CHM 250 Exam II Summer 2015
6/15/2015

Last name:_____ First name:_____
Left-side Neighbor: Right-side Neighbor:

I. Multiple choices/Blank-fill-ins (3 pts per entry, 42 pts)

1. The most reactive alcohol (when reacting with a hydrogen halide) with the molecular formula of $C_4H_{10}O$ is _____. (a name or a structure)

2. _____has the highest boiling point. (choose one of the following four compounds).
$CH_3CH_2CH_2OH$ CH_3CH_2F CH_3CH_2OH $CH_3CH_2CH_3$

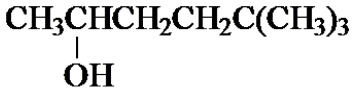
3. Write the structure of a tertiary alcohol _____.

4. The most stable carbocation with the molecular formula of $C_4H_9^+$ is: _____.

5. Write the structure of a secondary alkyl halide _____.

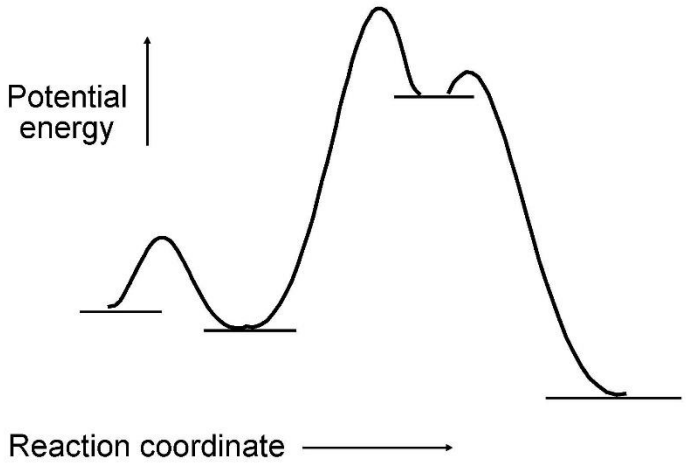
6. The name of the mechanism by which methanol reacts with hydrogen bromide forming methyl bromide and water is _____.

7. The IUPAC name of the following compound is _____.



8. The nucleophile in the following substitution reaction is _____.

9. Please label (a) a transition state (b) an intermediate (c) the product on the potential energy diagram shown below for a multi-step reaction. (total 9 pts)



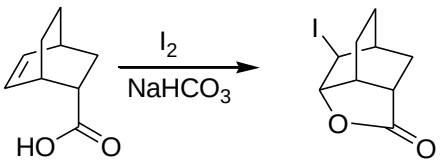
10. According to Hammond's Postulate, the transition state in the rate-limiting step of the following reaction

$(CH_3)_3COH + HBr \longrightarrow (CH_3)_3CBr + H_2O$

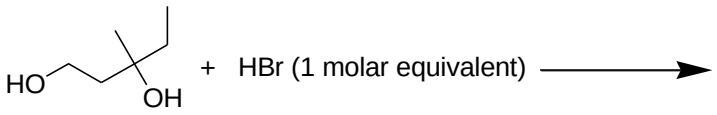
has a structure most closely resembles to the structure of _____ (must be one of intermediates or reactants or products).

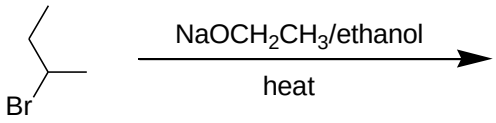
11. _____ is the most reactive hydrogen halide when reacting with an alcohol producing an alkyl halide and water. (fill in a name or a structure)

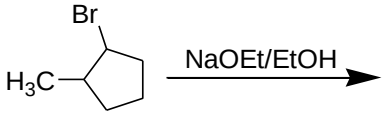
12. Show your understanding to the mechanism of the following reaction by giving the key cationic intermediate _____

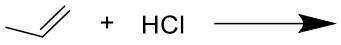


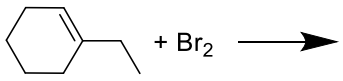
II. Please give the structure of principle organic product of each reaction, please specify stereochemistry if it applies (38 pts):

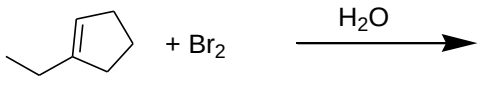
1. 

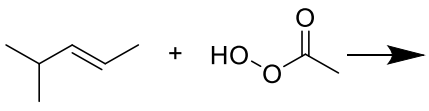
2. 

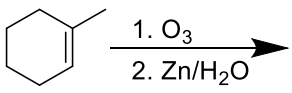
3. 

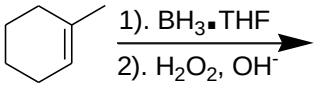
4. 

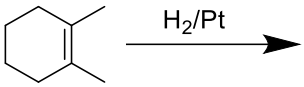
5. 

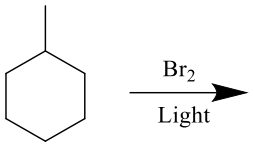
6. 

7. 

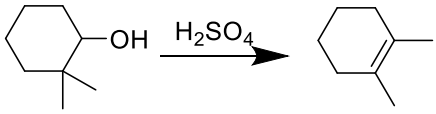
8. 

9. 

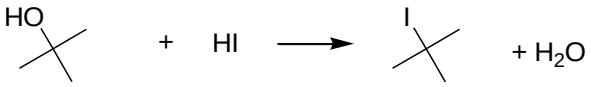
10. 

11. 

III. Please give the detailed mechanism of following reaction by showing all elementary steps, using curved arrows to show the flow of electrons. If any lone pairs are involved in a reaction, they must be shown. (12 pts)



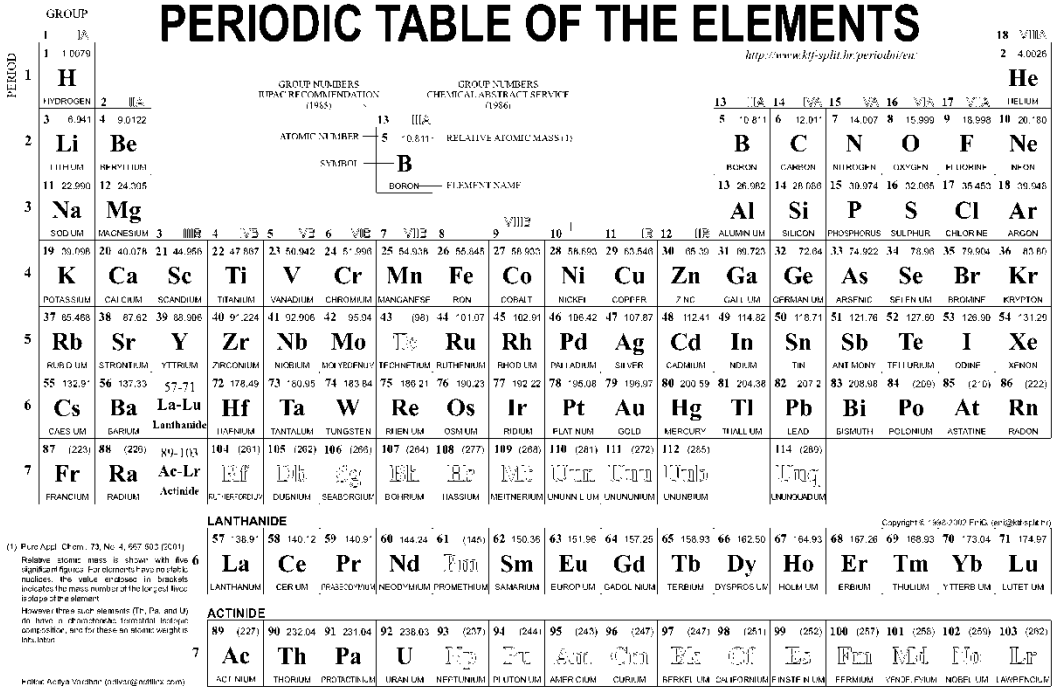
IV. Consider the reaction:



(1) Please give the detailed mechanism of this reaction, using curved arrows to show the flow of electrons. If any lone pairs are involved in a reaction, they must be shown. (9 points)

(2) What is the name of the mechanism? (3 points)

(3) **What is the rate-limiting step? (3 points)**



1	2	3	4	5	6	7	8	9	10	11	12	13	14

meth	eth	prop	but	pent	hex	hept	oct	non	dec	undec	dodec	tridec	tetradec