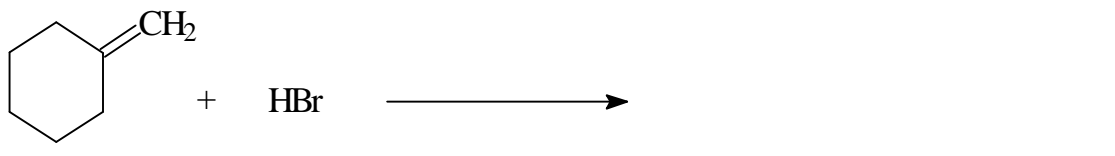


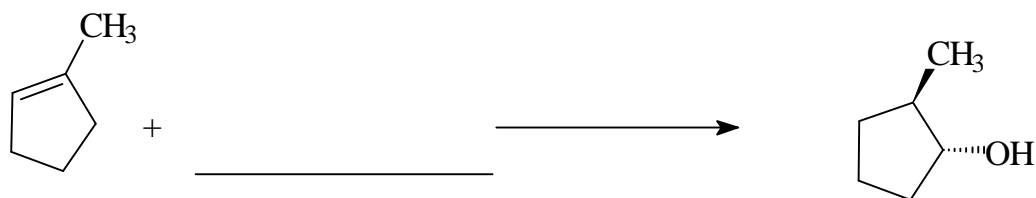
Second Test

1. For each of the following equations, fill in the blank with the correct structural formula. If any catalysts or special solvents are required, indicate these over the arrows. If stereochemistry is important, make sure your drawings indicate it. [25 points]

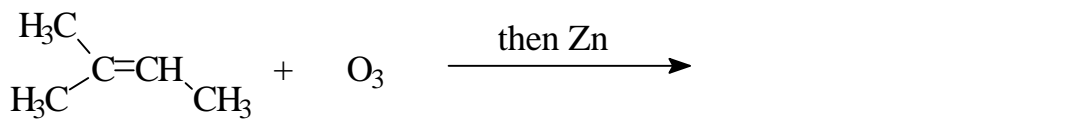
(a)



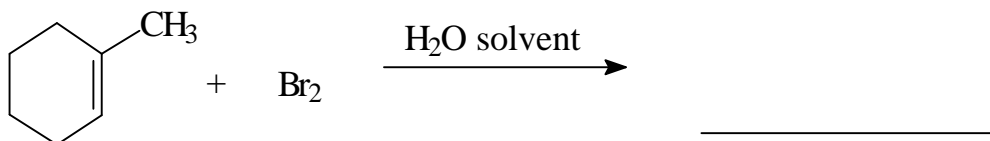
(b)



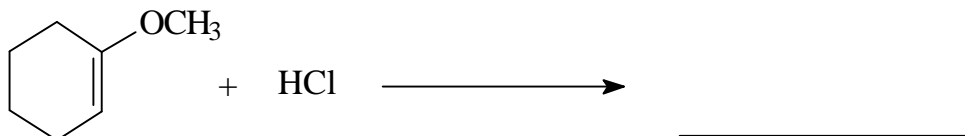
(c)



(d)



(e)



[Hint - consider resonance]

2. Draw the COMPLETE MECHANISM for the acid catalyzed reaction of 2-methyl-1-butene with water. Make sure you show which steps are reversible. Also, draw the overall reaction [20 points].

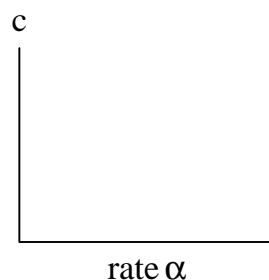
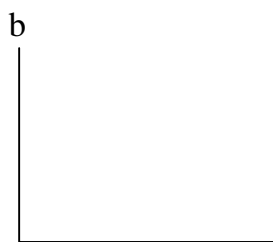
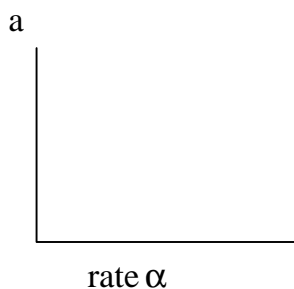
3. On the axes below, draw the appropriate energy profile for the following reactions. [5 points each]

(a) An exothermic reaction between A and B which occurs in three steps, the second of which is the slowest. For this reaction, also write the form of the rate equation if B is involved in the last step.

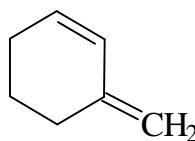
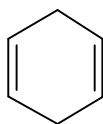
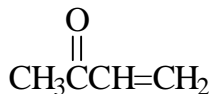
(b) A reaction between A and B which occurs in two steps and whose rate depends on the concentrations of both A and B.

(c) A reaction between A and B in which A is first converted to I and then, in the slow step, B reacts with I to give the product. For this reaction, also write the form of the rate equation.

4. (a) Circle those molecules in the following list which can be stabilized by resonance. [5 points]

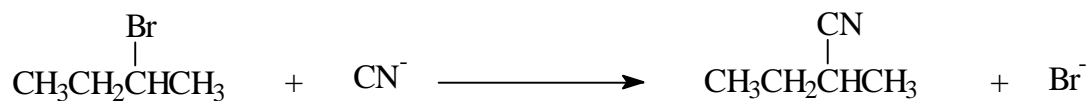


(b) For each of the structures shown below, draw as many resonance structures as possible. [5 points each]

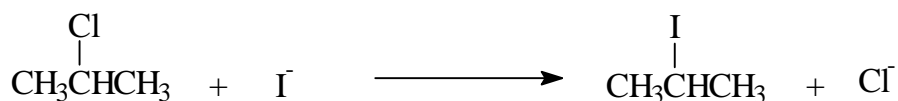


5. For each of the following pairs of reactions, answer the question asked AND PROVIDE A REASON FOR YOUR CHOICE. BRIEF (5 WORD) ANSWERS ARE BEST! [5 points each]

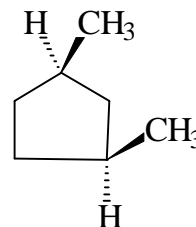
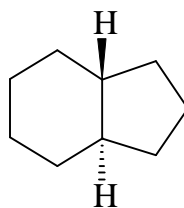
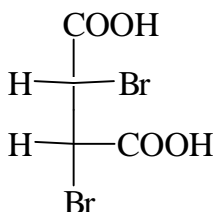
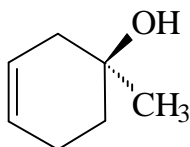
(a) Which reaction will be more likely to proceed via a S_N1 mechanism?



(b) Which reaction will proceed faster.



6.(a) Circle those molecules in the list below that are optically active. [5 points]



(b) The addition of I_2 , I-Br and I-Cl to ethene occurs with relative rates of $1:10^3:10^5$. Explain this observation. [5 points]

(c) Bonds between carbon and chlorine are polar. The molecule 1,2-dichloroethane has a dipole moment that increases with increasing temperature. Explain this fact. [5 points]