Your Name	
Your Name	

Lab Instructor Belyayeva Malek Mollica

ORGANIC CHEMISTRY FOR HEALTH AND NUTRITION MIDTERM II April 20, 2016

Periodic Table of the Elements

Ground State Electron Configurations

1A														http://chemistry.about.com					
1	l					©2012 Todd Helmenstine About Chemistry					2								
H 1s1	2A						3A 4A 5A 6A 7A					He 1s²							
3	2A 4											5	6	7	8	9	10		
Li	Be											B	č	N	ŏ	F	Ne		
1s ² 2s ¹	1s ² 2s ²											1s ² 2s ² p ¹	1s ² 2s ² p ²	1s ² 2s ² p ³	1s ² 2s ² p ⁴	1s ² 2s ² p ⁵	1s ² 2s ² p ⁶		
11	12											13	14	15	16	17	18		
Na	Mg											AI	Si	Р	s	СІ	Ar		
[Ne]3s ¹	[Ne]3s ²	3B	4B	5B	6B	7B		— 8B —		1B	2B	[Ne]3s ² p ¹	[Ne]3s ² p ²	[Ne]3s ² p ³	[Ne]3s ² p ⁴	[Ne]3s ² p ⁵	[Ne]3s ² p ⁶		
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36		
ĸ	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr		
[Ar]4s ¹	[Ar]4s ²	[Ar]3d ¹ 4s ²	[Ar 3d ² 4s ²	[Ar]3d ² 4s ²	[Ar]3d ⁵ 4s ¹	[Ar]3d ⁵ 4s ²	[Ar]3d ⁶ 4s ²	[Ar]3d ⁷ 4s ²	[Ar]3d ⁰ 4s ²	[Ar]3d ¹⁰ 4s ¹	[Ar]3d ¹⁰ 4s ²	[Ar]3d ¹⁰ 4s ² p ¹	[Ar]3d ¹⁰ 4s ² p ²	[Ar 3d ¹⁰ 4s ² p ³	[Ar]3d ¹⁰ 4s ² p ⁴	[Ar]3d ⁹³ 4s ² p ⁵	[Ar]3d ¹⁰ 4s ² p ⁶		
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54		
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	ln	Sn	Sb	Те	'	Xe		
[Kr]5s1	[Kr]5s ²	[Kir]4d ¹ 5s ²	[Kr]4d ² 5s ²	[Kr]4d ⁴ 5s ¹	[Kr]4d ⁵ 5s ¹	[Kr]4d ⁵ 5s ²	[Kr]4d ⁷ 5s ¹	[Kr]4d ⁸ 5s ¹	[Kr]4d ¹⁰	[Kir]4d ¹⁰ 5s ¹	[Kr]4d ¹⁰ 5s ²	[Ki]4d ¹⁰ 5s ² p ¹		[Kr]4d ¹⁰ 5s ² p ³	[Kr]4d ¹⁰ 5s ² p ⁴				
55	56	57-71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86		
Cs	Ва		Hf	Та	W	Re	Os	lr	Pt	Au	Hg	TI	Pb	Bi	Ро	At	Rn		
[Xe]6s ¹	(Xe)6s ²	Lanthanides	[Xe]d ¹⁴ 5d ² 6s ²	[xe]d**5d*6s*	[Xe]4 ^M 5d ⁴ 6s ²	[xe]ar ¹⁴ 5d ⁶ 6s ²	[Xe]4f ^M 5d ¹ 6s ²	[Xe/at ¹⁴ 5d ² 6s ²	[Xe]ar ¹⁴ 5a ⁹ 6s ¹	[Xe]47 ¹⁴ 5d ¹⁰ 6s ¹	(Xe)41 ⁶⁴ 53 ¹⁰ 65 ²	[Xe]4f ⁴ 6d ⁴ 6e ² p ⁴	[Xe 44"6d"6c292	115	[xe]st'*6d*6e2p*	[Ke]#"63"662p"			
87	88 Ra	89-103	104 Rf	105 Db	106	Bh	108 Hs	109 Mt	110	111	Cn	Uut	FI				Uuo		
Fr Rni7s¹	Rni7s ²	Actinides	(Rn)ti ¹⁴ Ed ² 7s ² *	IRnisi ¹⁴ 6s ² 7s ² *	Sg IRm5f*6d*7s**	BII IR::191 ^M 6d [†] 7s ² *	IRnitr ¹⁴ 6d ⁴ 7s ² *	IVIE (Rn)St ¹⁴ 6a ² 7s ² *	Ds (Rnist*6d*7s**	Rg	IRnitif ⁴⁶ 6d ³⁰ 7s ² *	Out British Tribh	FI Pross*Na ⁴⁵ 7s ² 7s ²	Uup (Rose*No*Pre*To*	Lv Folki'sa"ta*	Uus	Fritti Tid Tight		
Kultz	[KII]/S	Patinos	prints to 15	polar 0375	pringer ou 15	paga 6075	India on 15	page 6075	[Kinjar od 15	(railb. m. is	prings on 15	program out in the	7001 10 10 10	proper to 101p	Judy or 111b	Autor on 1919	p.q. 00 11 p		
			57	58	59	60	61	62	63	64	65	66	67	68	69	70	71		
	Lanthanides			Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dv	Но	Er	Tm	Yb	Lu l		
			La [Xe]5d ¹ 6s ²	pxepar*5d*6s*	(Xe)4f ⁸ 6s ²	[Xe]4f ⁴ 6s ²	[Xe]4f ⁶ 6s ²	[Xe]4f ⁶ 6s ²	[Xe]4 ² 6s ²	pxejaf*5d*6s²	[Xe]4f ⁸ 6s ²	[Xe]4f ¹⁸ 6s ²	[Xe]4f ¹¹ 6s ²	[Xe]4f ¹² 6s ²	[Xe]4f ¹³ 6s ²		[Xe]#145d16s2		
				90	91	92	93	94	95	96	97	98	99	100	101	102	103		
Actinides			Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr		
			[Rn]6d ¹ 7s ²	[Rn]6d ² 7s ²	[Rn]5f ² 6d ¹ 7s ²	[Rn]51 ³ 6d ⁴ 7s ²	[Rn]5f ⁴ 6d ¹ 7s ²	[Rn]5f ² 7s ²	[Rn]5f ² 7s ²	[Rn]5f ² 6d ¹ 7s ²	[Rn]5f7s ²	[Rn]5f ⁸ 7s ²	[Rn]5/ ¹¹ 7s ²	[Rn]5f ² 7s ²	[Rn]5f ⁴³ 7s ²	[Rn]5/47s ²	[Rn]5f ¹⁴ 8d ¹ 7s ²		

^{*} values are based on theory and are not verified

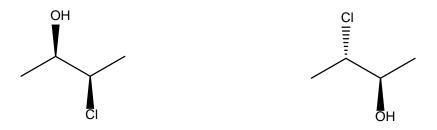
Good luck on this exam!

Please try to relax. Remember it is your job to simply SHOW ME WHAT YOU KNOW.

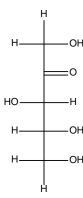
1. What is the relationship between the following two molecules? Are they identical, constitutional isomers, enantiomers or diasteriomers? (5 pts)



2. What is the relationship between the following two molecules? Are they identical, constitutional isomers, enantiomers or diasteriomers? (5 pts)



3. Label each chiral center in the molecule below with a star. (5 pts)



4. Determine the R/S configuration of all chiral centers in the molecule shown below. Make sure to clearly indicate the priority (1, 2, 3 or 4) of each group attached to a chiral carbon. (12 pts)

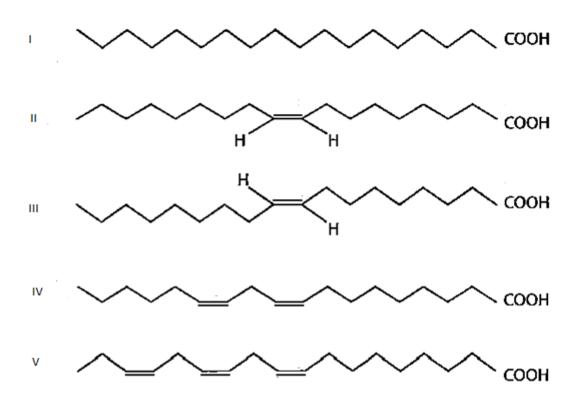
5. Which functional group (acetal or hemiacetal) is shown below? (12 pts)

Draw the structure of the ketone/aldehyde plus alcohol(s) that were used to synthesize it.

6. Draw the structure of the polymer that would form upon polymerization of the following two compounds *with each other*. (6 pts)

$$H_2$$
 HO_2 C CO_2 H

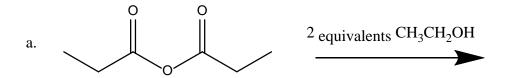
- 7. Four fatty acids are shown below. Each has 18 carbons: (10 pts)
 - a. Which of the four has the highest melting point?
 - b. Which is most likely to be a liquid at room temperature?
 - c. Which is most likely to be synthetic or man-made?
 - d. Which is/are omega-9 fatty acid(s)?



8. Fill in the missing reagent(s) needed to accomplish each of the following reactions. (20 pts)

b. ?
$$\begin{array}{c} \text{CH}_3\text{CH}_2\text{OH} \\ \hline \\ \text{OCH}_2\text{CH}_3 \end{array}$$

9. Give the product(s) of each of the following reactions. (25 pts)



d.
$$\frac{2 \text{ equivalents NH}_3}{}$$

e.
$$\frac{Ag(NH_3)_2^+}{}$$



1. What is the relationship between the following two molecules? Are the identical, constitutional isomers, enantiomers or diasteriomers? (5 pts)



 What is the relationship between the following two molecules? Are they identical, constitutional isomers, enantiomers or diasteriomersy (5 pts)

3. Label each chiral center in the molecule below with a star. (5 pts)

4. Determine the R/S configuration of all chiral centers in the molecule shown below. Make sure to clearly indicate the priority (1, 2, 3 or 4) of each group attached to a chiral carbon. (12 pts)

5. Which functional group (acetal or <u>hemiacetal</u>) is shown below? (12 pts)
Draw the structure of the ketone/aldehyde plus alcohol(s) that were used to synthesize it.

6. Draw the structure of the polymer that would form upon polymerization of the following two compounds *with each other*. (6 pts)

$$H_2N$$
 H_2N
 H_2N
 H_2N
 H_3N
 H_4N
 H_4N
 H_5N
 H_5N

7. Four fatty acids are shown below. Each has 18 carbons: (10 pts)

- a. Which of the four has the highest melting point?
- b. Which is most likely to be a liquid at room temperature?
- c. Which is most likely to be synthetic or man-made?
- d. Which is/are omega-9 fatty acid(s)?







H COOH

COOH

COOH

8. Fill in the missing reagent(s) needed to accomplish each of the following reactions. (20 pts)

9,

a. PR OH OH OH + 3 ROO

c. ? CH3COH LIAIH4 H OH

d. NaBH40r OH Hz+catalyst?

9. Give the product(s) of each of the following reactions. (25 pts)

a.
$$\frac{2 \text{ equivalents CH}_3\text{CH}_2\text{OH}}{}$$

d.
$$\frac{2 \text{ equivalents NH}_3}{\text{OR}}$$

$$\frac{2 \text{ equivalents NH}_3}{\text{OR}}$$

$$\frac{1 \text{ NH}_2}{\text{OR}}$$

$$\frac{1 \text{ NH}_2}{\text{OR}}$$

e.
$$\frac{\text{Ag(NH_3)}_2^+}{\text{Or NO RXN}}$$