AL/systems.

ID # 53

Reg. No: | | | | | | | | |



The Open University of Sri Lanka
B. Sc Degree / Stand Alone Programme 2009/2010
Organic Chemistry - CHU 2221
Level 4 - Assignment I – Open Book Test
Duration 1½ hours

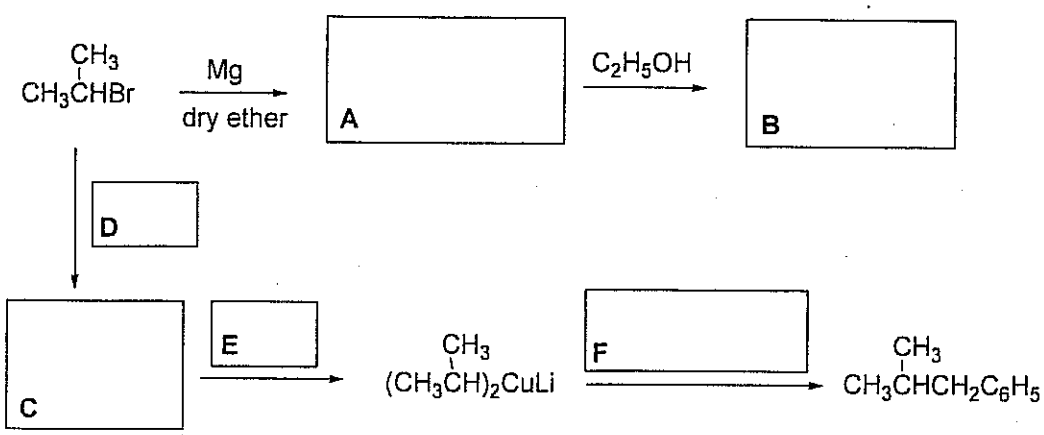
| Q | Marks | |
|---|---|---|
| | Max | Awarded |
| 1 | 24 | |
| 2 | 16 | |
| 3 | 50 | |
| 4 | 20 | |
| Total | 110 | |

**Thursday 03rd December 2009** **Time: 4.00 p.m. – 5.30 p.m.**

**Maximum marks allocated to this paper are 110. However a candidate who scores 100 marks or above will be awarded 100% and those scoring less will be awarded the score they make.**

**Answer all questions.**

1. Give the structures of the products **A** – **C** and the reagents **D** – **F** in the following reaction scheme.




(24 Marks)

2. Explain why, the solubility of *para* nitrophenol in water is higher than that of *ortho* nitrophenol.

(16 Marks)

3. Giving reasons, propose a suitable structure for the compound **P** ($C_{10}H_{12}O_2$) of which IR, $^1$H NMR and MS spectra are provided. Assign all $^1$H NMR signals to proposed structure.

   Give the structures of fragment ions responsible for the peaks at m/e 136, 119 and 91 in the MS.

(*Write your answer **only** in the following box. Answers written in additional sheets are not marked*)

(50 Marks)

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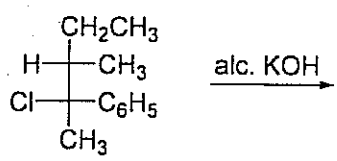
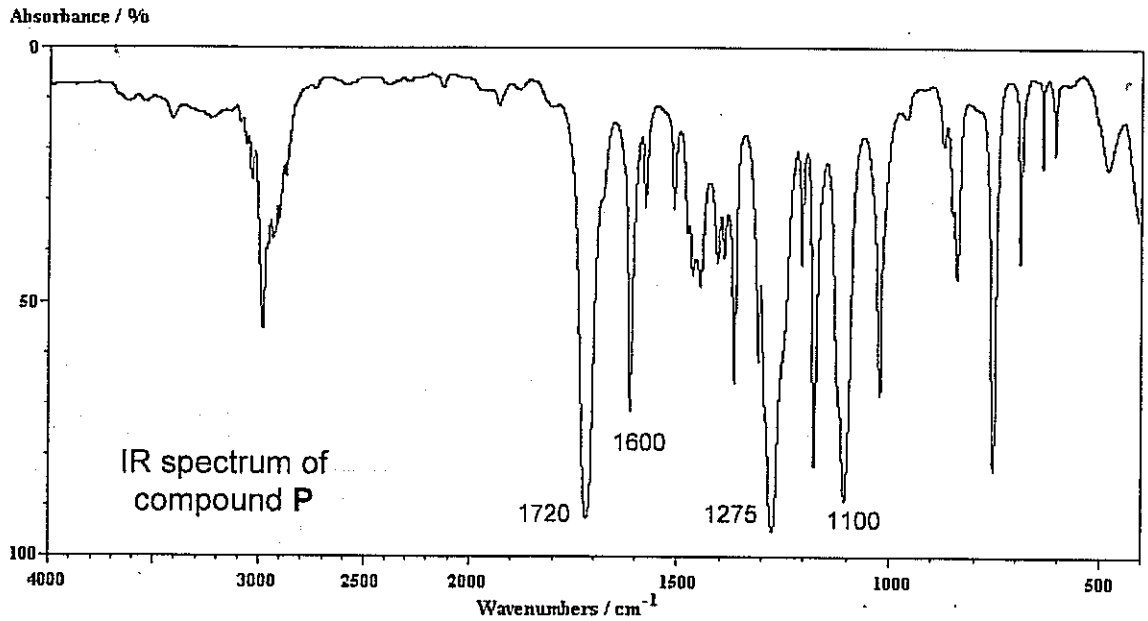
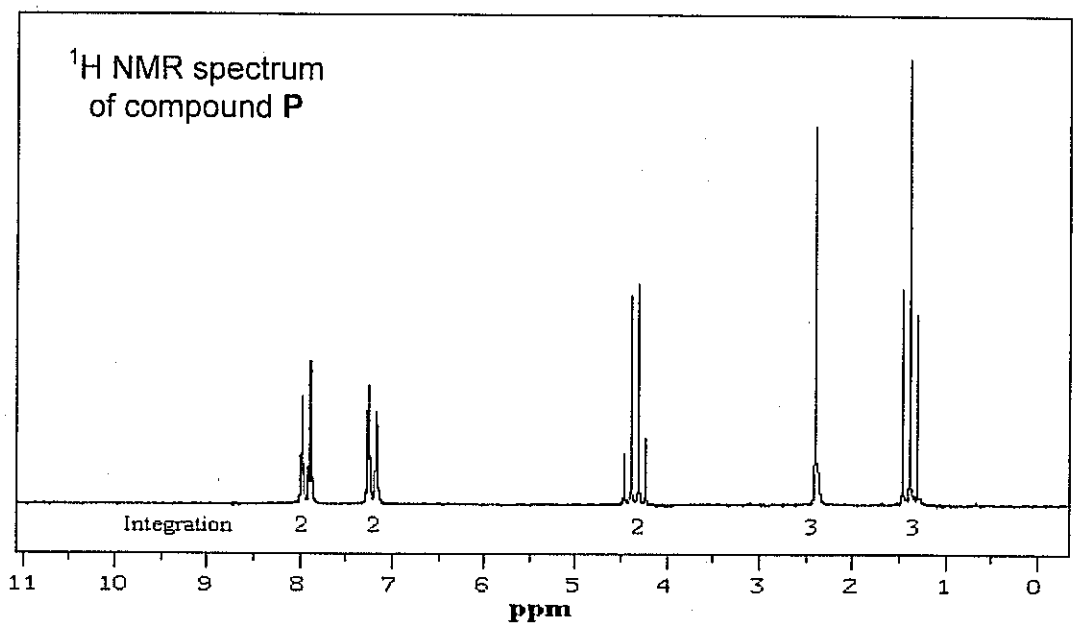
4. Giving appropriate mechanism of the following reaction, deduce the structure of the product with its stereochemistry.

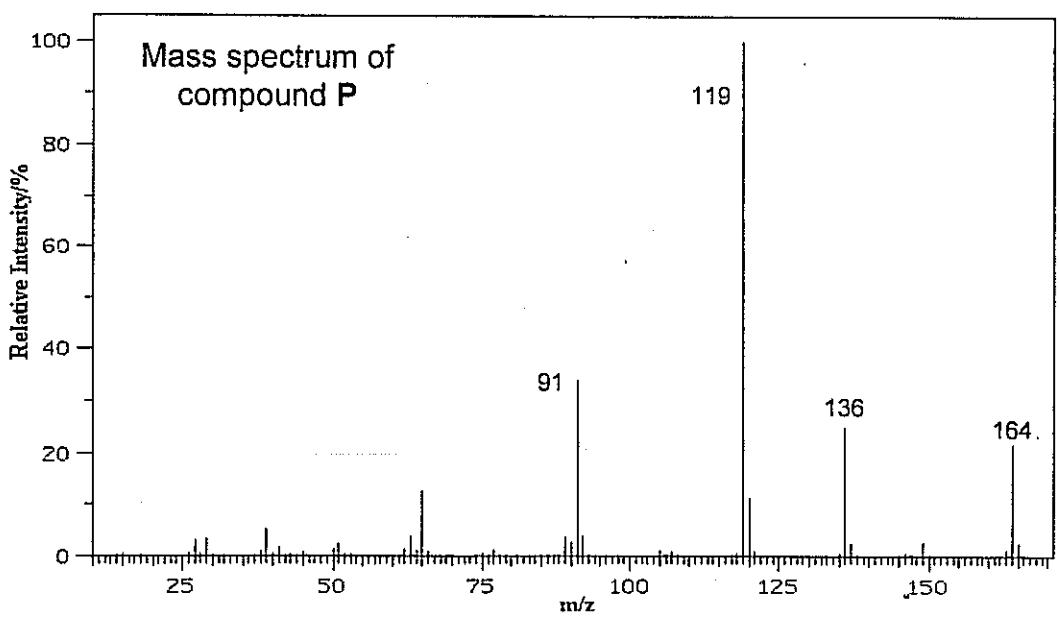



(20 Marks)

IR, 1H NMR and Ms Spectra of compound **P** ($C_{10}H_{12}O_2$)



# The Open University Of Sri Lanka

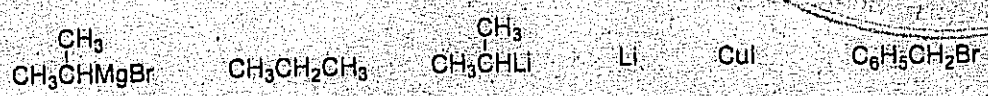
## Organic Chemistry - CHU 2221

## Answer Guide

## Level 4 – Assignment Test 01



1.

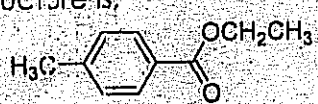


A B C D E F

2. In *ortho*- nitro phenol, Intramolecular H bonding present. Therefore it can't form Intermolecular H- Bonding with water. The bonding type which present in the *ortho*- nitro phenol with water is Dipole –Dipole type.
In para-nitrophenol, Intermolecular H bonding is present. Water can interact with para-nitrophenol, and intermolecular H bonds break, while forming H bonds between water and para-nitrophenol.

3. Degree of Unsaturation = 5,
According to the IR Spectroscopy ,
1720 $cm^{-1}$ – Due to the carbonyl stretching
1600 $cm^{-1}$ – Due to the c=c (aromatic system)
According to the NMR Spectroscopy,
5 different types of protons present.
- 1.4 ppm – Triplet ( Adjacent carbon has 2 hydrogen )
- 2.3 ppm - Singlet (Adjacent carbon has no hydrogen )
- 4.3 ppm - Quartet (Adjacent carbon has 3 hydrogen )
- 7- 8 ppm – 2 Doublets – Para disubstituted benzene ring.

The structure is,



4. $E_2$ Type of Elimination. The two groups involved in elimination have to take up anti periplanar arrangement.
Product with corrects stereochemistry is: