

Name: _____

IA																				0															
1 H 1.008																				2 He 4.003															
IIA												IIIA		IVA		VA		VIA		VIIA															
3 Li 6.941		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		IIIB		IVB		VB		VIB		VIIB		VIIIB				IB		IIB		13 Al 26.98		14 Si 28.09		15 P 30.97		16 S 32.06		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 58.70		29 Cu 63.55		30 Zn 65.38		31 Ga 69.72		32 Ge 72.59		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 (98)		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 180.9		74 W 183.9		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)		104 Rf		105 Ha		106 Unh		107 Uns		108		109 Uue																			

* 58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm (145)	62 Sm 150.4	63 Eu 152.0	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0
*** 90 Th 232.0	91 Pa (231)	92 U 238.0	93 Np (244)	94 Pu (242)	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)

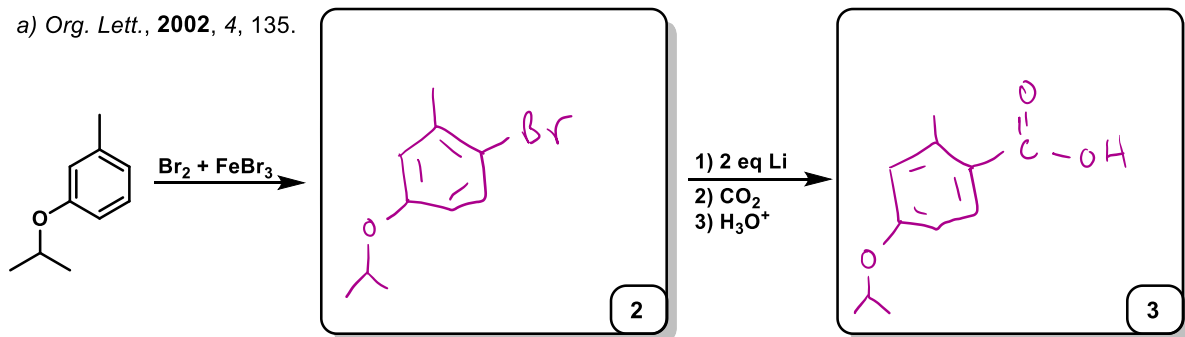
You have 50 minutes to complete this 1st half of the exam.

The section has 3 total questions.

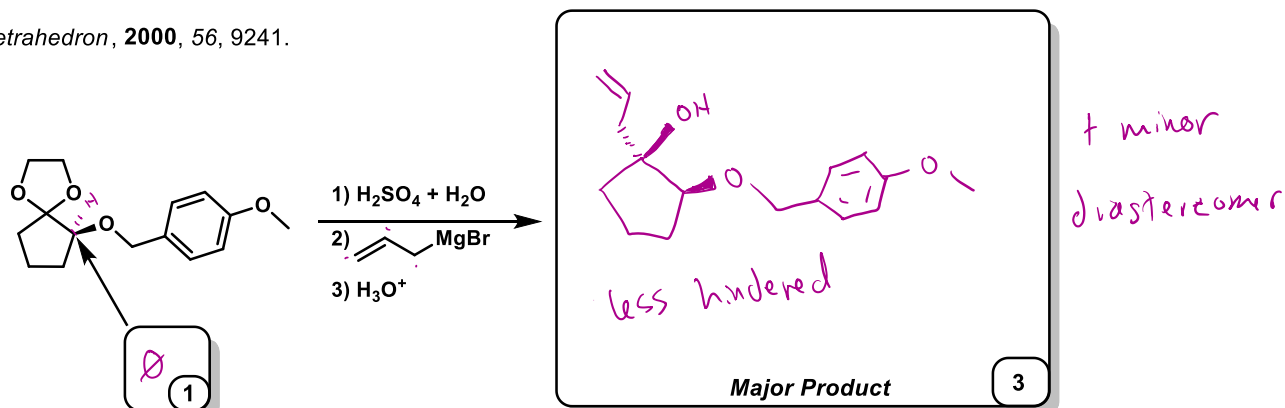
Be sure to be as explicit as possible in your answers.

1. **Quick Synthesis.** Fill in the boxes with either the correct reagents or products. Please be sure to indicate stereochemistry (where appropriate) and steps, if needed. In the small boxes pointing towards specific atoms, fill in the oxidation number for that atom.

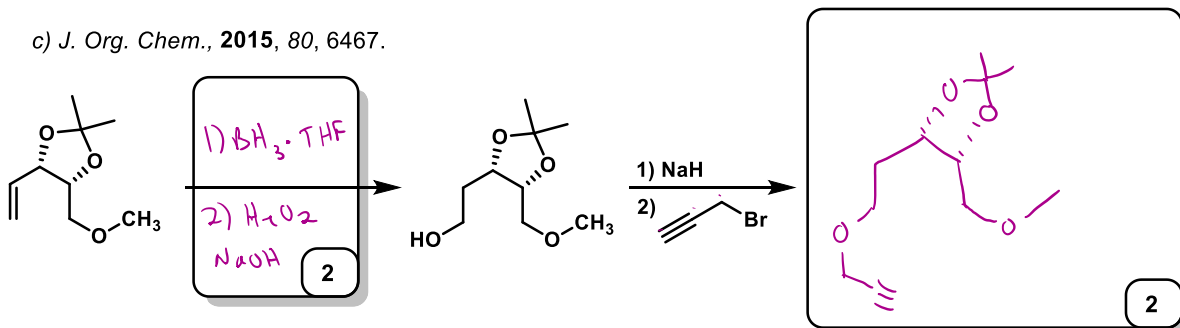
a) *Org. Lett.*, **2002**, 4, 135.



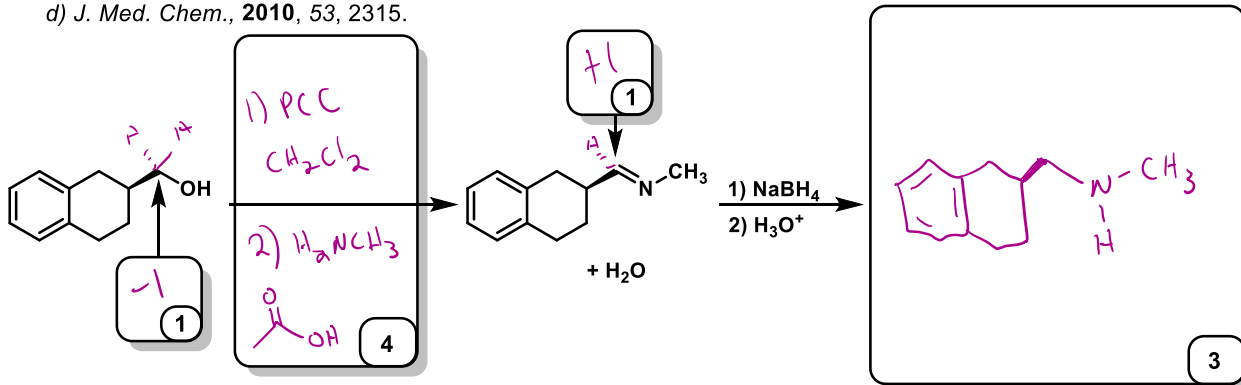
b) *Tetrahedron*, **2000**, 56, 9241.



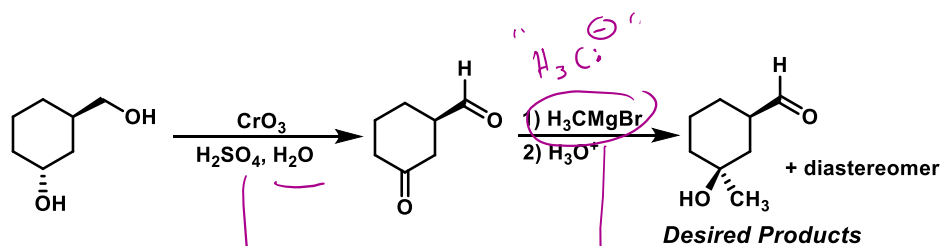
c) *J. Org. Chem.*, **2015**, 80, 6467.



d) *J. Med. Chem.*, **2010**, 53, 2315.



3. **Flawed Synthesis.** Below you will find a synthesis that will not ultimately lead to the **Desired Products**. In the first box, describe the flaw(s) inherent in the synthetic route presented. In the second box, provide a new synthetic route that will lead to the **Desired Product**.

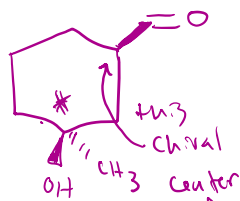
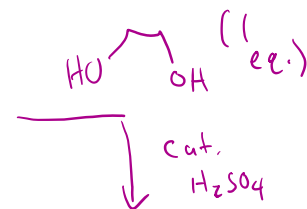
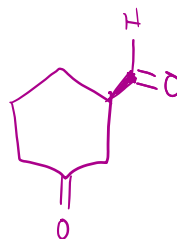
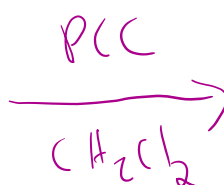


5. Yes
carboxylic
acid
in aqueous
conditions

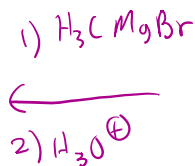
will attack
aldehyde instead of
ketone

New Synthetic Plan

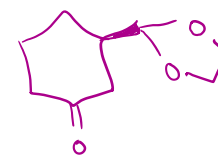
(or one of other anhydrous ones)



2
diastereomers



also
hydrolyzes
the acetal



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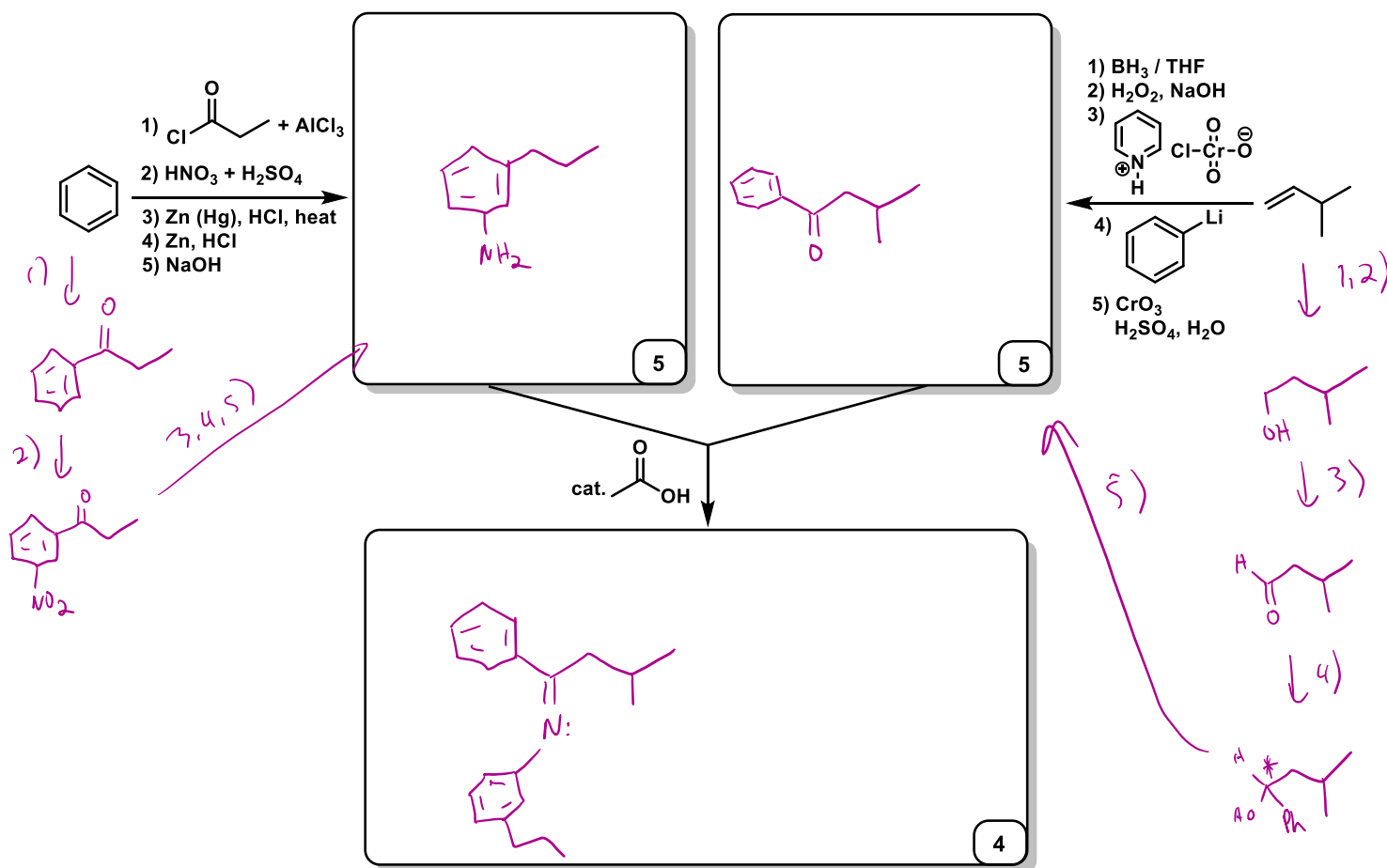
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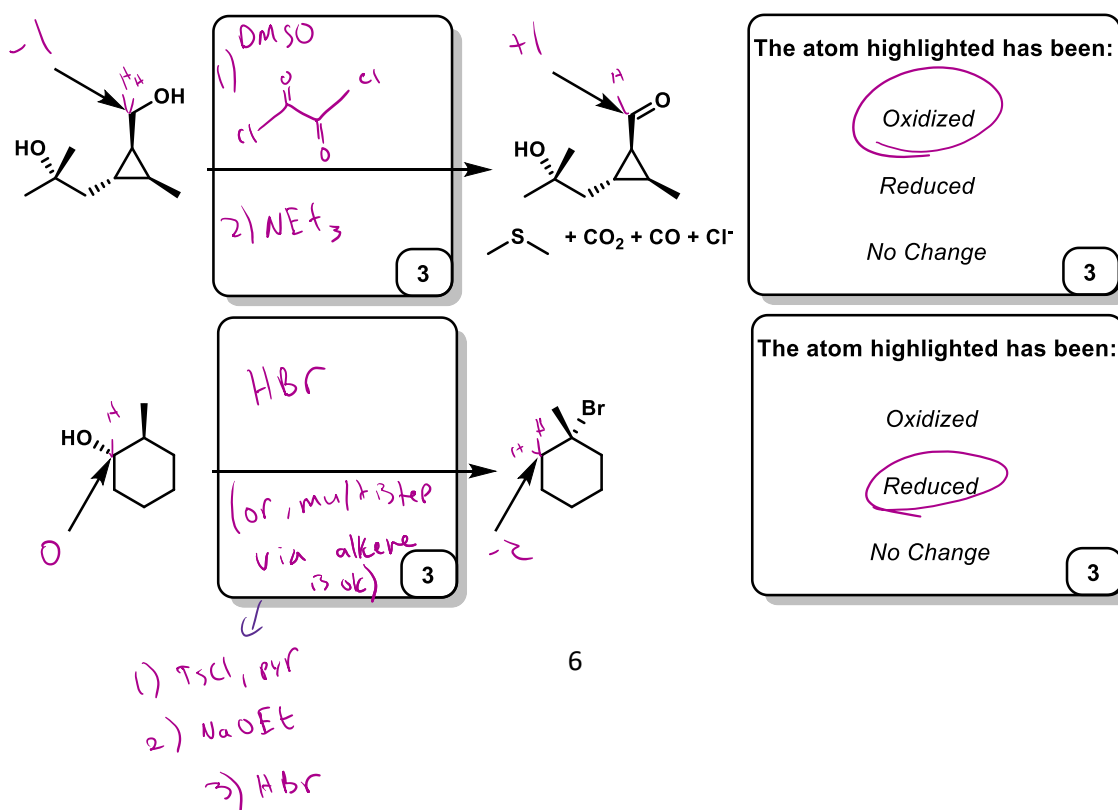
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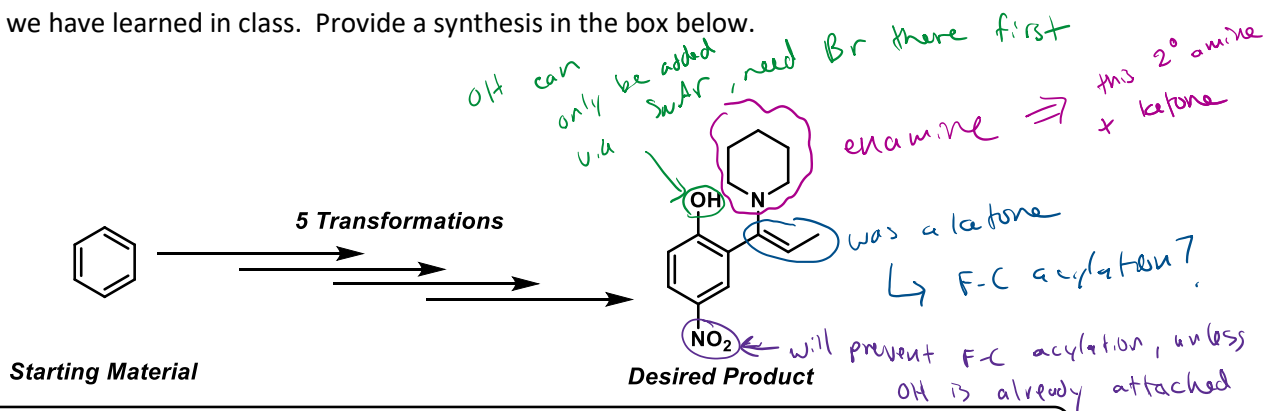
4. **Less-Guided Synthesis.** In the top two boxes, fill in the product you would get from the multiple synthetic steps provided. In the box on the bottom, fill in the product you would expect from combining the two boxed components.



5. **Oxidation States.** Fill in the reagents necessary to complete the transformation. Also, circle which process (oxidation / reduction / no change) has occurred.

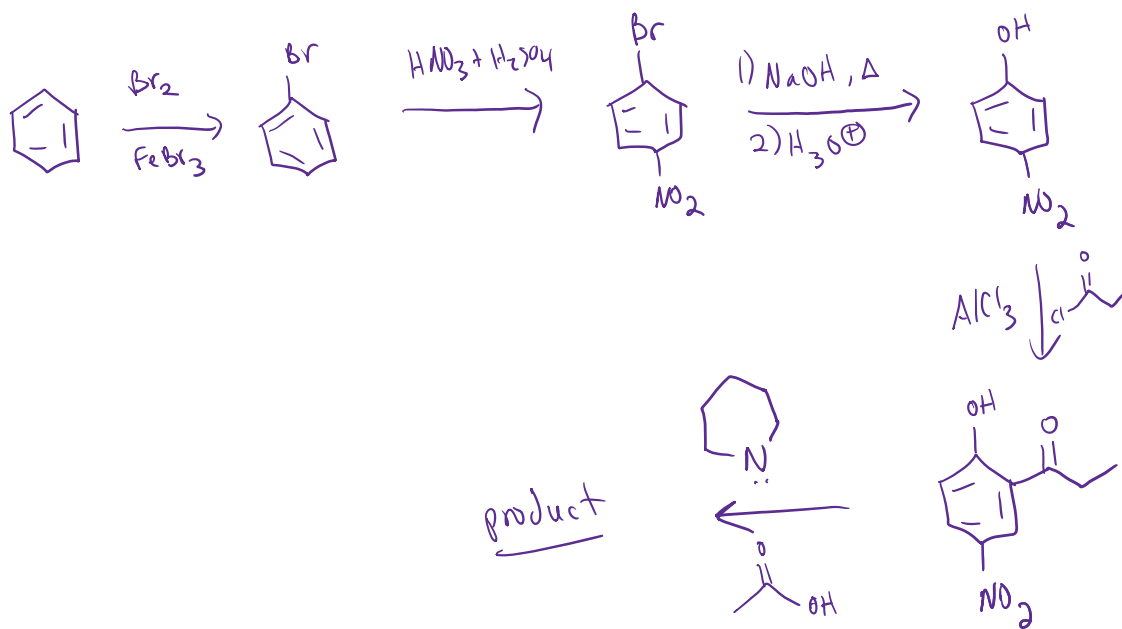


6. **Full Synthesis.** The **Desired Product** below can be made from the given **Starting Material** using reactions we have learned in class. Provide a synthesis in the box below.



thoughts:

- need NO_2 before S_NAr
- F-C must be last (directing effects + EWG limitations)



OH is strong activator so F-C is ok now