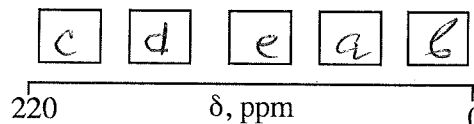


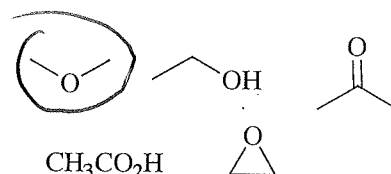
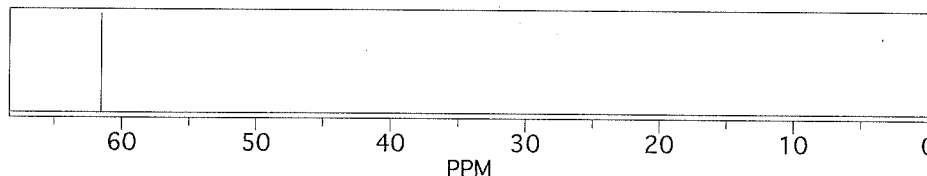
1. (5) List compounds **a-e** in the order as they would appear in ^{13}C NMR

(place letters **a, b, c, d, e** in appropriate boxes, 1 pt each):

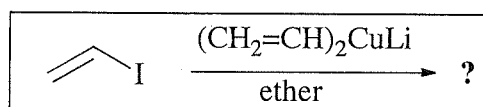
(a) CH_4 ; (b) $(\text{CH}_3)_4\text{Si}$; (c) $\text{H}_2\text{C}=\text{O}$; (d) CH_3Cl ; (e) CH_3I



2. (3) Which one of the following compounds has the molecular peak $M^+ m/z = 46$ in the mass spectrum (atomic weight of C is 12, O 16, H 1) **and** the following ^{13}C NMR spectrum:



3. (6) Circle the name or the structure of the main product in each of the following reactions (3 pts each):



1,4-pentadiene

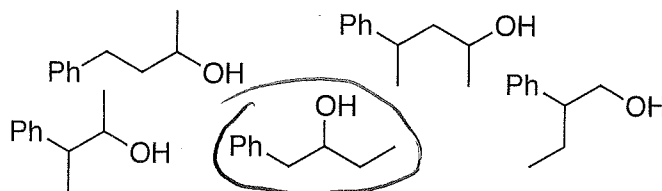
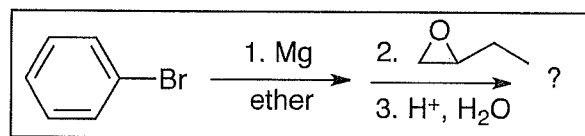
1,3-butadiene

1,3-pentadiene

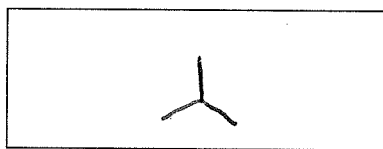
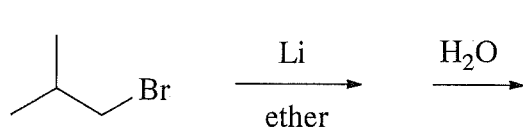
1-butene

1-pentene

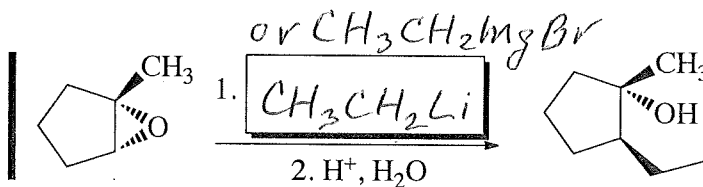
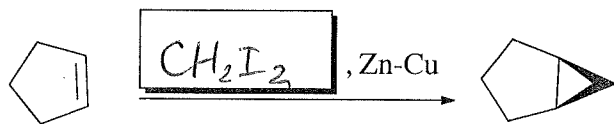
3-iodopropene



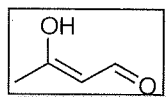
4. (3) Draw *line-angle* formula of the **product** in the following reaction (no partial credit):



5. (4) Write reagents (in the boxes) that can be used to convert the reactant to the indicated product (2 pts each):



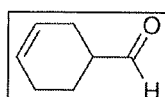
6. (4) Circle the correct **IUPAC name** of the compounds in the boxes (2 pts each):



(E)-4-hydroxy-2-butenal (Z)-4-hydroxy-2-butenal

(Z)-4-oxo-2-butenol

(Z)-3-hydroxy-2-butenal



1-cyclohexene-4-carbaldehyde

(Z)-2-cyclohexenecarbaldehyde

3-cyclohexenal 3-cyclohexenecarbaldehyde

Overall Score:

25