

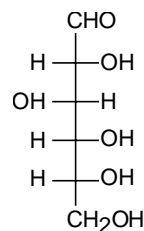
Chem 250

In-class Quiz #3

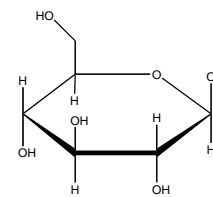
This exam is composed of **20** questions. Please scan them all before starting.

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

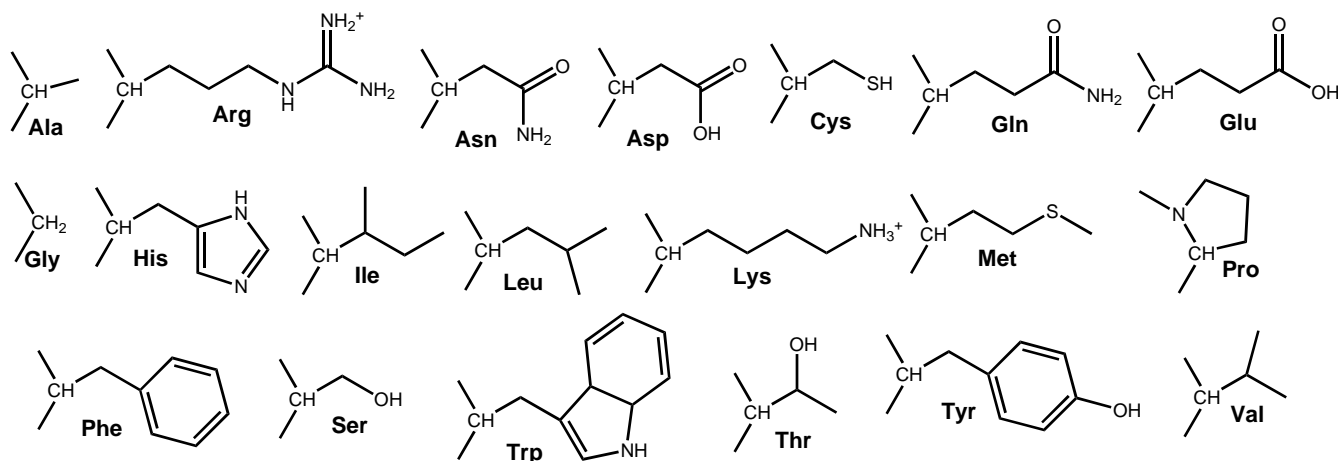


β-D-Glucose

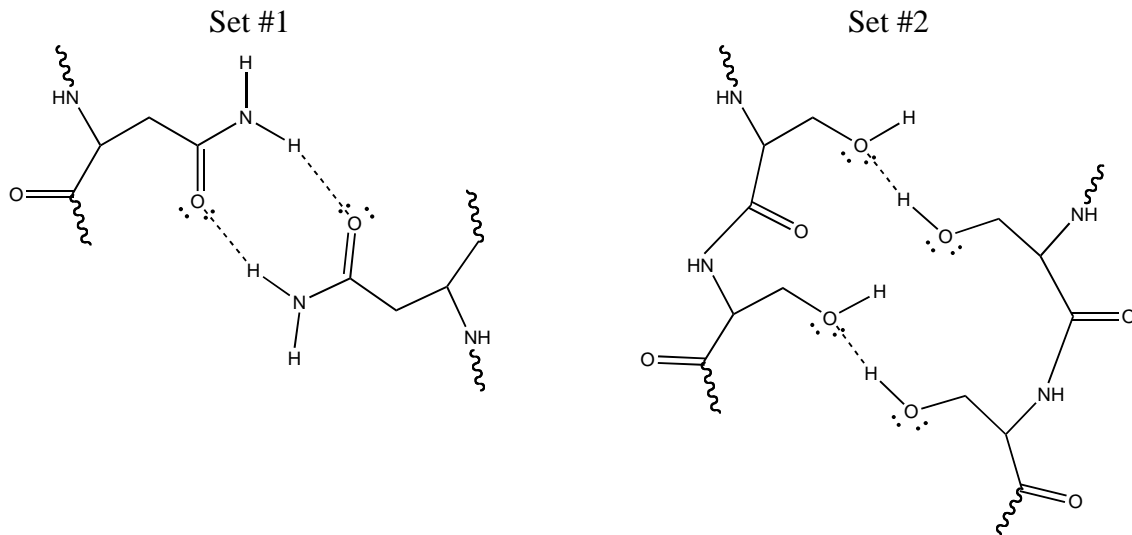
Signature

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)									



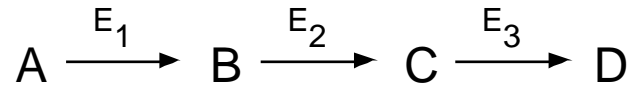
7. (5 points) Consider the sets of interactions below



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) raising the local kinetic energy of the substrate atoms
 - 2) lowering the energy of the transition state of the reaction
 - 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 complete inhibition of the reaction. 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) the complementary structures of the substrate and an enzyme active site
 - 3) inhibition by an inhibitor complementary in structure to the substrate
 - 4) activation by an allosteric cofactor

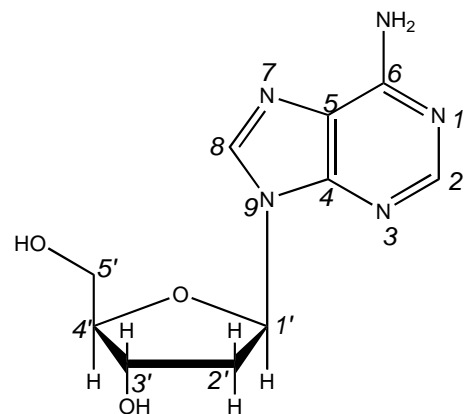
11. (5 points) In the reaction below, “feedback control” refers to:



- 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_1 inhibits the enzyme
 - 5) Binding of product D to enzyme E_3 inhibits the enzyme
12. (5 points) Which process below is NOT used to regulate enzyme networks?
- 1) proenzyme synthesis
 - 2) feedback inhibition
 - 3) allosteric regulation
 - 4) homeopathic 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 their size and shape to match those of the active site
 - 3) by changing the size and shape of the active site upon binding

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) $1'$, $3'$, and $4'$
- 5) $1'$, $2'$, $3'$, 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 9

4) 1 through 8

5) 1 through 9 and 5'

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

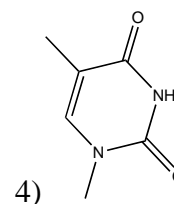
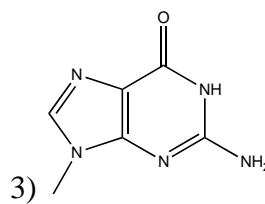
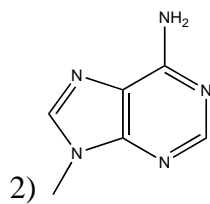
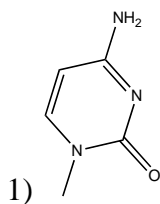
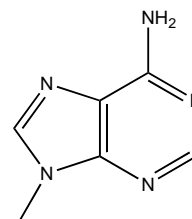
1) 111

2) 250

3) 496

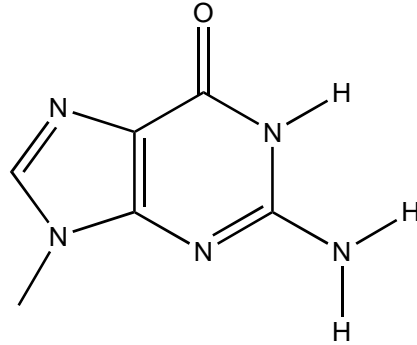
4) 728

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

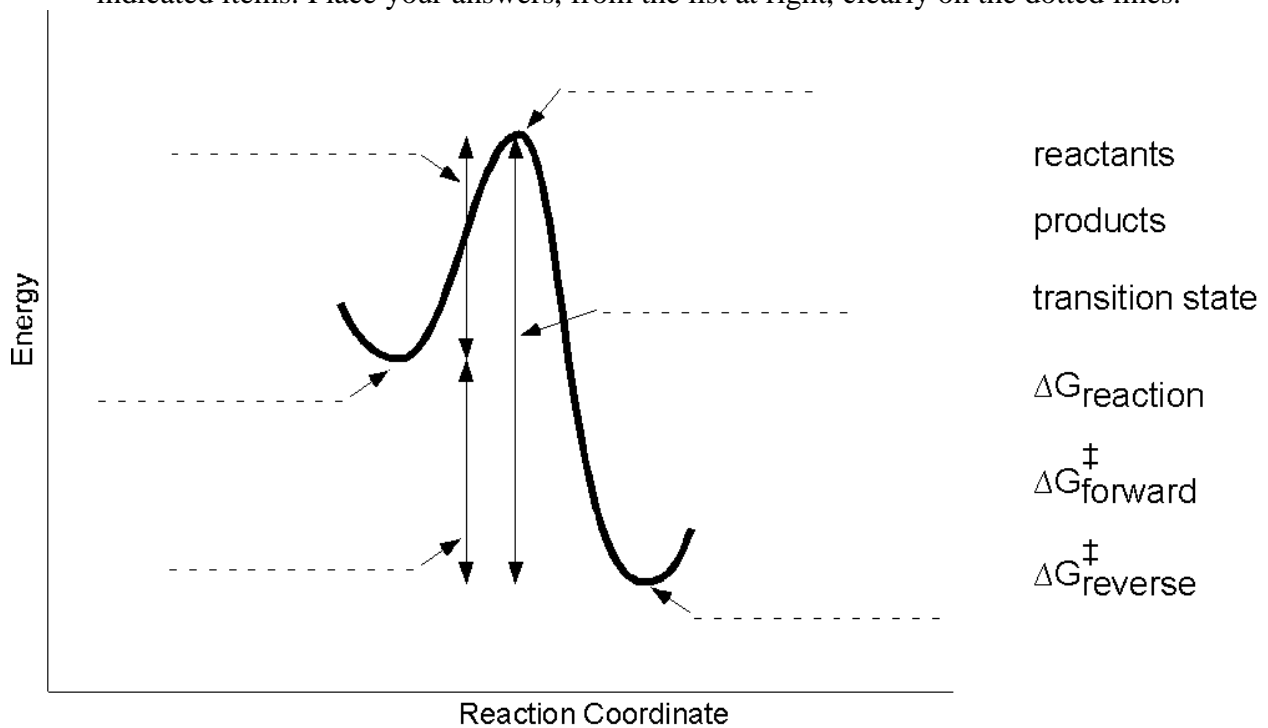


**** Answer questions 18-20 directly on this sheet, in the spaces provided ****

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 adenosine and thymine form stable base pairs in a DNA duplex, but do not pair when in solution as isolated nucleotides.