

**Chemistry 2521**  
**Fall 2001; Midterm 2 Exam**

This exam has 5 problems on 6 pages. Make sure your copy is complete and correct.

Printed Name (Last, First) Key

Scores:

1. 24

2. 8

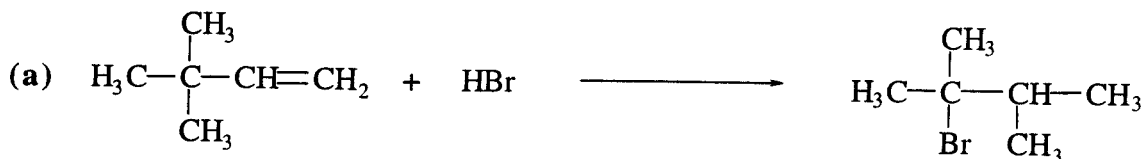
3. 18

4. 30

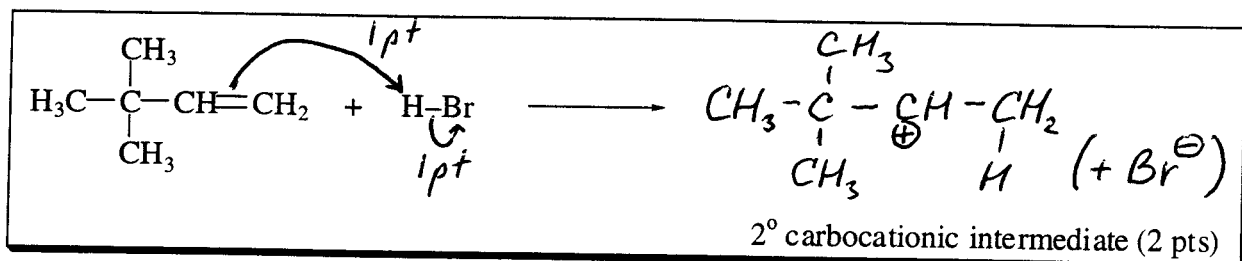
5. 20

Total: 100

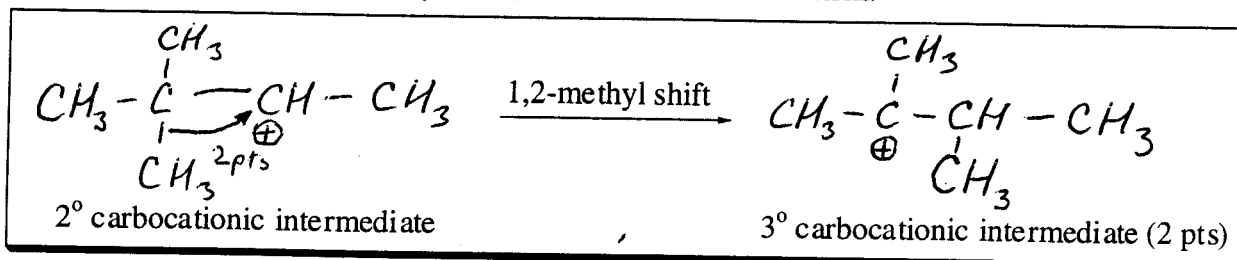
1. (24) Using provided boxes, answer the questions on **mechanisms** of the following reactions (12 pts each):



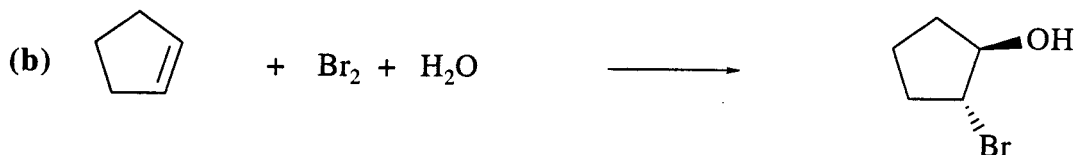
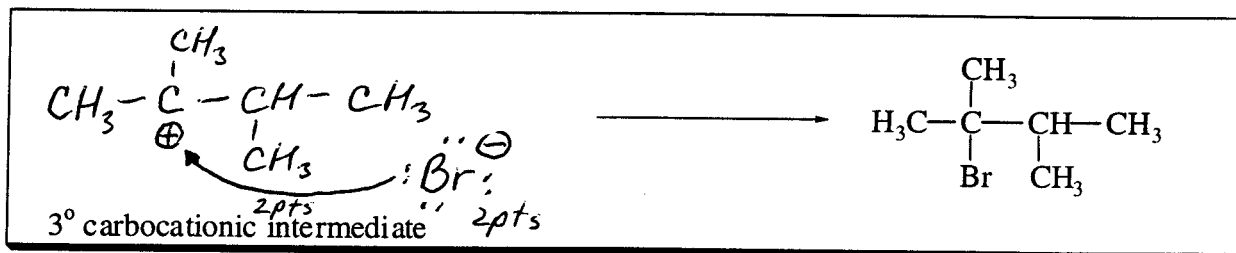
Using curved arrows (2 pts) and showing the structure of the intermediate (2 pts), write the **first step** in the reaction mechanism:



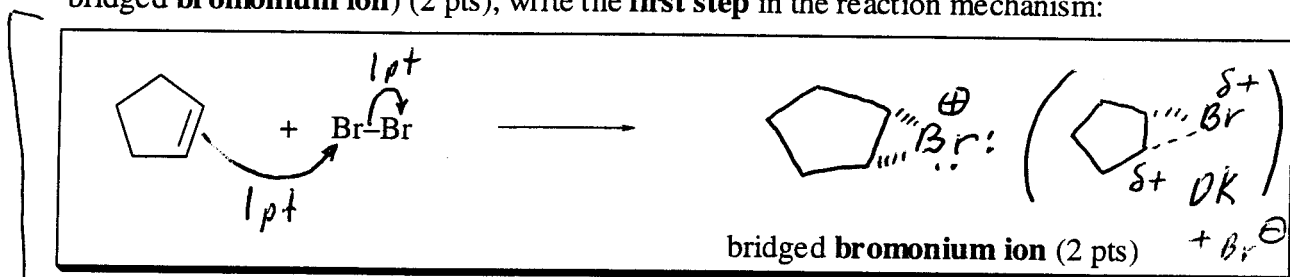
Using curved arrow (2 pts) and showing the structure of the intermediate (2 pts), write the **rearrangement** step (1,2-methyl shift) in the reaction mechanism:



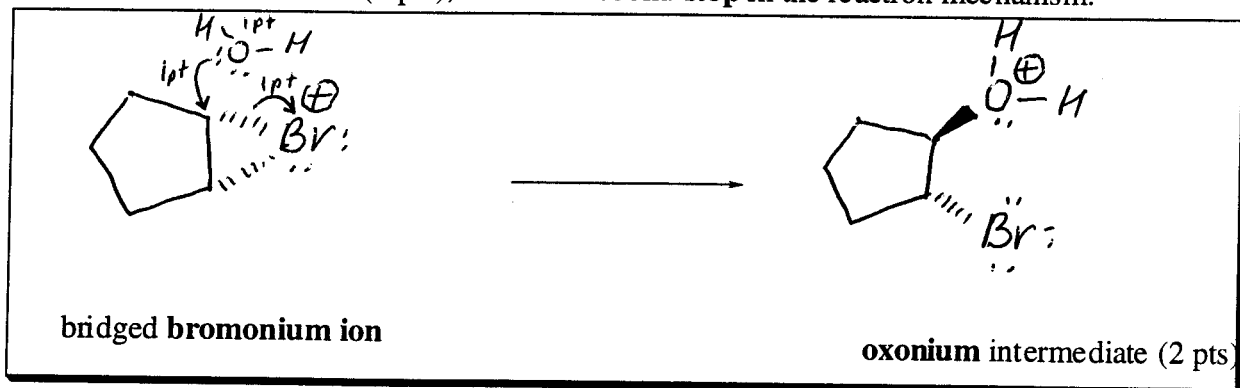
Using curved arrow (2 pts) and other essential species (2 pts), write the **final step** in the reaction mechanism:



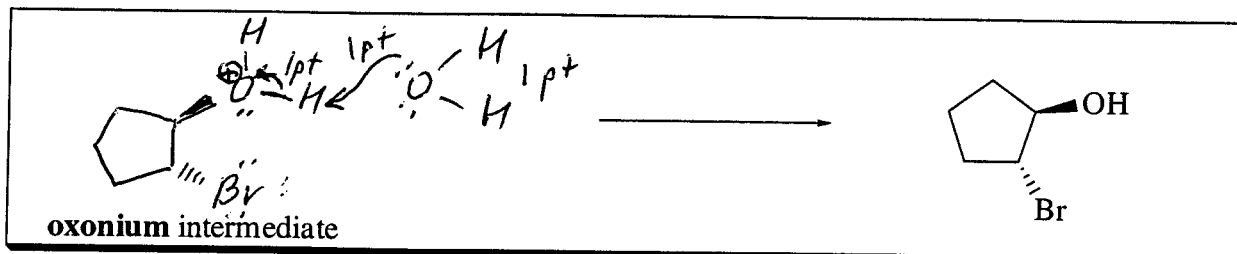
Using curved arrows (2 pts) and showing the structure of the intermediate (in the form of the bridged bromonium ion) (2 pts), write the **first step** in the reaction mechanism:



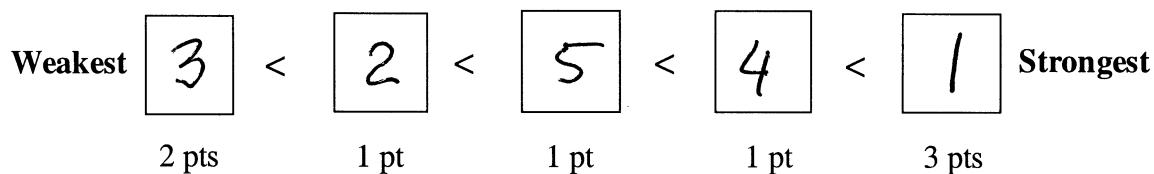
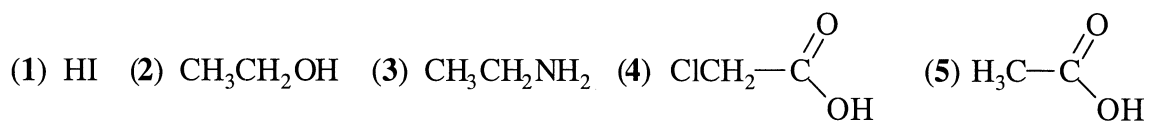
Using curved arrows (2 pts) and other essential species (1 pt), and showing the structure of the **oxonium** intermediate (2 pts), write the **second step** in the reaction mechanism:



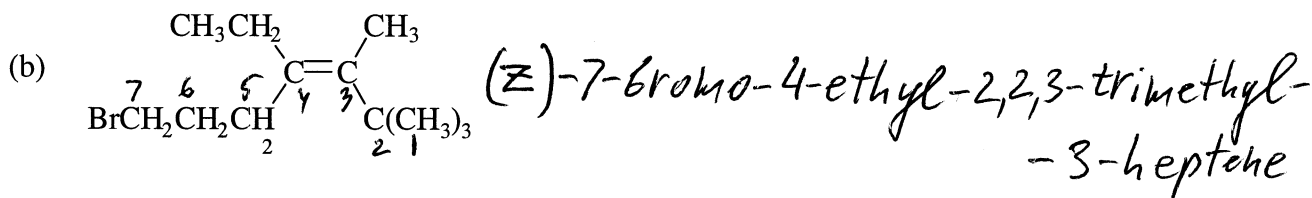
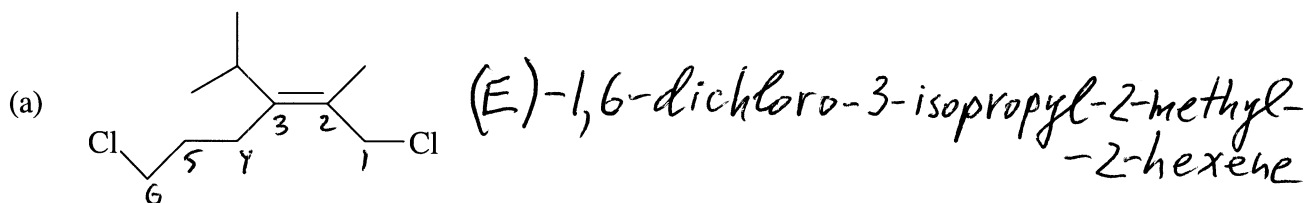
Using curved arrow (2 pts) and other essential species (1 pt), write the **final step** (proton transfer) in the reaction mechanism:



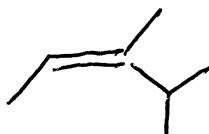
2. (8) Arrange the following compounds in order of **increasing acidity**:



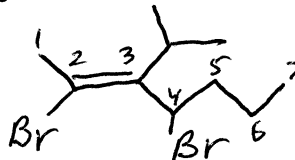
3. (18) Give either the **IUPAC name** (including *E*, *Z* designation) or the **correct structure** for each of the following compounds (3 pts each).



(c) *cis*-3,4-dimethyl-2-pentene



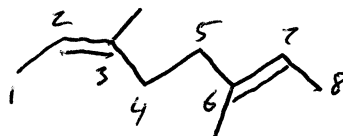
(d) *(Z)*-2,4-dibromo-3-isopropyl-2-heptene



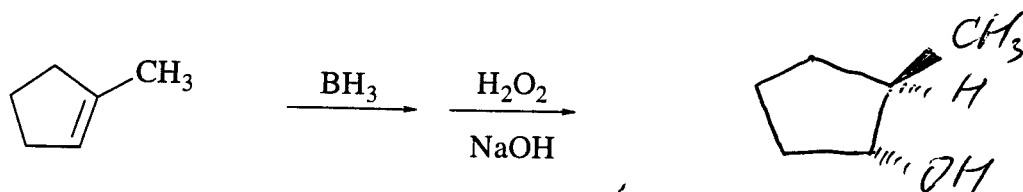
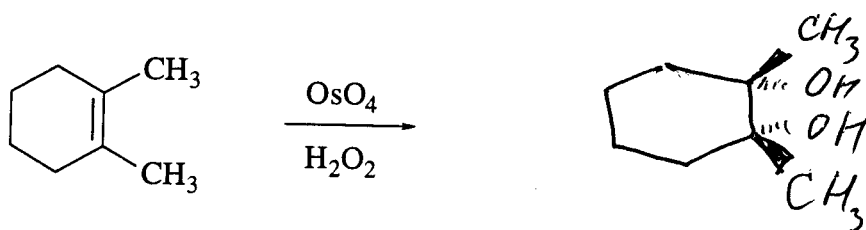
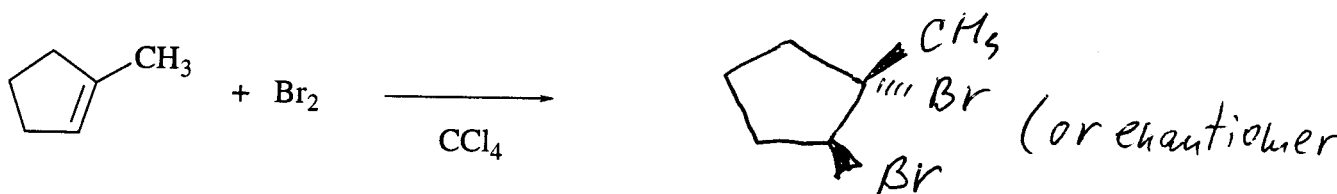
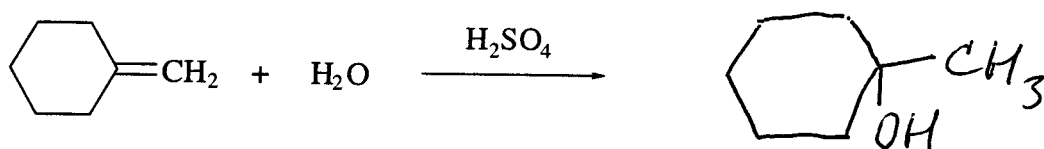
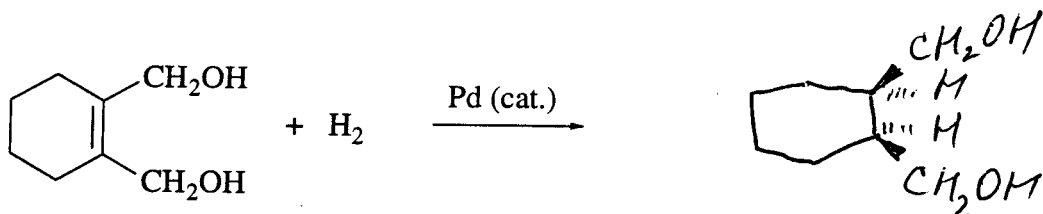
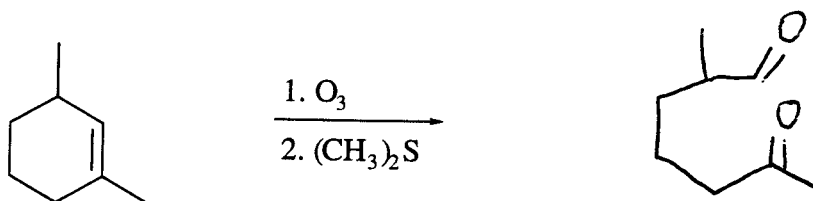
(e) 1-ethyl-5-isopropylcyclopentene



(f) *(2Z,6E)*-3,6-dimethyl-2,6-octadiene

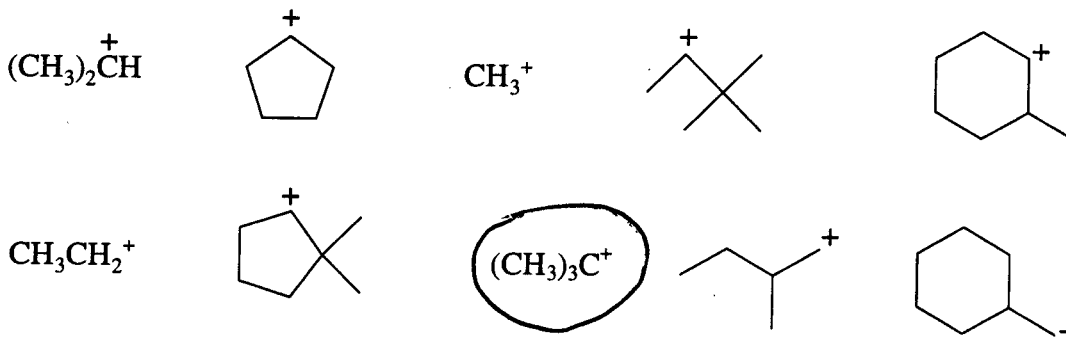


4. (30; 5 pts each) Complete the following equations, showing the stereochemistry of the product when appropriate.

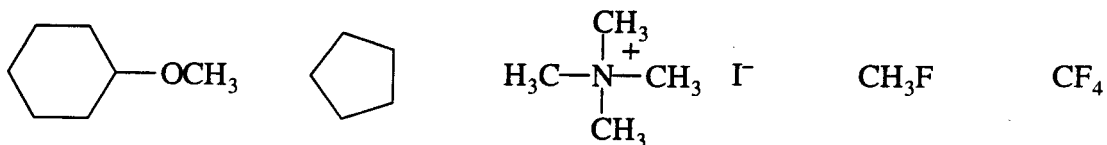
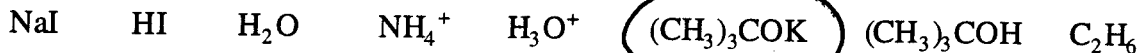


5. (20, 5 pts each) For each of the following questions (a)-(d) **circle** the item that is the correct answer.

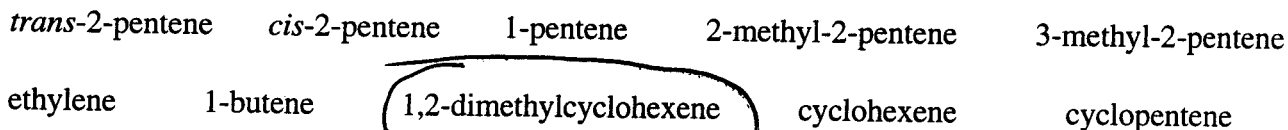
(a) Which one of the following carbocations is the **most stable**?



(b) Which one of the following compounds is the **strongest base**?



(c) Circle the molecule of the **most stable alkene**:



(d) Which one of the following compounds has the most **acidic C-H bonds**?

