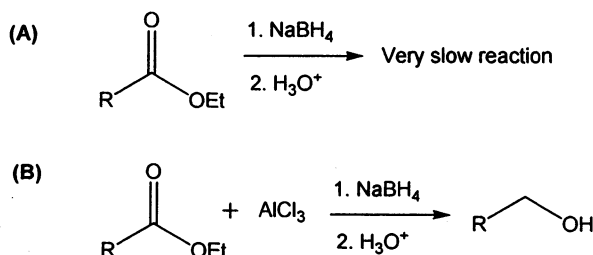


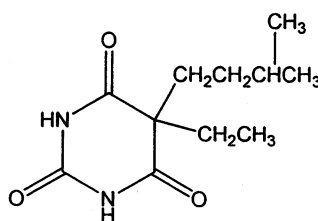
Don't provide mechanism unless asked

Part A

1. Explain the following mechanistically. When sodium borohydride is added to a solution of an ester, as shown in (A), the reduction takes place very slowly. However, on addition of aluminium trichloride, as shown in (B), the reduction takes place readily. (1.5 marks)

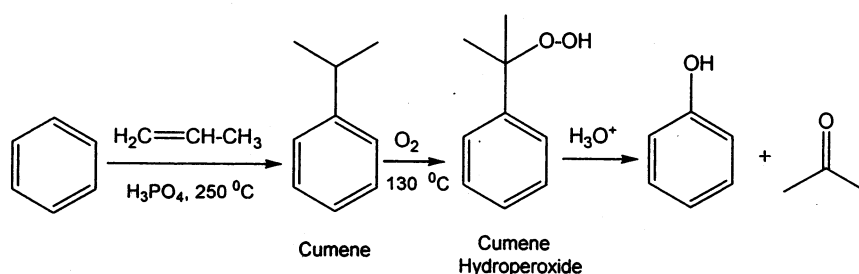


2. Amobarbital is a sedative marketed under the trade name Amytal. Propose a synthesis of amobarbital, using diethyl malonate and urea as two of the starting materials. Show mechanisms of all the steps. (2.5 marks)

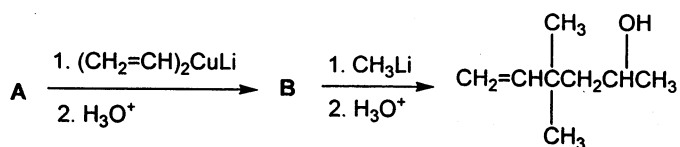


Amytal

3. The acid catalysed rearrangement of cumene hydroperoxide is an important industrial process which generates two important chemical substances: phenol and acetone. Provide mechanisms for the following two steps in the given synthetic scheme: preparation of cumene from benzene and the rearrangement of cumene hydroperoxide to phenol and acetone. (3 marks)

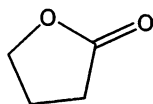


4. Identify compound A and B. (2 marks)



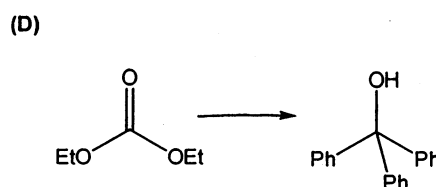
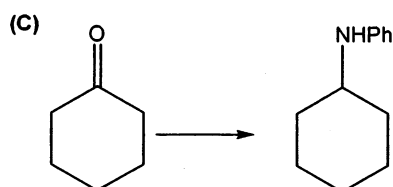
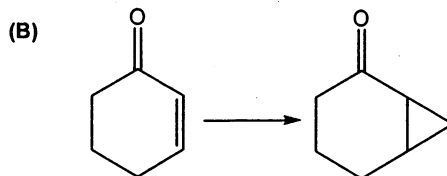
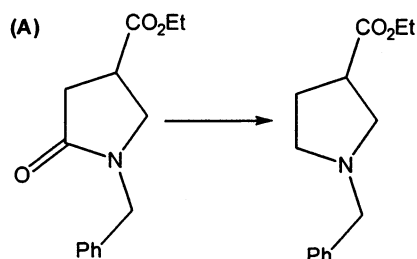
5. Attempted Cr(VI) oxidation of 1,4-butanediol to butanedioic acid results in significant yields of "γ-butyrolactone (structure given below)." Explain mechanistically. (2 marks)

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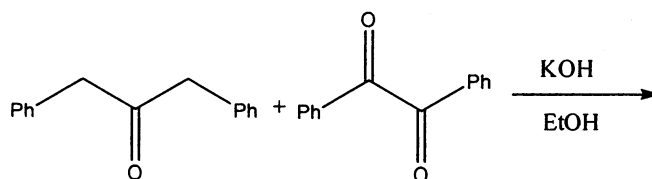
6. Suggest appropriate reagents and conditions for the following transformations.

(1 x 4 = 4 marks)



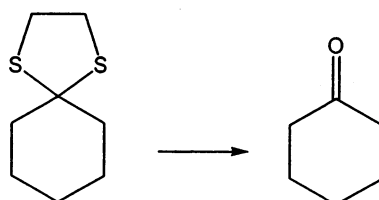
7. What is the product of the following reaction? Explain with a mechanism.

(2 marks)

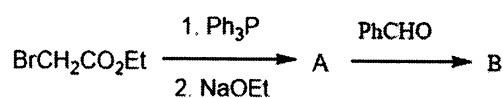


8. How would you carry out the following transformation? Show a plausible mechanism.

(2.5 marks)

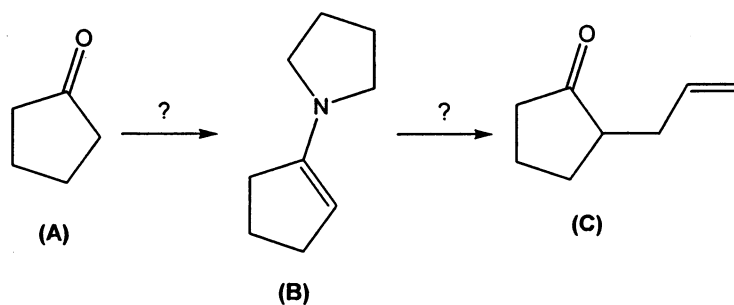


9. Identify A and B in the following sequence and provide mechanism for each step. (2.5 marks)



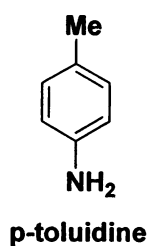
10. Provide the missing reagents for the transformations: A to B and B to C. Show mechanisms for both the steps. (3 marks)

Supratu. Bay



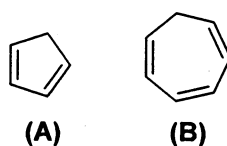
Part B

11. *p*-Toluidine (structure given below) reacts with benzene diazonium chloride to form a compound which on boiling with dil. sulphuric acid gives four products (excluding nitrogen). Write the structures of the four products with appropriate mechanism. (2+1 marks)



12. Which one is more acidic and why?

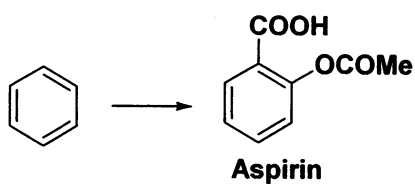
(1 mark)



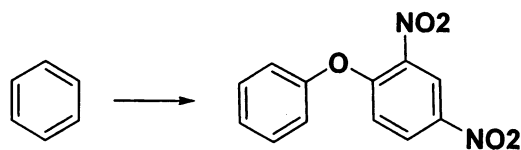
13. Carry out the following transformations (mechanism is not needed)

(2x3=6 marks)

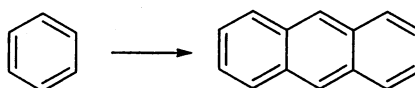
a)



b)

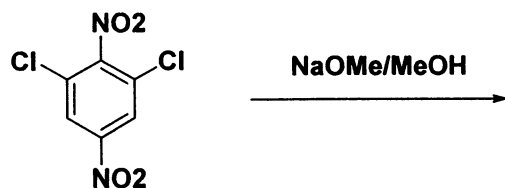


c)



D: 47.4.12
Supra. By

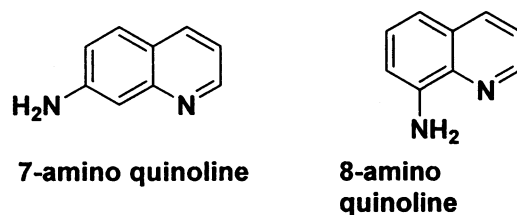
(2.5 marks)



(2.5 marks)



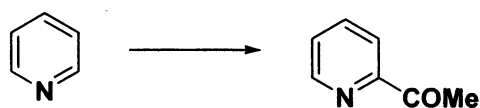
(2 marks)



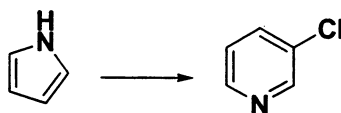
(4 marks)



(2 marks)



(2 marks)



Supratim Bar