

Name of the Student: _____

Max. Marks : 25 Marks

Time : 25 Minutes

Q1.

- (a) Describe how propanal, $\text{CH}_3\text{CH}_2\text{CHO}$, and propanone, CH_3COCH_3 , can be distinguished using

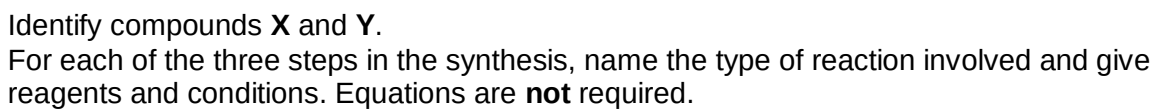
- (i) a chemical test and

(3)

- (ii) the number of peaks in their proton n.m.r. spectra.

(2)

- (b) Compound **Z** can be produced by the reaction of compound **X** with compound **Y** as shown in the synthesis outlined below.



For each of the three steps in the synthesis, name the type of reaction involved and give reagents and conditions. Equations are **not** required.

[illegible]

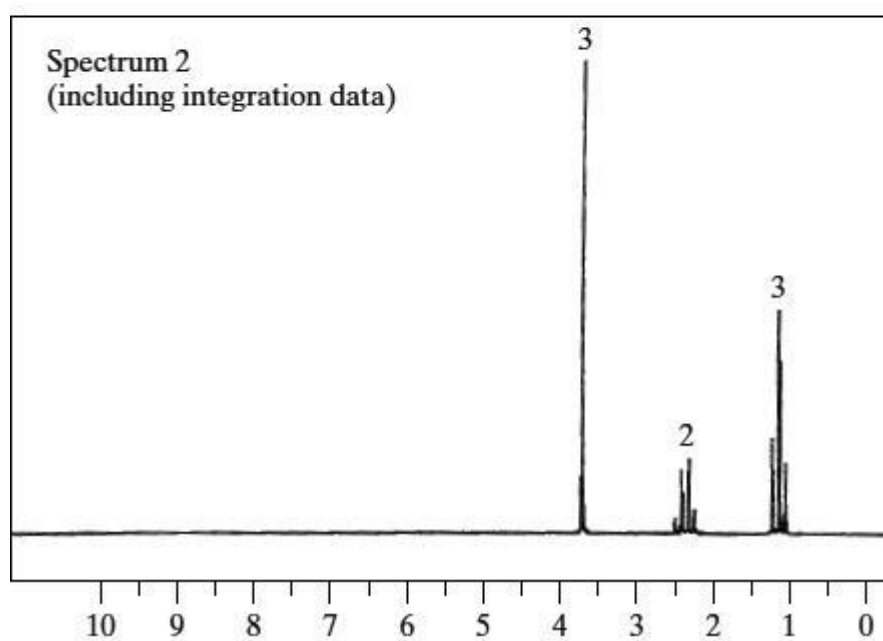
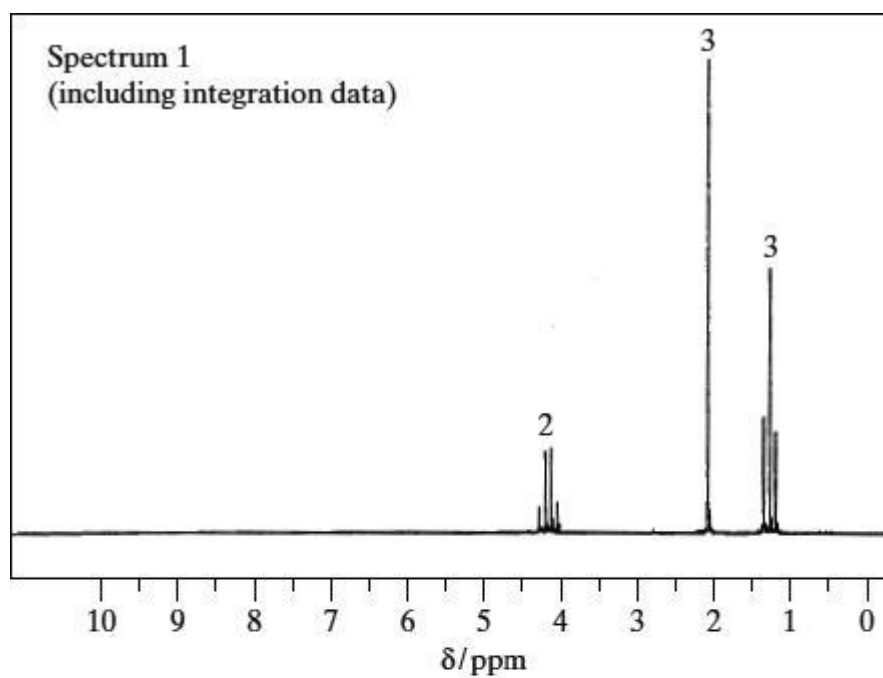
(Total 15 marks)

Q2.

- (a) Ester **X**, $\text{CH}_3\text{CH}_2\text{COOCH}_3$, can be produced by the reaction between propanoyl chloride and methanol. Name **X** and outline a mechanism for this reaction. Name the mechanism involved.

(6)

- (b) The proton n.m.r. spectrum of **X** is shown below together with that of an isomeric ester, **Y**. Deduce which of Spectrum 1 and Spectrum 2 is that obtained from **X**. Use **Table 1** on the Data Sheet and the integration data on the spectra to help you to explain your deduction. Suggest a structure for **Y**.



(4)
(Total 10 marks)