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EASETRN UNIVERSITY, SRI LANKA

SECOND EXAMINATION IN SCIENCE – PROPER

EXTERNAL DEGREE

FIRST SEMESTER 2002-2003 (OCTOBER 2006)

EXTCH 204 REACTION MECHANISM AND AROMATICITY

Time allowed: **ONE Hour**

Candidate must NOT start writing their answers until told to do so

You may find the following data useful

Avagadro constant (N_A): 6.023×10^{23} mol^{-1}

Electron charge (e): 1.602×10^{-19} C

Faraday constant (F): 9.648×10^{4} $Cmol^{-1}$

Gas constant (R): 8.314 $JK^{-1}mol^{-1}$

Planck's constant (h): 6.626×10^{-34} Js

Rest mass of electron (m_e): 9.1×10^{-31} kg

Velocity of light (c): 3×10^{8} ms^{-1}

The use of a non –programmable calculator is permitted

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1. Suggest a plausible mechanism for the following reactions.

(i) $PhCHO + CH_2(COOEt)_2 \xrightarrow[\text{(ii) } H^+/H_2O,\ \text{Heat}]{\text{(i) Pyridine}} PhCH = CHCOOH$

(35 marks)

(ii) $PhCHO \xrightarrow{NaCN/\ EtOH/\ Heat} PhCOCH(OH)Ph$

(35 marks)

(iii) $CH_3CHO + CH_3OH \xrightarrow{HCl\ (g)} CH_3CH(OCH_3)_2$

(30 marks)

2. (a) Nitration of naphthalene with con HNO_3 and con H_2SO_4 gives 1- nitronaphthalene as the major product. Explain.

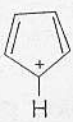
(15 marks)

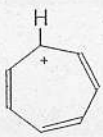
(b) (i) State Huckel's rule.

(10 marks)

(ii) Determine whether the following compounds are aromatic or not, by using Huckel's rule.

(I) 

(II) 

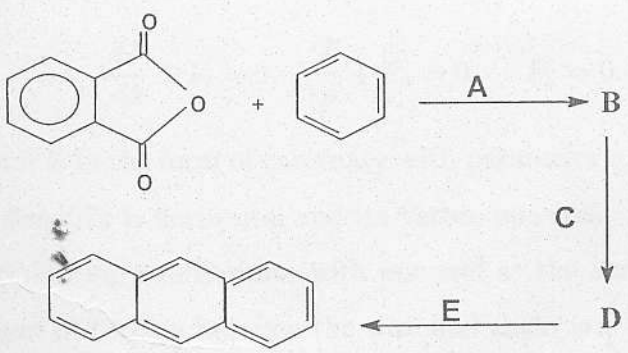
(III) 

(30 marks)

(c) Outline the molecular orbitals of cyclopentadienyl anion using circle and polygon method and explain on this basis why cyclopentadienyl is aromatic.

(20 marks)

(d) What are **A**, **C** and **E**. Give the structures of **B** and **D**.



(25 marks)

End