
First Name

Last Name

Student ID

Signature

Chemistry 164/261, A2
Final Examination - 17 December 2010
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Note

Exams are not returned, but may be viewed upon request.

Instructions

Closed book exam; no calculators. Physical models permitted.

Only answers on the front side of each page will be marked, unless requested otherwise.

Time allowed: 3 h. There are **24** questions on **15** pages. Please, check!

Potentially Useful Data

Attached at the end. You may want to detach the final page.

Page #	Maximum	Score			
1	15				
2	11				
3	15				
4	11				
5	6				
6	11				
7	6				
8	10				
9	12				
10	12				
11	8				
12	10				
13	10				
14	13				
15	10				
Total	160				

Potentially Useful Data

Mini Periodic Table

H, He, Li, Be, B, C, N, O, F, .., Cl,.., Br,.., I

Electronegativity: H 2.1, C 2.5, N 3.0, O 3.5, F 4.0, Cl 3.0

Strain energy for a 1,3-diaxial interaction in cyclohexanes:



Nucleophilicity trends: H_2O , CH_3CO_2^- , Cl^- , OH^- , OCH_3^- , I^- , CN^- , SH^-

Leaving group trends: $(\text{OH}^-, \text{NH}_2^-, \text{OR}^-)$, F^- , $(\text{Cl}^-, \text{Br}^-, \text{I}^-)$, OTs^-

Approx. pK _a Values	
“acid”	pK _a
HCl	-7
$\begin{array}{c} \text{R} \\ \diagdown \\ \text{C}=\text{OH}^+ \\ \diagup \\ \text{R} \end{array}$	-7
$\begin{array}{c} \text{H} \\ \\ \text{R}-\text{O}^+-\text{R} \end{array}$	-4
ROH_2^+	-4
H_2SO_4	-3
H_3O^+	-2
$\text{CH}_3\text{CO}_2\text{H}$	5
NH_4^+	9
phenol	10
1,3-dicarbonyl	9 -13
methanol	16
H_2O	16
ethanol	16
acetone	20
alkyne	25
NH_3	33
alkene	43
alkane	50