

CHEM 3311

HARRINGTON

Exam 7:00 – 8:30 PM October 18, 2016 in MATH 100

Instructions. No notes, books, laptops, phones, or calculators.
Periodic Table and electronegativity chart are provided.

NAME:

	Points Possible	Score
1	15	
2	15	
3	15	
4	15	
5	16	
6	10	
7	14	
Exam 2 Total Raw Score	100	
Curve		
Exam 1 Curved Score		
Exam 1 Letter Grade		

NAME OF YOUR TA:

1(15 points) Draw a **structure** corresponding to each of the following IUPAC names.

a. (R)-fluoro-3-methylhexane

d. (3R,5S)-3,5-dimethylheptane

b. (E)-4-ethyl-3-octene

e. (3Z,6E)-1,3,6-decatriene

c. 4-vinylcyclopentene

2. (15 points) Draw a **structure for the major product** formed when 2-methyl-1-butene reacts with each of the following reagents.

a. Br₂ in CH₂Cl₂ solvent

d. HBr, ROOR, light (R = *tert*-butyl)

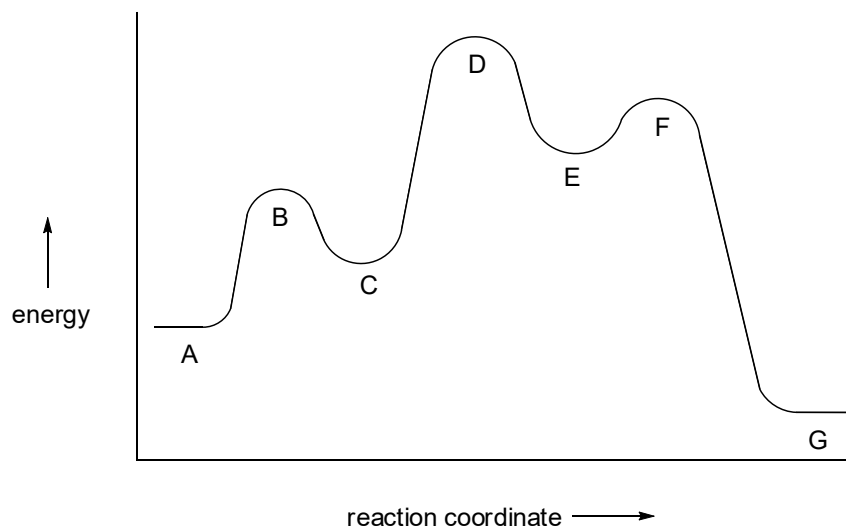
b. H₂, Pt/C

e. Br₂ in H₂O solvent

c. HCl

3. (15 points) Draw clear 3-dimensional structures for each of the stereoisomers of 2,5-dibromohexane. For each stereoisomer structure: 1) assign each chiral carbon in the structure as **R** or **S** and 2) label each stereoisomer structure as **chiral** or **achiral**.

4. (15 points) A reaction coordinate-energy diagram for the reaction $A \rightarrow G$ is shown.



How many steps are there in the mechanism?

Which of the labeled positions on the diagram correspond to intermediates?

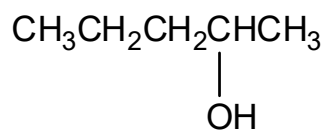
Which of the labeled positions on the diagram correspond to transition states?

Which step is the slow (rate-determining) step in the mechanism?

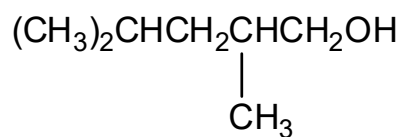
Is the overall reaction $A \rightarrow G$ endothermic or exothermic?

5. (16 points) You have access to a stockroom containing many alkenes and the reagents commonly used to make alcohols from alkenes. Propose one synthesis for each alcohol (draw a structure for the alkene you will start with and fill in the necessary reagents). Your synthesis must be efficient (the desired alcohol must be **the major product**)!

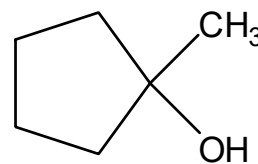
reagents



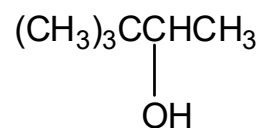
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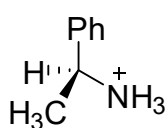
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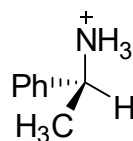
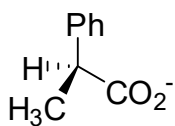
reagents



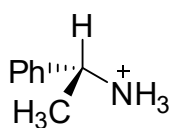
6. (10 points) Which of the salts shown below should have the **same solubility** in methanol? Explain your answer.



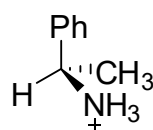
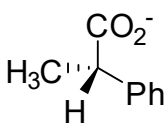
A



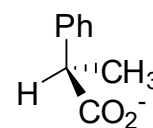
B



C



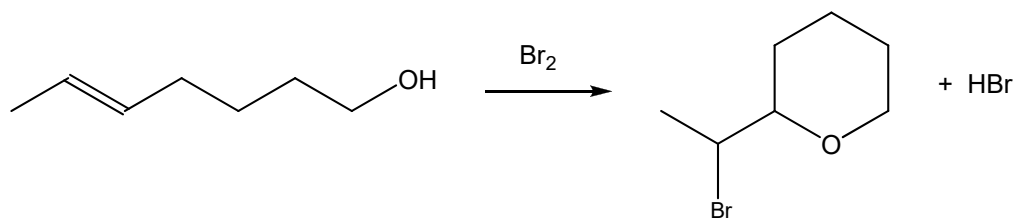
D



Answer:

Explanation (twenty words or less):

7. (14 points) Using your knowledge of the mechanisms of reactions studied in Chapters 4 and 5, propose a detailed mechanism for the reaction below (remember to track the movement of electrons using curved arrows as part of your mechanism).



Mechanism: