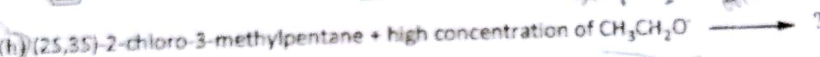
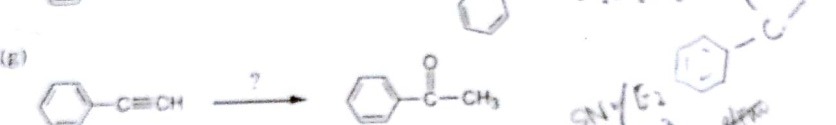
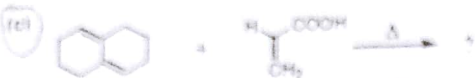
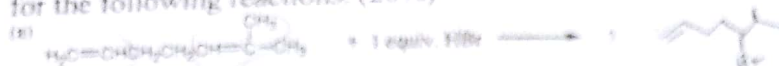
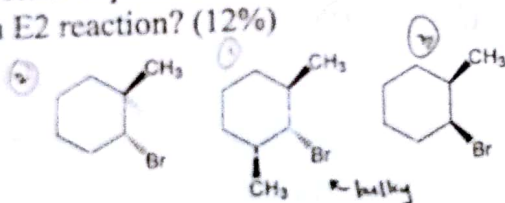


December 15, 2017

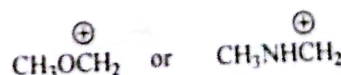
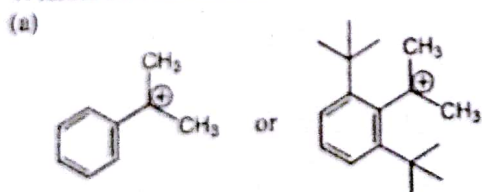
1. Predict the major product, if any, or provide appropriate starting materials, or reagent(s) for the following reactions. (20%)



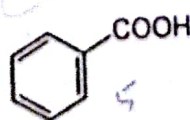
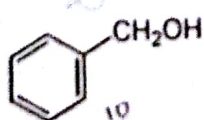
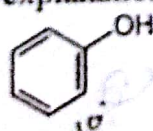
2. Rank the following compounds from most reactive to least reactive in an E2 reaction and give a brief explanation. What would be the major product, if any, for each compound after an E2 reaction? (12%)



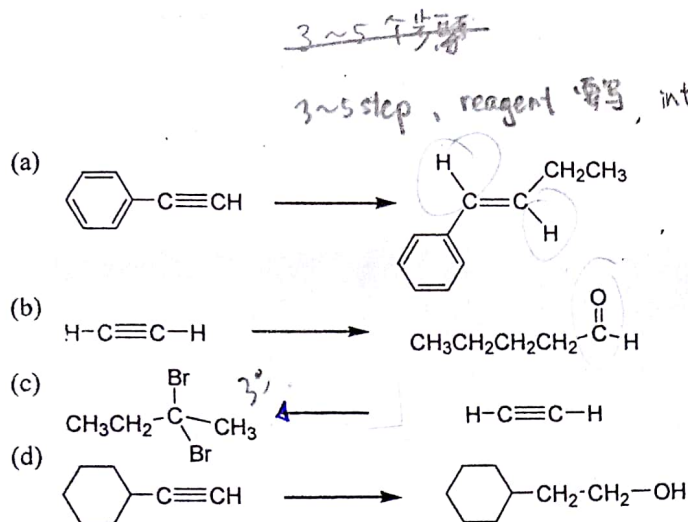
3. Which carbocation in each of the following pairs is more stable? Why? (8%)



4. Rank the following compounds in an order of decreasing acid strength, and give a brief explanation. (8%)

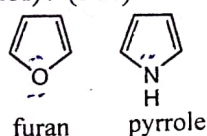


5. Show how you would synthesize the following compound, starting with the provided starting material. (32%)



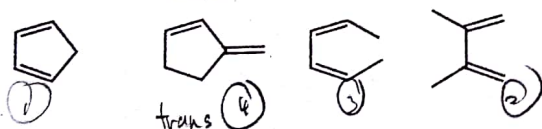
这样 ans. 给
逻辑 有分

6. Why is the resonance energy of pyrrole (21 kcal/mol) greater than the resonance energy of furan (16 kcal/mol)? (5%)

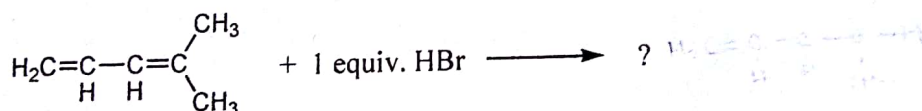


resonance energy
∴ stability ↑, delocalized energy

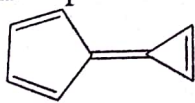
7. Rank the following dienes in order of decreasing reactivity in a Diels-Alder Reaction, and give a brief reason for your prediction. (6%)



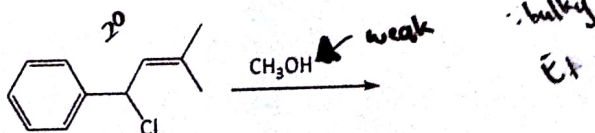
8. Give the possible reaction products for each of the following reactions, and indicate which is the kinetic product, and which is the thermodynamic product. (6%)



9. In what direction is the dipole moment in calicene? Explain. (4%)



10. Predict the product for the following reaction and write a mechanism to explain how it is formed. (6%)



bulky
Et

11. What is the relative reactivity of the following compounds toward the addition of HBr? Give a brief explanation of your answer. (5%)

