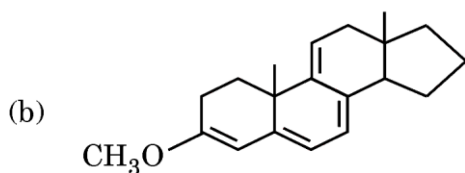
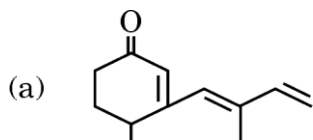
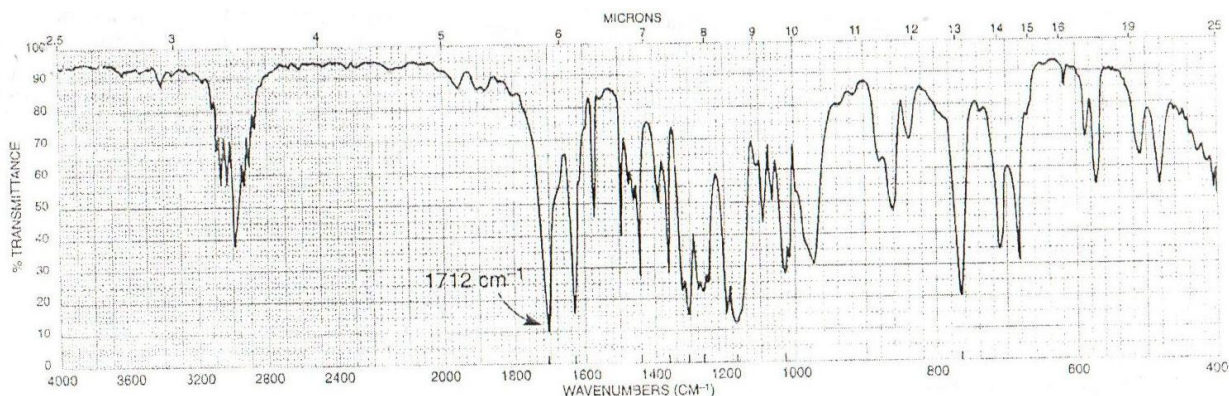
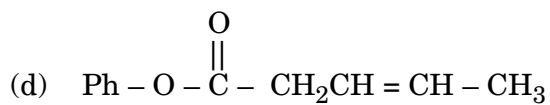
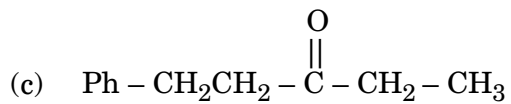
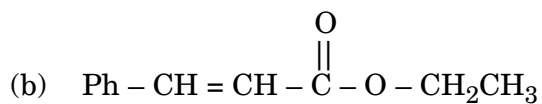
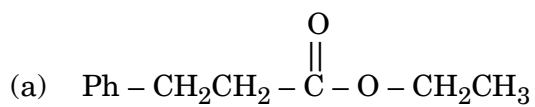
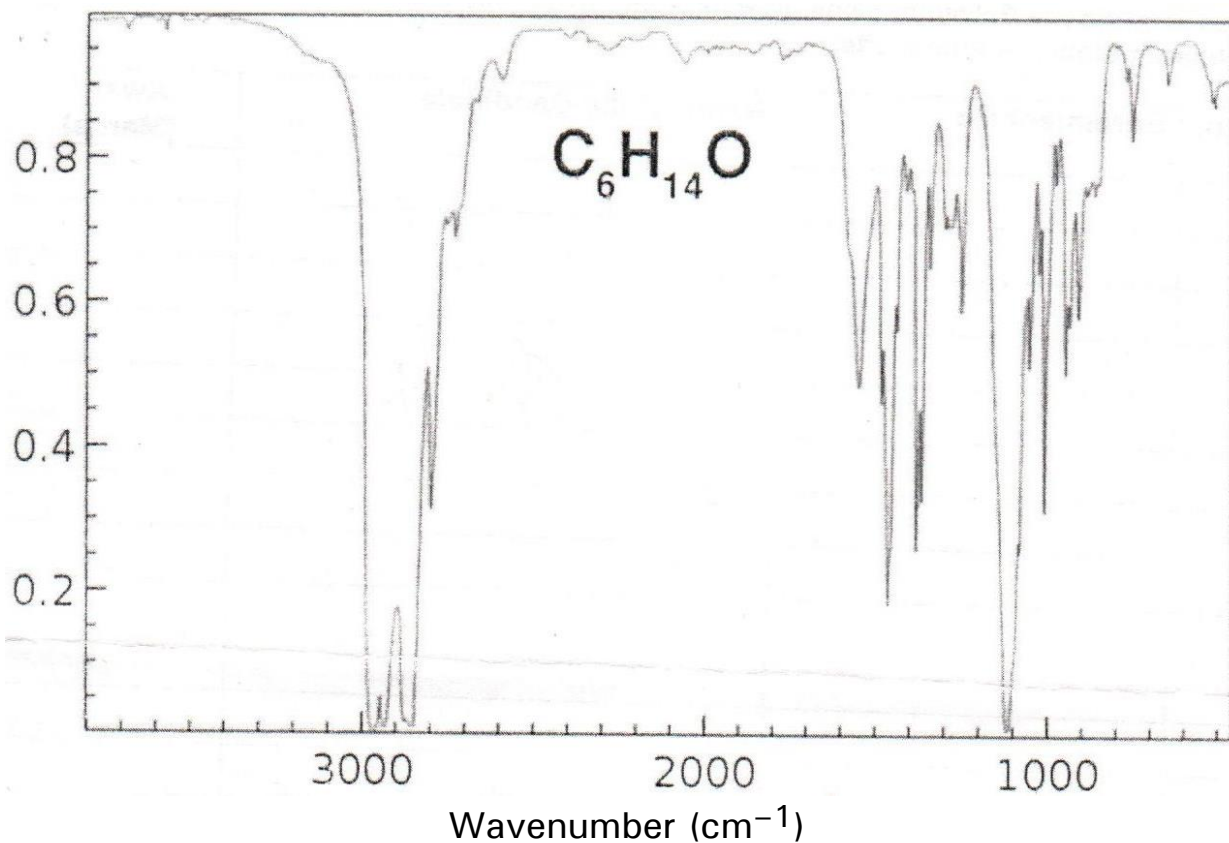


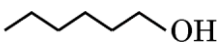
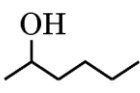
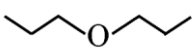
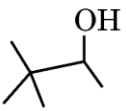
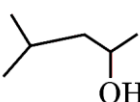
M.Phil. / Ph.D. IN CHEMISTRY (MPHILCHEM / PHDCHEM)**Term-End Examination****December, 2022****RCH-002 : ANALYTICAL TECHNIQUES IN CHEMISTRY-I***Time : 3 hours**Maximum Marks : 100***Note :** Answer **all** the questions given below.1. Write brief description for ORD and CD techniques. 102. Predict λ_{max} for the following compounds using Woodward-Fieser Rules : 103. Out of a, b, c and d, choose the structure that fits best with the infrared spectrum shown below. 10



4. Which of these molecules with molecular formula $\text{C}_6\text{H}_{14}\text{O}$, best corresponds to the IR spectrum below ?

10



- (a) 
- (b) 
- (c) 
- (d) 
- (e) 

5. Explain the principle of FT-NMR and outline its advantages. 10
6. Why do the methyl protons of toluene absorb around 2.2 ppm whereas, in methane they absorb around 1 ppm in the NMR spectrum? 10
7. Discuss briefly HSQC and HMBC experiments. What are the salient features of these experiments? 10
8. What are the advantages of High Resolution mass spectrum? 10
9. Predict a structure inconsistent with each set of proton NMR and IR data. 10
- (a) $C_{15}H_{14}O$: NMR δ : 2.20, 5.08, 7.25 (integration 3 : 1 : 10), IR : 1720 cm^{-1} (strong).
- (b) C_8H_9Br : NMR δ : 2.00, 5.15, 7.35 (integration 3 : 1 : 5), IR : 700 cm^{-1} .

10. Draw the structure of compound A having molecular formula C_9H_8O which has the following IR, mass and 1H -NMR spectra.

10

