

Eastern University, Sri Lanka  
Second Year First Semester Examination in Science-2008/2009  
(May/July 2012)  
External Degree  
EXTCH 204 Reaction Mechanisms and Aromaticity  
(Proper and Repeat)

Answer all questions

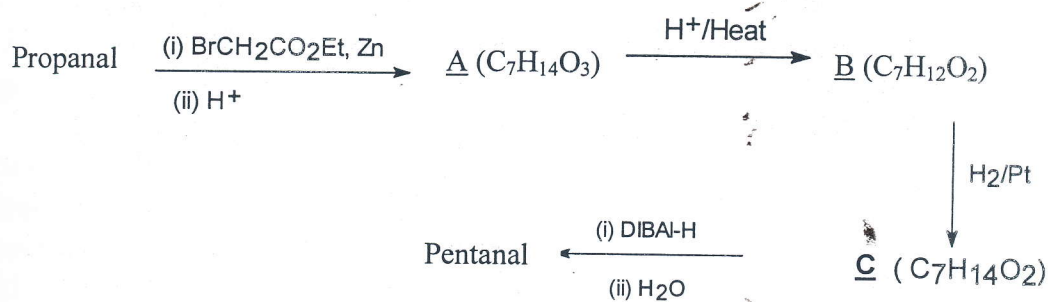
Time: 01 hour

01. (a) Write the structural formulas for the product formed when ethanal reacts with each of the following reagents.

- (i)  $C_6H_5MgBr$ , then  $H_2O$
- (ii)  $(C_6H_5)_3P=CH_2$
- (iii)  $HO-CH_2-CH_2-OH$  in  $H^+$
- (iv) Phenyl hydrazine

(20 Marks)

(b) Give the structures for the following compounds A to C



(30 Marks)

(c) Write the mechanism for the following reactions

(i)



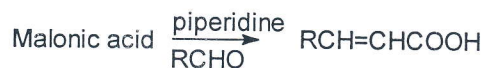
(15 Marks)

(ii)



(15 Marks)

(iii)

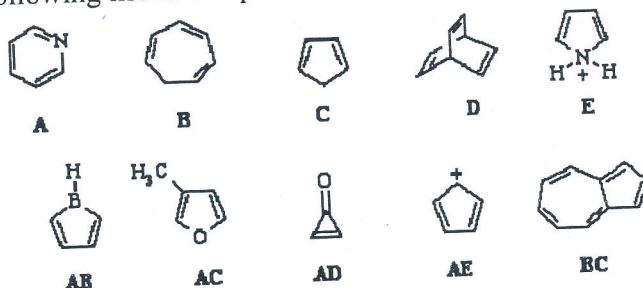


(20 Marks)

Contd...

02. (a) (I) State Huckel's rule for aromaticity

(II) Use the following list of compounds to answer the questions below:



Choose the compound that is best described as the following;

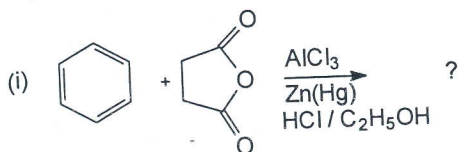
- (i) A neutral, 4  $\pi$ -electron, anti-aromatic system.
- (ii) A 6  $\pi$ -electron, aromatic system.
- (iii) A non-aromatic, conjugated 6  $\pi$ -electron system.
- (iv) A non conjugated hydrocarbon.
- (v) Non-aromatic as drawn, but if H- were removed would give an aromatic cation.
- (vi) Non-aromatic as drawn, but has an important resonance structure.
- (vii) Non-aromatic as drawn but has an aromatic conjugate base.
- (viii) An aromatic heterocyclic that can act as a diene in a Diels-Alder reaction.

(40 Marks)

(b) Use the polygon and circle method to outline the  $\pi$  molecular orbitals of cyclopentadienyl anion and hence explain whether cyclopentadienyl anion is aromatic or not.

(20 Marks)

(c) Identify the product (with the correct stereochemistry where possible) in each of the following reaction.



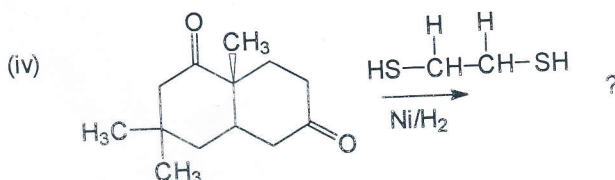
(10 marks)



(10 marks)



(10 marks)



(10 marks)