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Name::

Chem 250

This exam is composed of ${\bf 20}$ 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.

In-class Quiz #3



Signature

PERIODIC TABLE OF THE ELEMENTS																	
1A	2A	3B	4B	5B	6B	7B	8B	8B	8B	1 B	2B	3A	4 A	5A	6A	7A	8A
1																	2
H																	Не
1.008		1															4.003
3 T i	4 Ro											5 R	6 C	7 N	8	9 F	10 No
L/I 6.030	0.012											10.81	12.01	14.01	16.00	10.00	20.18
11	12	-										13	12.01	15	16	17.00	18
Na	Mg											Al	Si	P	S	Cl	Ar
22.99	24.31											26.98	28.09	30.97	32.07	35.45	39.95
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Со	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
39.10	40.08	44.96	47.90	50.94	52.00	54.94	55.85	58.93	58.71	63.55	65.39	69.72	72.61	74.92	78.96	79.90	83.80
37	38 C	39 • • •	40	41	42	43	44 D	45	46	47	48	49 T	50 C	51	52	53	54 N/
RD	Sr	Y	Zr	ND	NIO	Te	Ku	Kh	Pa	Ag	Ca	In	Sn	SD	Te	1	хе
85.47	87.62	88.91	91.22	92.91	95.94	(99)	101.1	102.9	106.4	107.9	112.4	114.8	118.7	121.8	127.6	126.9	131.3
55 Cs	56 Ba	57 La	72 Hf	73 Тя	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Δ 11	80 Ησ	81 TI	82 Ph	83 Bi	84 Po	85 At	86 Rn
132.0	137 3	138.0	178 5	181.0	183.8	186.2	100.2	102.2	105.1	197.0	200.6	204.4	207.2	209.0	(209)	(210)	(222)
87	88	89	104	101.0	105.0	100.2	108	109	175.1	177.0	200.0	204.4	207.2	207.0	(20))	(210)	(222)
Fr	Ra	Ac	Unq	Unp	Unh	Uns	Uno	Une									
(223)	226.0	227.0	(261)	(262)	(263)	(262)	(265)	(266)									
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$\begin{array}{c c} CH_2 & CH \\ \hline Gly & His \\ \hline N \\ \hline N \\ \hline N \\ \hline Hie \\ \hline He \\ \hline Leu \\ \hline Leu \\ \hline Leu \\ \hline Lys \\ \hline His \\ \hline Met \\ \hline He \\ \hline Pro \\ \hline He \hline \hline He \hline \hline He \hline \hline He$																	
CH Val																	
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Page	2 of 6	Quiz #3	Name::							
1.	(5 points) Which of the following amino acids is best described as polar?									
	1) Val	2) Gln	3) Asn	4) Arg	5) Phe					
2.	(5 points) Which of the following amino acids is most likely to be found in the interior of a protein?									
	1) Arg	2) Lys	3) Asn	4) Leu	5) Ser					
3.	(5 points) Which amino acid most restricts the configuration of a peptide backbone?									
	1) Arg	2) Asp	3) Pro	4) Gly	5) Ile					
4.	(5 points) Quaternary structure refers to									
	1) covalent modifications of a protein									
	2) the folding of a peptide into its final structure									
	3) the association of individually folded peptides									
	4) four or more amino acids partitioning into the interior of a protein									
5.	(5 points) What force is most dominant in driving a protein from an ensemble of unfolded states to a compact globular structure?									
	1) hydrogen	bonding		2) hydrophobic collapse						
	3) disulfide bonding4) formation of helices									
	5) electrostatic attraction between charged amino acid side chains									
6.	(5 points) Which structural element(s) most commonly stabilize polar groups in the interior of a protein (choose the best answer)?									
	1) primary s	structure		2) secondary structure						
	3) quaternar	y structure		4) disulfide bonds						

5) electrostatic interactions

Name::

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



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

- 1) Set #12) Set #23) 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
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- 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, "feeback control" refers to:

$$A \xrightarrow{E_1} B \xrightarrow{E_2} C \xrightarrow{E_3} D$$

- 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'



Name::

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.