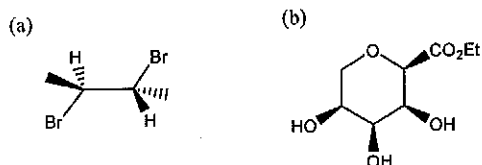
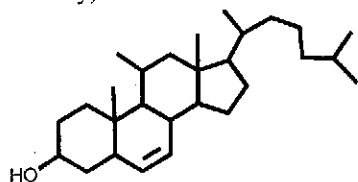


『有機化學』（化生系），問答題16題，總分100分

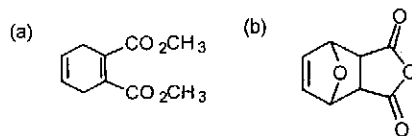
1. (4 points) For each center of chirality in the following molecules, assign an *R* or *S* configuration according to the Cahn-Ingold-Prelog rules.



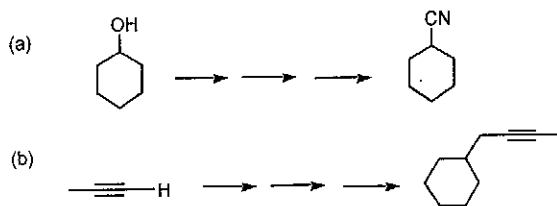
2. (5 points) The basic structure of cholesterol, the principal sterol found in all mammals, is shown here. Identify all centers of chirality, and calculate the number of possible stereoisomers.



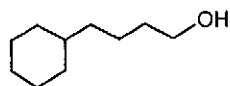
3. (8 points) Which diene and dienophile would you choose to synthesize each of the following products by a Diels-Alder reaction?



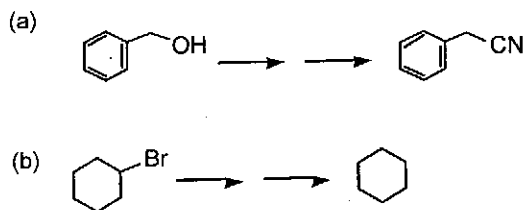
4. (6 points) What reagents are required to accomplish each of the following transformations.



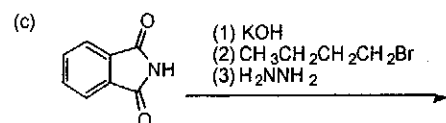
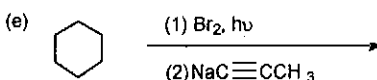
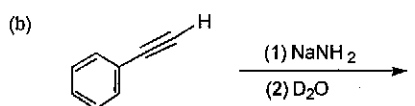
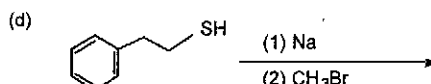
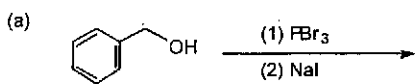
5. (4 points) How can the following alcohol be prepared from cyclohexane?



6. (6 points) What reagents are required to accomplish each of the following transformations.



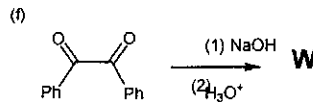
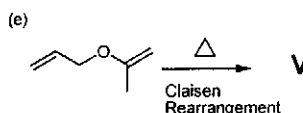
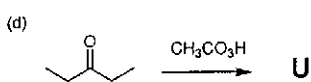
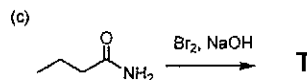
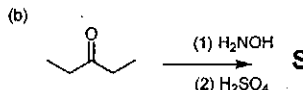
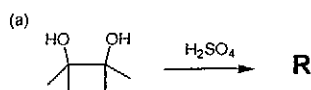
7. (10 points) For each of the following reactions, predict the expected product.



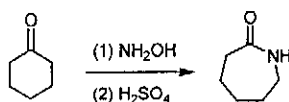
8. (4 points) Develop a synthesis for the following Wieland-Miescher ketone.



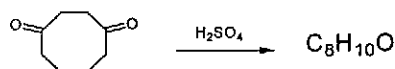
9. (12 points) Provide the product of the following rearrangement.



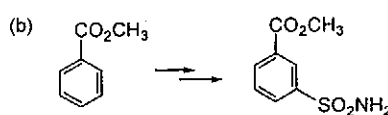
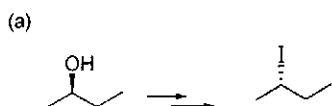
10. (4 points) Write a detailed mechanism for the following rearrangement.



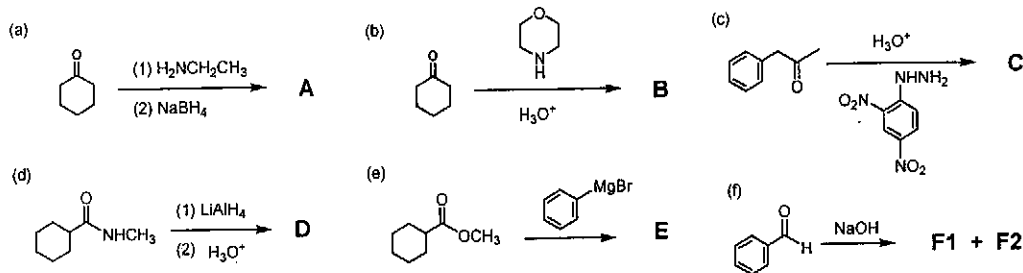
11. (4 points) Treatment of 1,4-cyclooctadione with sulfuric acid produces a ketone with the formula $\text{C}_8\text{H}_{10}\text{O}$. Assign a structure to this ketone, and then write a detailed reaction mechanism that accounts for its formation.



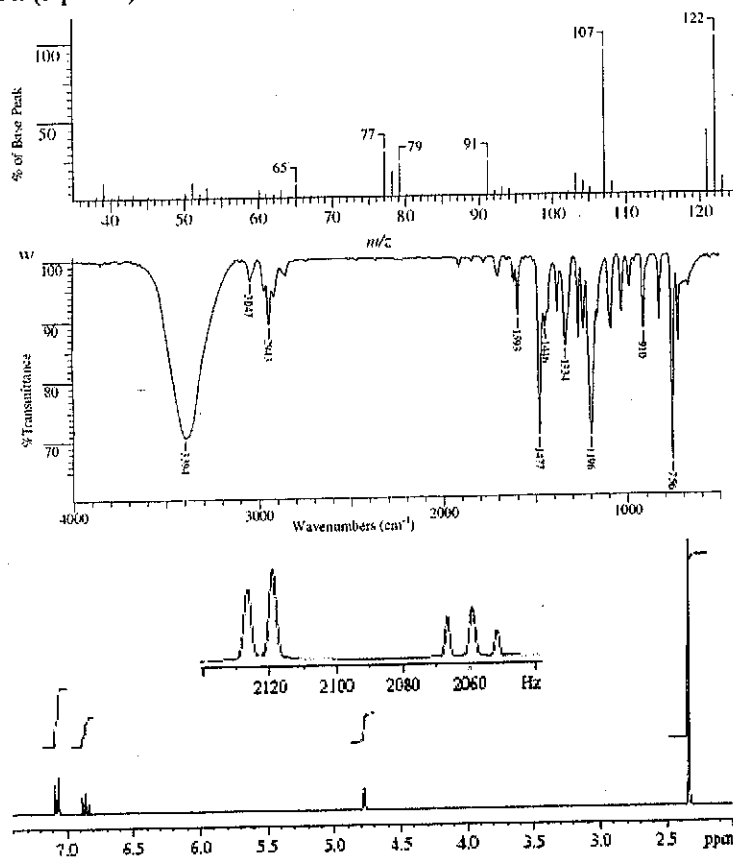
12. (6 points) Suggest a reagent (or a series of reagents) that can be used to accomplish the following transformation:



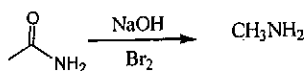
13. (12 points) Predict the product, if any, expected from each of the following reaction.



14. (5 points) Give a structure for the compound that is consistent with the following spectra.



15. (5 points) Please provide the reasonable mechanism for the following reactions:



16. (5 points) Please provide the reagents for the following transformation.

