

CHEMISTRY 2323: Fundamentals of Organic Chemistry I

Third Midterm Exam

November 14, 2025

Prof. Ognjen Š. Miljanić

Name: Answer Key
(print legibly) Last First

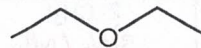
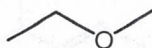
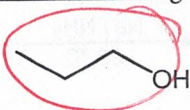
Student ID Number: N/A

Read all directions very carefully. Write your answer legibly in the designated spaces. Total number of points is 300. This exam is printed on both sides and should have six pages, with the last page intentionally left empty.

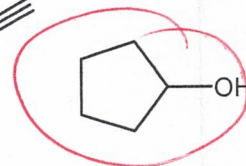
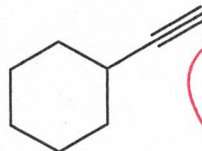
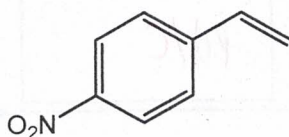
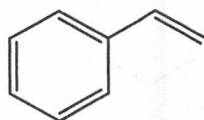
1. This question has several parts. In each, **circle only one entry**.

Circle the only compound that can engage in hydrogen bonding with itself:

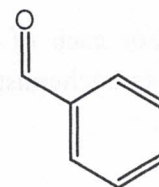
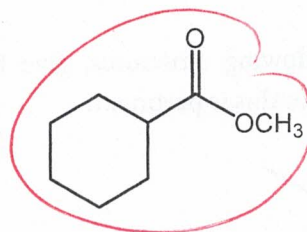
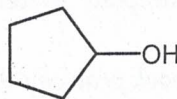
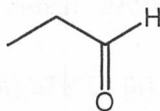
5×8 = 40 points



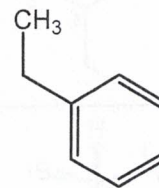
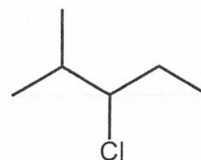
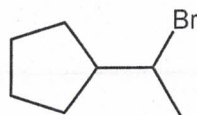
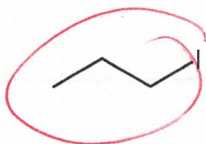
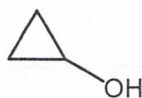
Circle the strongest acid:



Circle the compound with the most oxidized carbon atom:



Circle the most reactive compound in an S_N2 reaction:



Circle the approximate pK_a value of a terminal alkyne:

67

0

25

0.0001

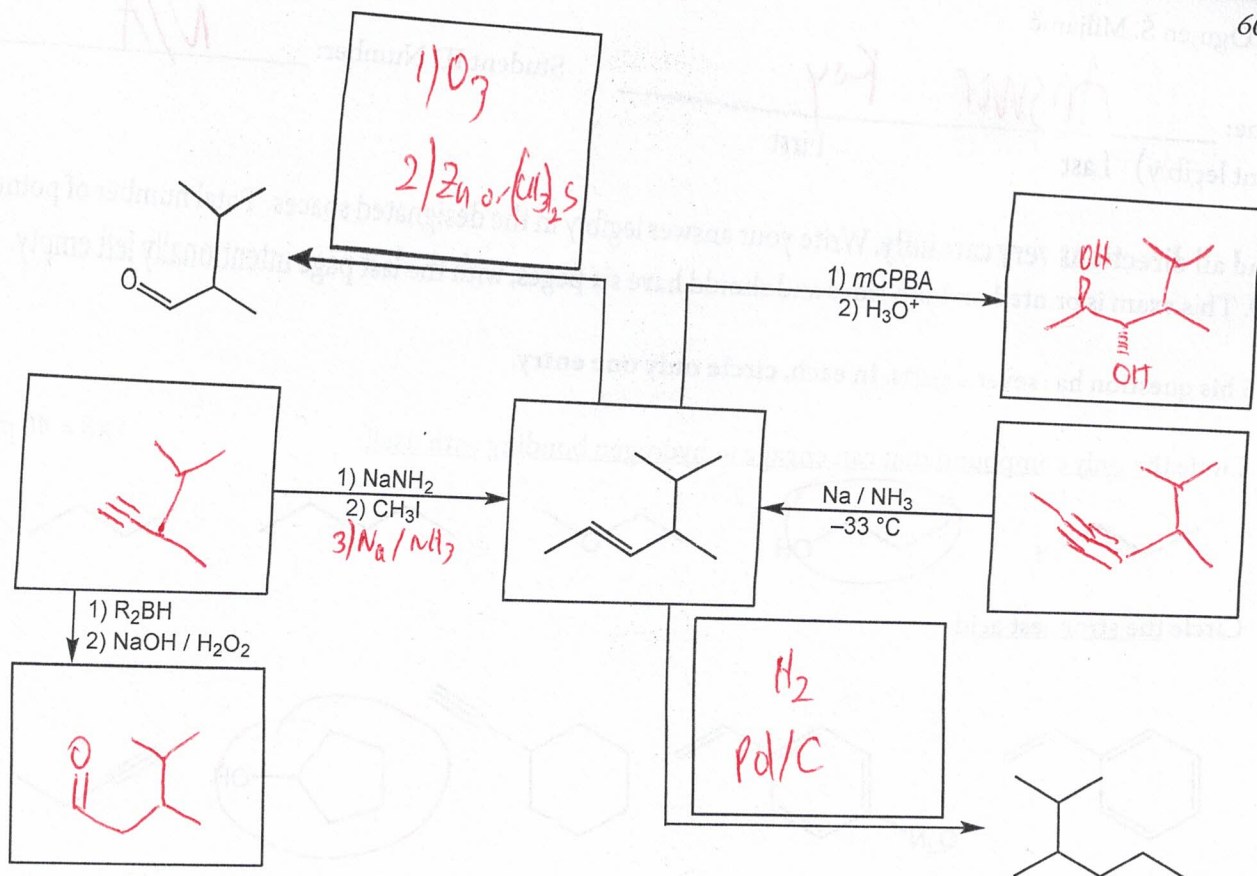
10⁹

DO NOT WRITE
IN THIS SPACE

320
FINAL SCORE

60

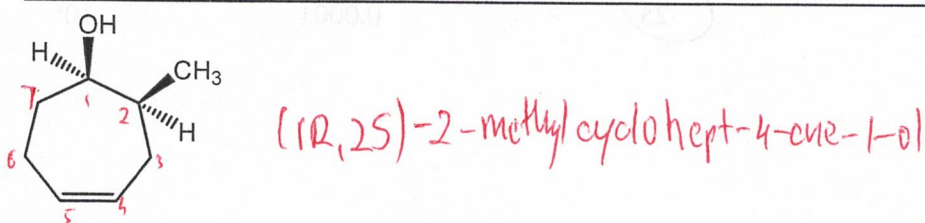
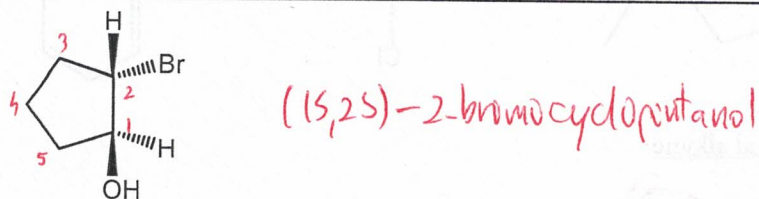
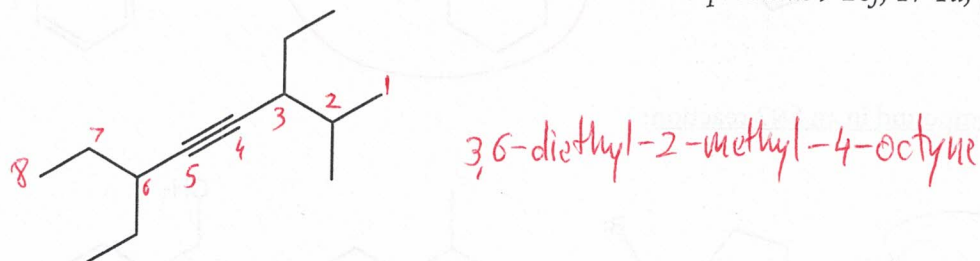
2. Provide the missing conditions or reaction products for the six reactions outlined below. Show all the necessary steps, but do not write mechanisms. 60 points



30

3. For each of the following structures, give the complete systematic IUPAC name. Be sure to indicate stereochemistry where this is pertinent. 30 points

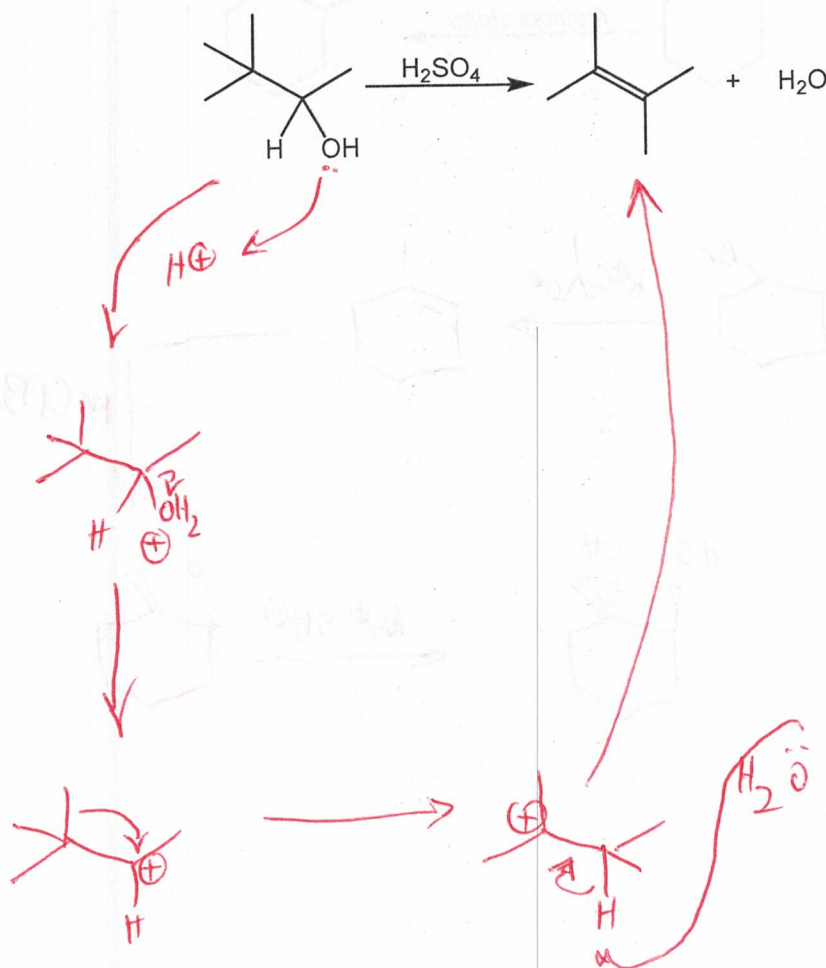
Textbook problems 9-26f; 17-1d; 17-37d (McMurry, 10th edition)



60

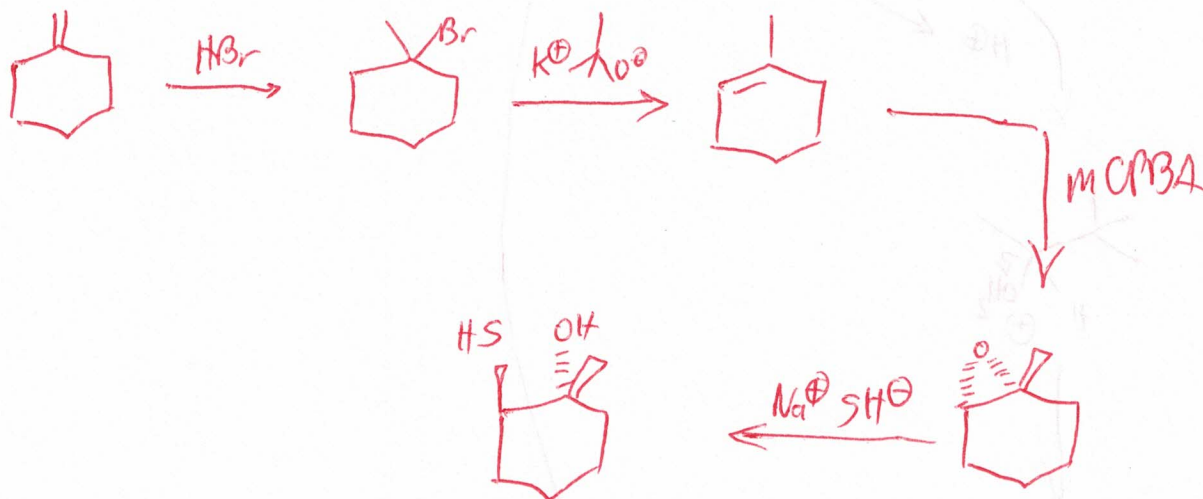
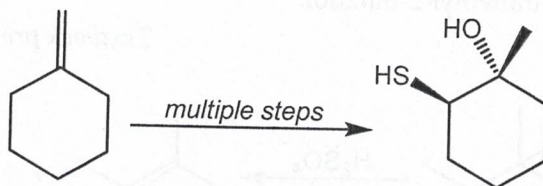
4. Evidence for the intermediate carbocations in the acid-catalyzed dehydration of alcohols comes from the observation that rearrangements sometimes occur. Propose a mechanism to account for the formation of 2,3-dimethyl-2-butene from 3,3-dimethyl-2-butanol. 60 points

Textbook problem 17-25 (McMurry, 10th edition)



40

5. How would you efficiently accomplish the following synthetic transformation? Multiple reactions steps are needed to accomplish this synthesis: draw them all out, but do not include mechanisms. 40 points



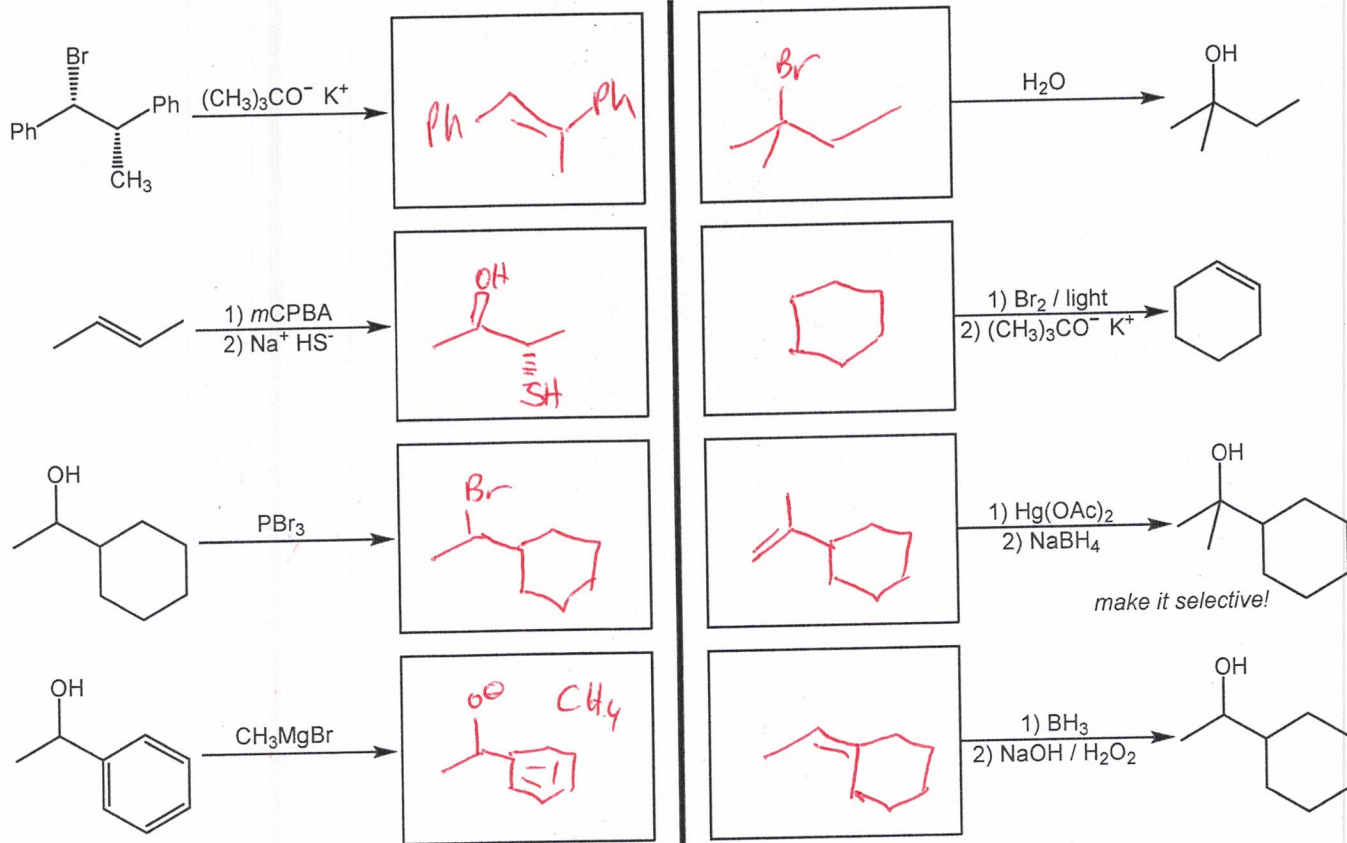
10

6. Write an example of an acid-base reaction in which an alkyne acts as an acid. You can choose any base strong enough to deprotonate the alkyne, **except** NaNH_2 . 10 points



80

7. Write the missing products or reactions for the reactions shown below. Make sure to include stereochemistry, but do not write mechanisms. 80 points

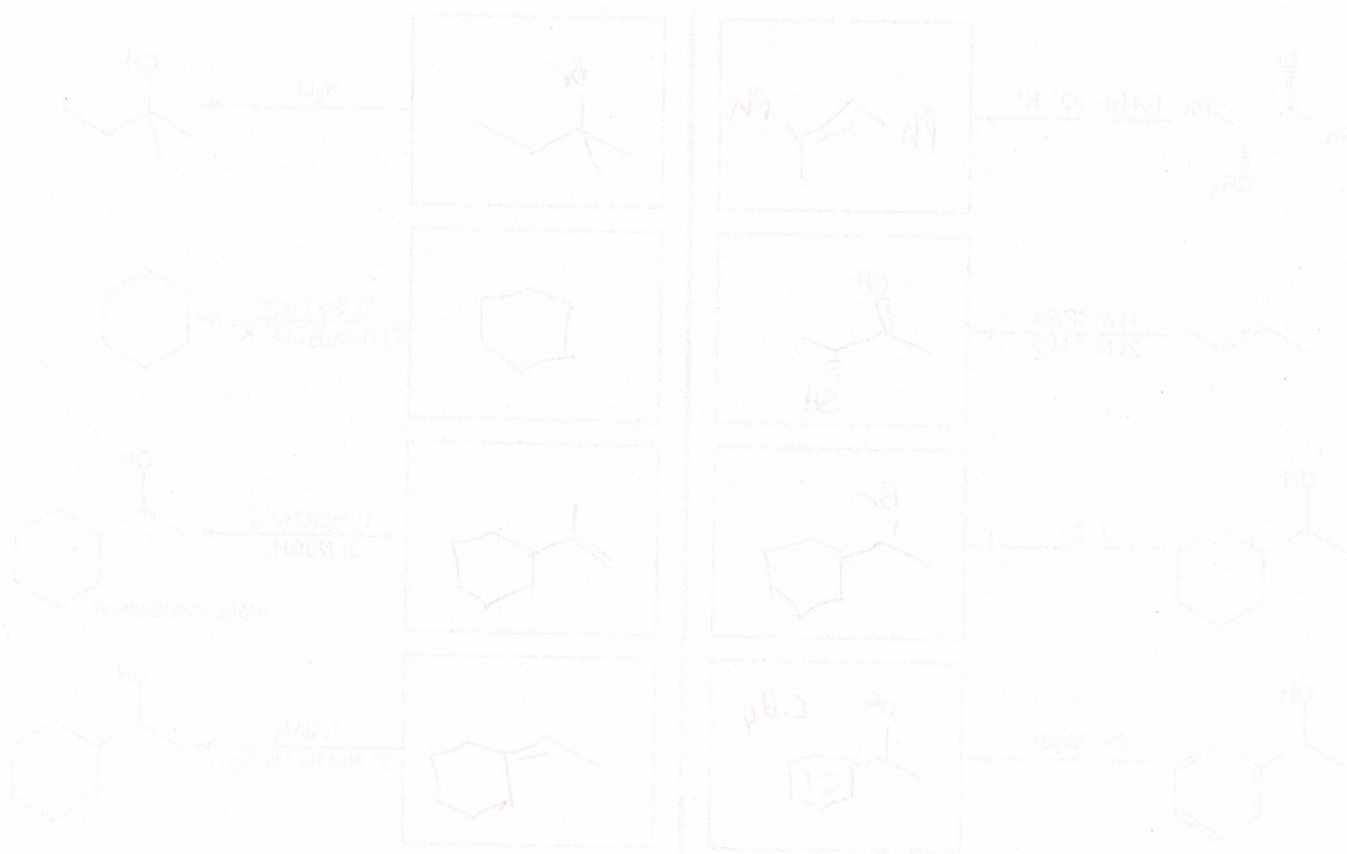


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* Lanthanide series

** Actinide series

Write the missing reagents or conditions for the reactions shown below. Make sure to include all reagents and conditions for the reactions.



Hs	He	Li	Be	B	C	N	O	F	Ne
		Na	Mg	Al	Si	P	S	Cl	Ar
		K	Ca	Sc	Ti	V	Cr	Mn	Fe
		Rb	Sr	Y	Zr	Nb	Mo	Tc	Co
		Cs	Ba	La	Hf	Ta	W	Re	Os
		Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs