

Name: Solutions
ID #: _____

Chemistry 3230y
Exam #3
April 17, 2001

This exam booklet contains seven (7) numbered pages, not including this one. The last of those seven pages is blank and may be used for scratch work. If you detach any pages, please reattach them before you turn in the exam. Be sure to clearly indicate your final answers. Work in pencil, please. Neatness *counts* – I need to be able to read your answers!

Before you begin, take a minute to scan all the questions. Do the ones you know you can do rapidly first, then go to the ones you find more difficult.

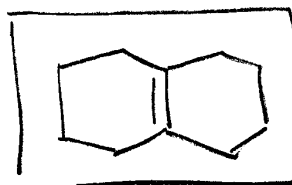
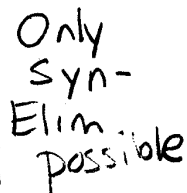
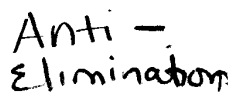
Point Totals:

1. Provide the products (30 points)	/30
2. Provide the structures (14 points)	/14
3. Provide the mechanism and product (16 points)	/16
4. Provide the mechanism (14 points)	/14
5. Explain reactivity (12 points)	/12
6. Provide the mechanism (14 points)	/14
Total Points (100)	/100

ID #: _____

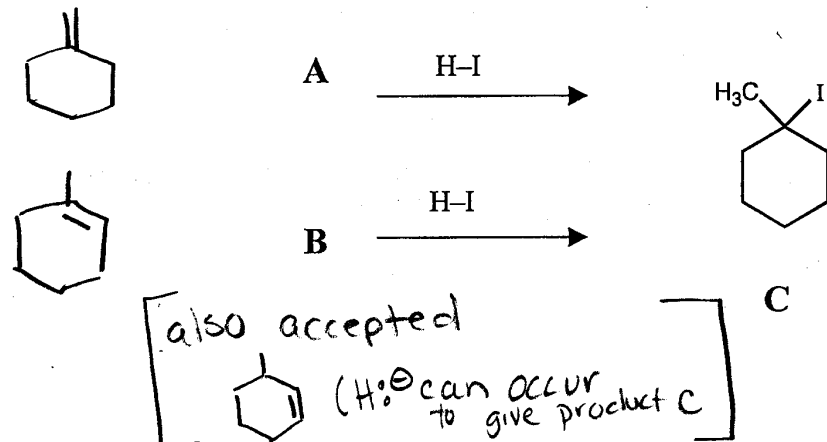
April 17, 2001

1. Provide a single, **MAJOR** organic product for each of the following reactions. Clearly show stereochemistry where appropriate. Please circle your answers. (30 points).

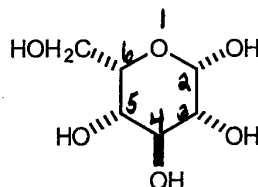


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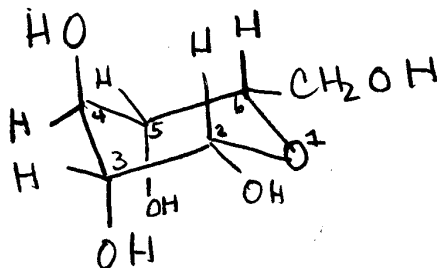
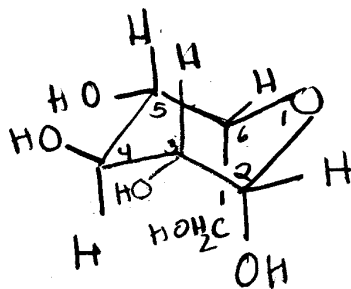
2. A) Provide the structures of the two isomeric alkenes, **A** and **B**, that would produce 1-iodo-1-methyl-cyclohexane (compound **C**), on treatment with HI. (8 points).



- B) A structure of the sugar glucose is shown below. The 6-membered ring is known to exist in a chair conformation. Draw a clear representation of this molecule in its most stable conformation. (6 points).



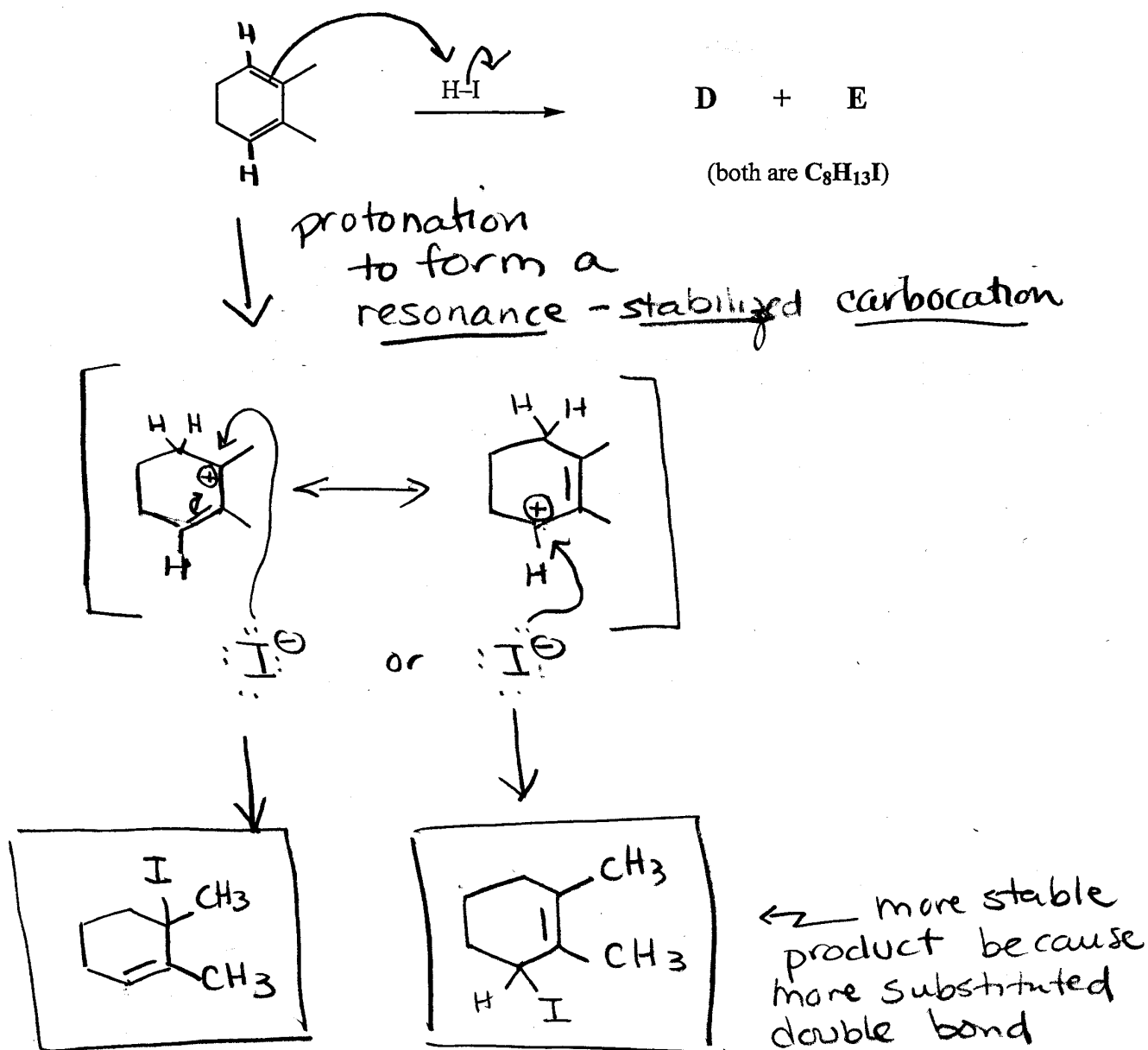
Either of these structures is accepted:



Name: Solutions
ID #: _____

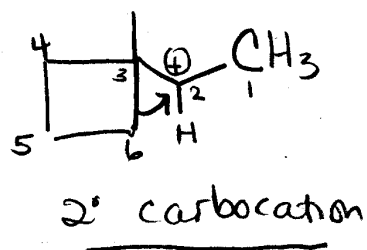
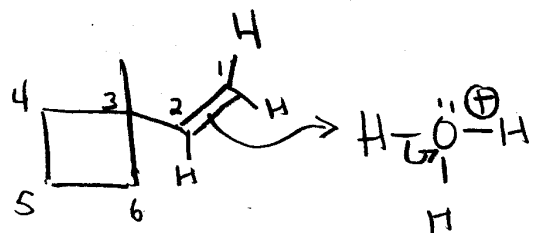
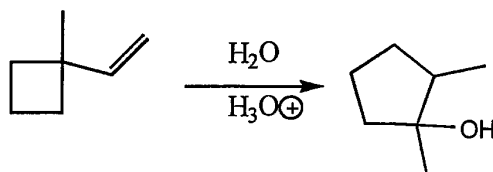
3. Draw the expected regioisomeric products, D and E, for the following reaction, and propose a careful mechanism for their formation.

Identify which product is the more stable one, and justify your reasoning (in one sentence).
(16 points).

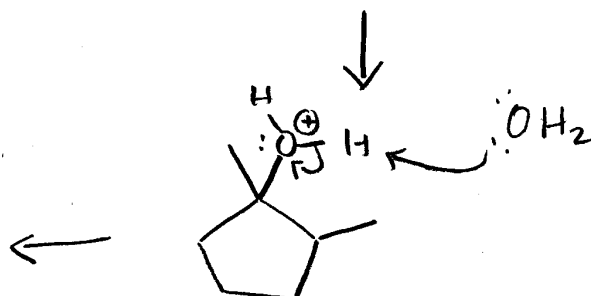
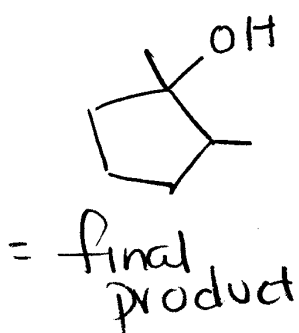
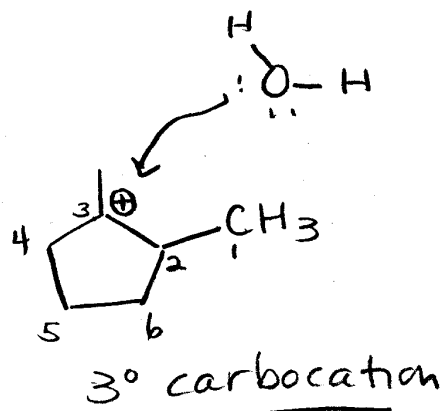


Name: Solutions
ID #: _____

4. Propose a reasonable mechanism to account for the following reaction:
(14 points).

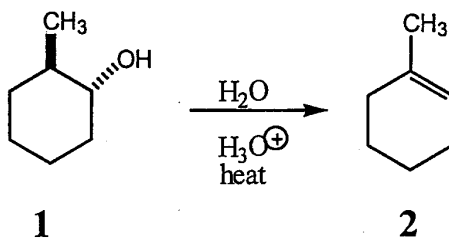


alkyl
Shift

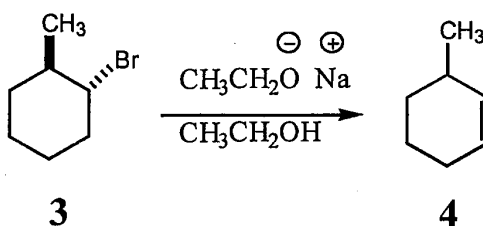


Name: Solutions
ID #: _____

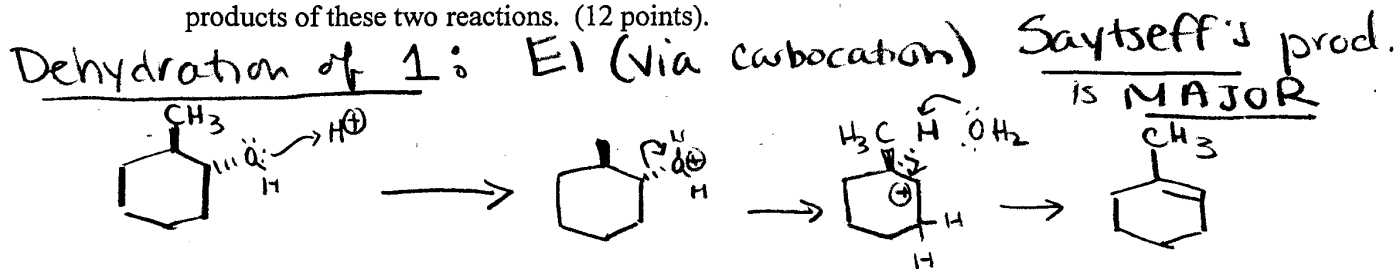
5. When *trans*-2-methylcyclohexanol (1) is subjected to acid catalyzed dehydration, the **MAJOR** product is 1-methylcyclohexene (2):



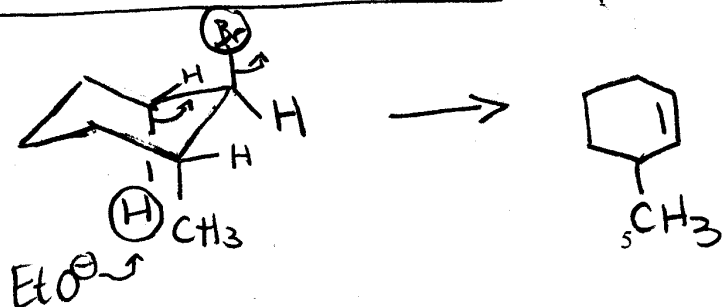
However, when *trans*-1-bromo-2-methylcyclohexane (3) is subjected to dehydrohalogenation (elimination of the halogen), the **MAJOR** product is 3-methylcyclohexene (4):



Using careful structural drawings, and as few words as possible, account for the different products of these two reactions. (12 points).



Dehydrohalogenation of 3: via E2 → Anti-Elimination



Name: Solutions
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6. Propose a mechanism for the following reaction:
(14 points).

