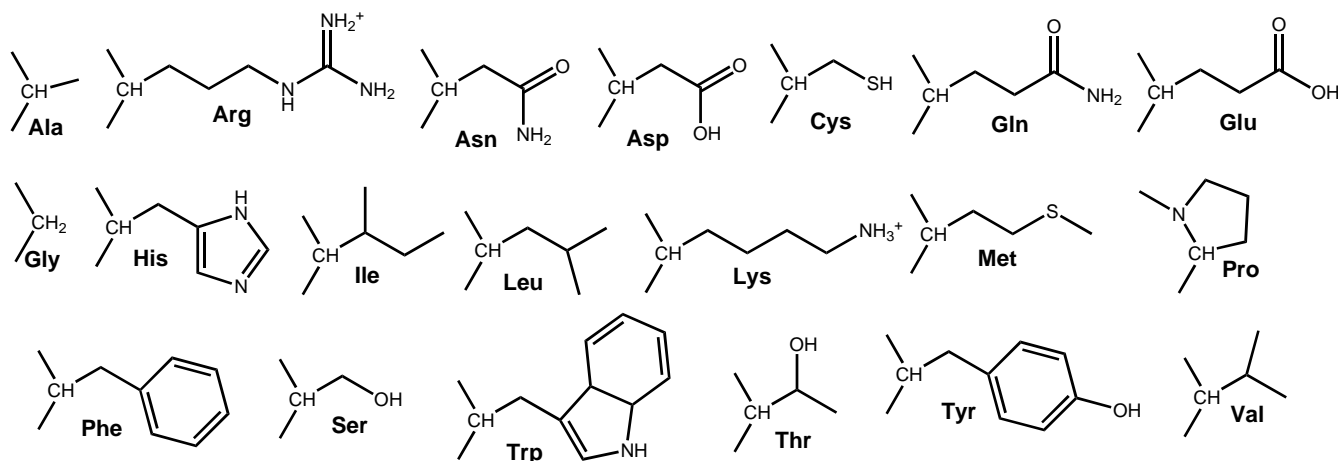


β-D-Glucose

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Signature

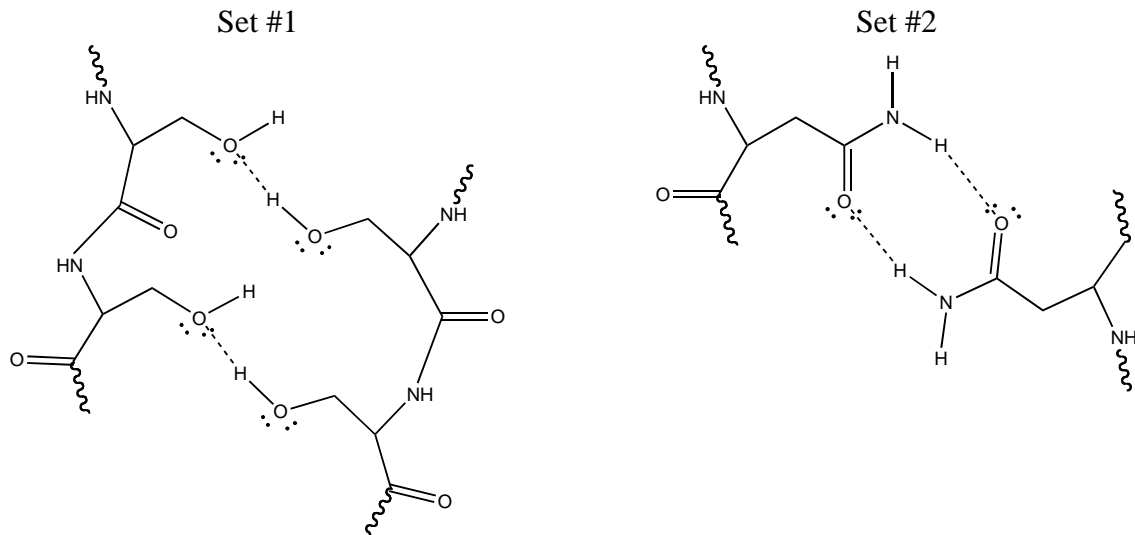
## PERIODIC TABLE OF THE ELEMENTS

1A	2A	3B	4B	5B	6B	7B	8B	8B	8B	1B	2B	3A	4A	5A	6A	7A	8A
1 <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)									





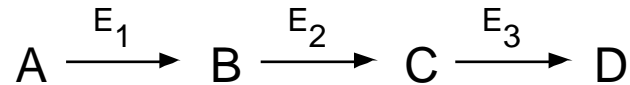
7. (5 points) Consider the sets of interactions below



Which of the above sets of interactions is more stabilizing (lower in energy)?

- 1) Set #1                      2) Set #2                      3) they have the same energy
8. (5 points) Enzymes increase the rate of reactions by
- 1) lowering the energy of the transition state of the reaction
  - 2) raising the local kinetic energy of the substrate atoms
  - 3) lowering the energy of the products
  - 4) magic
9. (5 points) You are measuring the rate of an enzyme catalyzed reaction. Addition of increasing amounts of an inhibitor leads, at the highest concentrations of the inhibitor, to a leveling off of the reaction rate. The inhibitor is
- 1) competitive              2) noncompetitive              3) complementary              4) noncomplementary
10. (5 points) “Lock and key fit” refers to
- 1) the binding of an activator unlocking an active site
  - 2) inhibition by an inhibitor complementary in structure to the substrate
  - 3) the complementary structures of the substrate and an enzyme active site
  - 4) activation by an allosteric cofactor

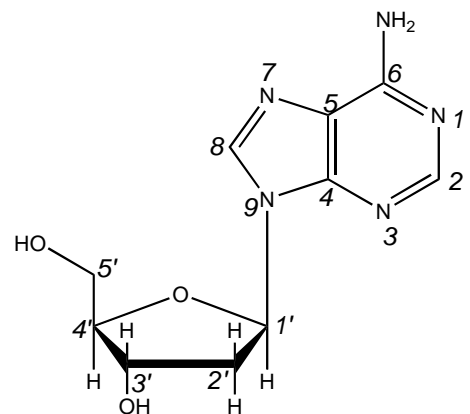
11. (5 points) In the reaction below, “feedback control” refers to:



- 1) Enzyme  $E_3$  binds to reactant A, preventing its reaction with enzyme  $E_1$
  - 2) Enzyme  $E_3$  is redirected to generate product A, rather than product D
  - 3) Enzyme  $E_3$  binds to and inhibits enzyme  $E_1$
  - 4) Binding of product D to enzyme  $E_3$  inhibits the enzyme
  - 5) Binding of product D to enzyme  $E_1$  inhibits the enzyme
12. (5 points) Which process below is NOT used to regulate enzyme networks?
- 1) proenzyme synthesis
  - 2) feedback inhibition
  - 3) homeopathic regulation
  - 4) allosteric regulation
  - 5) covalent modification of enzymes
13. (5 points) Which of the following is a correct statement describing the induced-fit model of enzyme action:
- Substrates fit into the active site:
- 1) because both are exactly the same size and shape
  - 2) by changing the size and shape of the active site upon binding
  - 3) by changing their size and shape to match those of the active site

14. (5 points) In adenosine, shown at right, which of the following sugar centers are chiral (note that the sugar atoms are labeled  $n'$ , while the base atoms are labeled  $n$ ).

- 1)  $1'$ ,  $2'$ ,  $3'$ ,  $4'$ , and  $5'$
- 2)  $1'$ ,  $2'$ ,  $3'$ ,  $4'$ , and  $5'$
- 3)  $1'$ ,  $3'$ ,  $4'$ , and  $5'$
- 4)  $1'$ ,  $2'$ ,  $3'$ , and  $4'$
- 5)  $1'$ ,  $3'$ , and  $4'$



15. (5 points) Which of the following atoms in adenosine are  $sp^2$  hybridized?

1) 1', 2', 3', 4', and 5'

2) 1', 2', 3', and 4'

3) 1 through 8

4) 1 through 9

5) 1 through 9 and 5'

16. (5 points) What is the course number of this class?

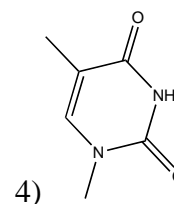
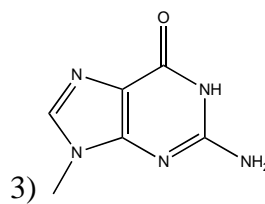
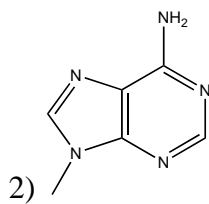
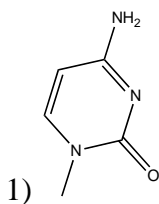
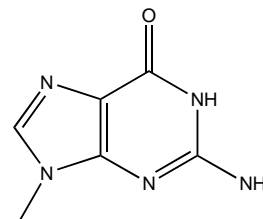
1) 250

2) 111

3) 496

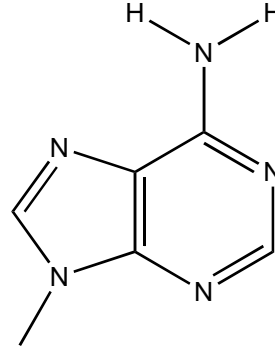
4) 728

17. (5 points) Consider the base at right. With which of the following bases below will it form the lowest energy base pair?

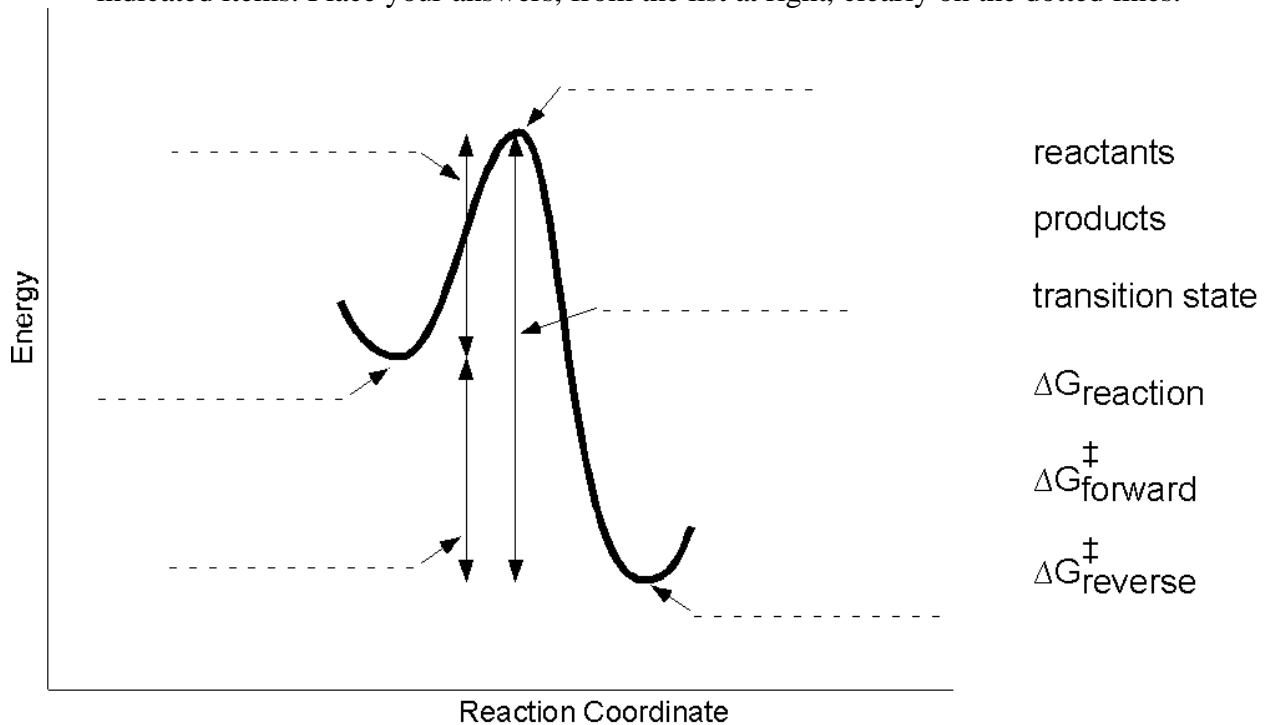


**\*\* Answer questions 18-20 directly on this sheet, in the spaces provided \*\***

18. (5 points) In the molecule at right, using arrows, mark each of the hydrogen bond donors (pointing out) and hydrogen bond acceptors (pointing in).



19. (5 points) Shown below is the reaction coordinate diagram for thermodynamically favorable, enzyme-catalyzed reaction. Briefly (one or two words) describe each of the indicated items. Place your answers, from the list at right, clearly on the dotted lines.



20. (5 points) In 15 words or less, explain why guanosine and cytosine form stable base pairs in a DNA duplex, but do not pair when in solution as isolated nucleotides.