

283G
 Midterm
 Instructor: Dr. Brian Pagenkopf
 Saturday, March 15, 2008
 2:00 pm – 5:00

Name

First Letter of Last Name

Work alone. Do not share answers or information. **No notes, books, calculators, cell phones, iPods, computers or electronics of any sort allowed. Please turn off your phone now.**

You have 3 hours to complete the exam.

Pay attention to how many points each question is worth, and manage your time accordingly. Be sure you have all of the exam pages.

Please do not write your name on subsequent pages, but you may write your ID number.

If needed, any blank scratch paper must be provided by the proctor.

PERIODIC TABLE OF THE ELEMENTS

Atomic masses are based on ¹²C. Atomic masses in parentheses are for the most stable isotope.

6 C 12.011		Atomic number Symbol Atomic mass																	
Groups																			
Periods																			
1A	2											III A	IV A	V A	VIA	VII A	VIII A		
1 H 1.00079												3 Li 6.941	4 Be 9.01218						2 He 4.00260
11 Na 22.98977	12 Mg 24.305													13 Al 26.98154	14 Si 28.0855	15 P 30.97376	16 S 32.06	17 Cl 35.453	18 Ar 39.948
19 K 39.0963	20 Ca 40.08	21 Sc 44.9559	22 Ti 47.90	23 V 50.9415	24 Cr 51.996	25 Mn 54.9380	26 Fe 55.847	27 Co 58.9332	28 Ni 58.70	29 Cu 63.546	30 Zn 65.38	31 Ga 69.72	32 Ge 72.59	33 As 74.9216	34 Se 78.96	35 Br 79.904	36 Kr 83.80		
37 Rb 85.4678	38 Sr 87.62	39 Y 88.9059	40 Zr 91.22	41 Nb 92.9064	42 Mo 95.94	43 Tc (98)	44 Ru 101.07	45 Rh 102.9055	46 Pd 106.4	47 Ag 107.868	48 Cd 112.41	49 In 114.82	50 Sn 118.69	51 Sb 121.75	52 Te 127.60	53 I 126.9045	54 Xe 131.30		
55 Cs 132.9054	56 Ba 137.33	57 La 138.9055	72 Hf 178.49	73 Ta 180.9479	74 W 183.85	75 Re 186.207	76 Os 190.2	77 Ir 192.22	78 Pt 195.09	79 Au 196.9665	80 Hg 200.59	81 Tl 204.37	82 Pb 207.2	83 Bi 208.9804	84 Po (209)	85 At (210)	86 Rn (222)		
87 Fr (223)	88 Ra 226.0254	89 Ac 227.0278	104 Unq (261)	105 Unp (262)	106 Unh (263)														

*Lanthanide series

58 Ce 140.12	59 Pr 140.9077	60 Nd 144.24	61 Pm (145)	62 Sm 150.4	63 Eu 151.96	64 Gd 157.25	65 Tb 158.9254	66 Dy 162.50	67 Ho 164.9304	68 Er 167.26	69 Tm 168.9342	70 Yb 173.04	71 Lu 174.967
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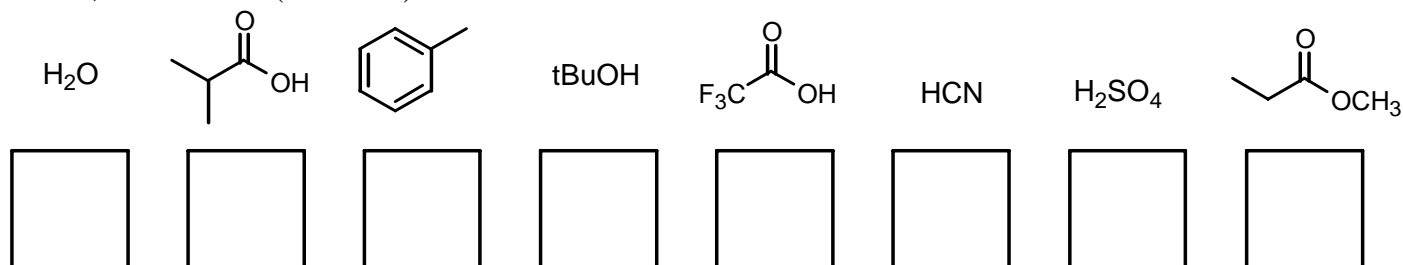
† Actinide series

90 Th 232.0381	91 Pa 231.0359	92 U 238.029	93 Np 237.0482	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (260)
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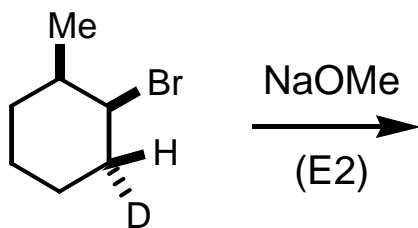
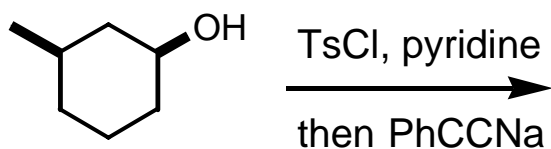
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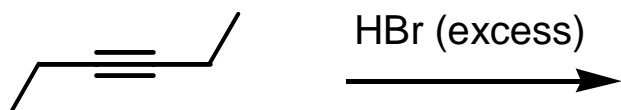
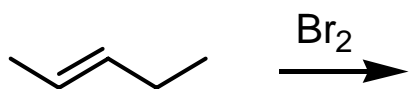
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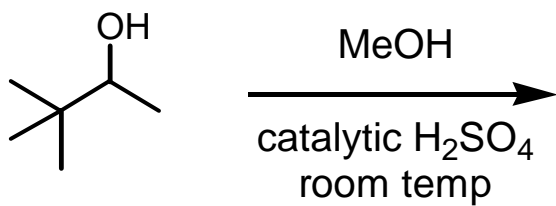
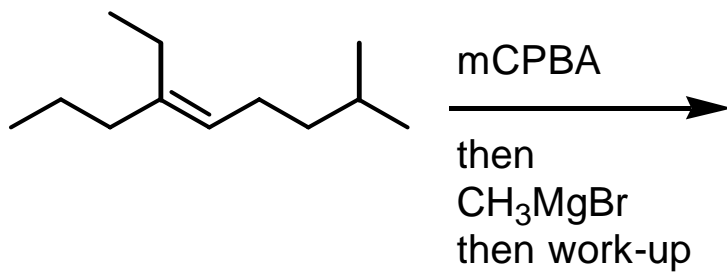
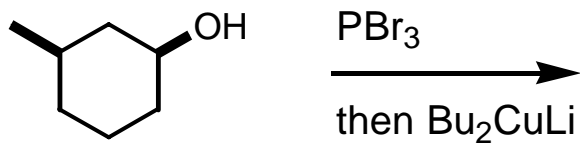
Rank the following molecules in order of increasing acidity (which is the same as decreasing pKa). Write an 8 in the box for the least acidic, a 1 in the box under the most acidic, and so on. (5 marks)

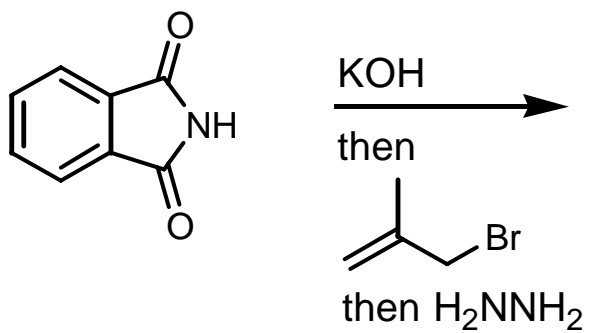
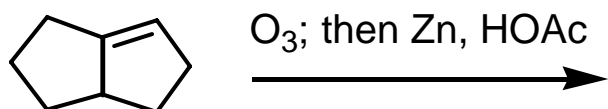
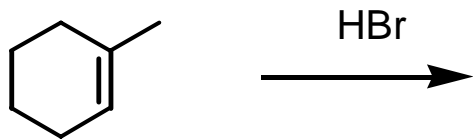


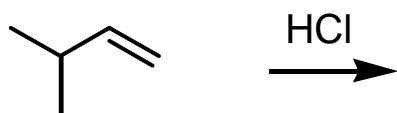
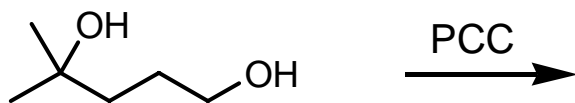
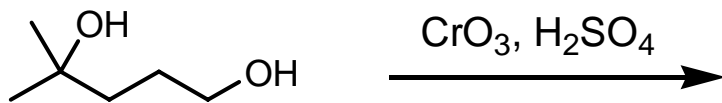
Show products for the following reactions. For some questions stereochemistry is a critical part of the answer for full marks. Be on the alert for carbocation rearrangements.



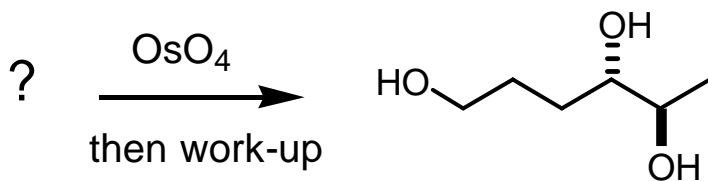
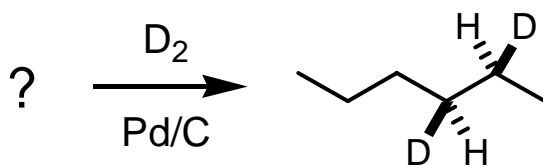
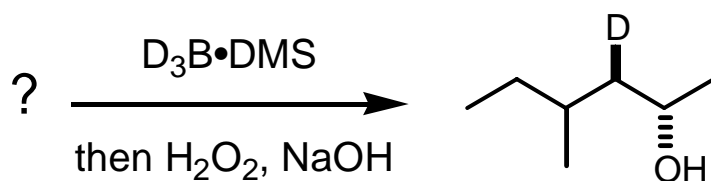




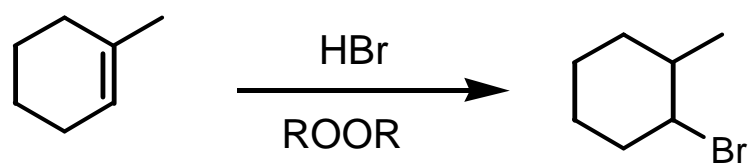
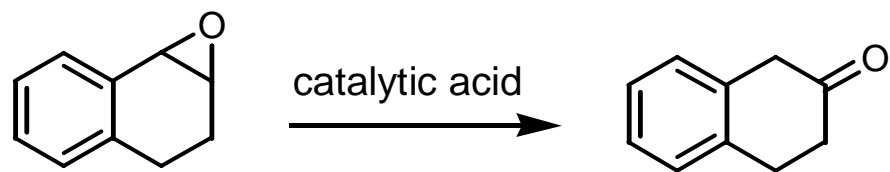




Identify the starting material, being careful in regard to cis//trans geometry of the alkene.
You may need to do some bond rotations.



Provide plausible mechanisms for the following transformations (4 + 8 marks).



Propose a laboratory synthesis of the following compound using any reagents you want with the restriction that cyclohexane can be your only source of carbon.

