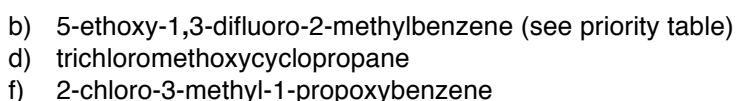
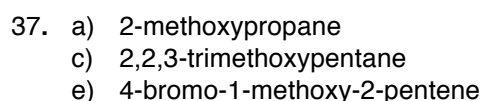
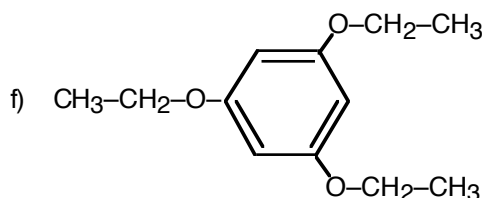
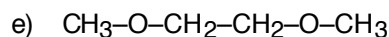
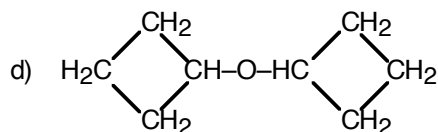
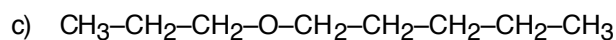
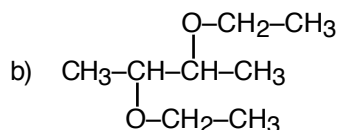
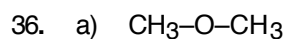
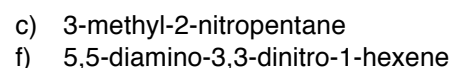
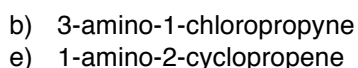
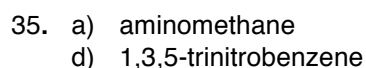
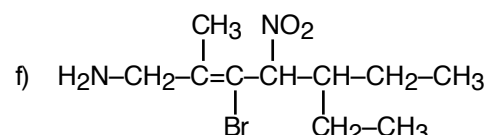
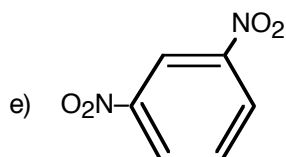
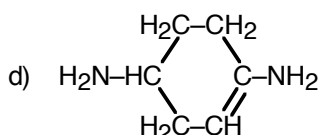
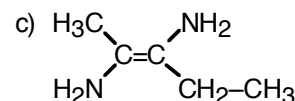
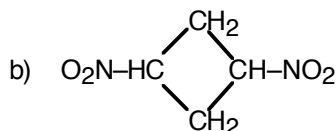
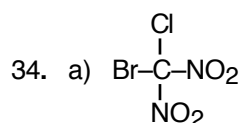
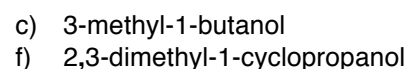
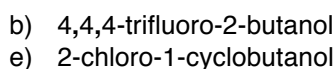
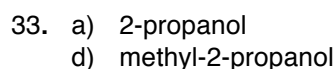
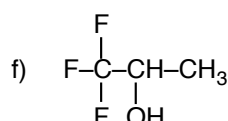
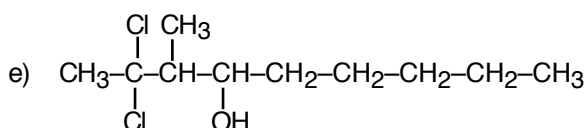
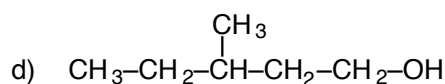
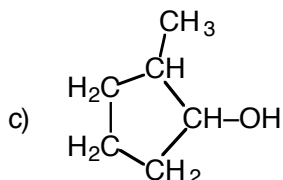
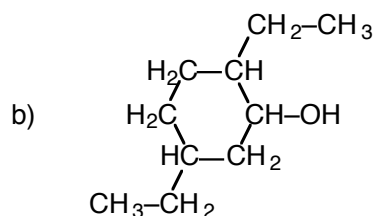
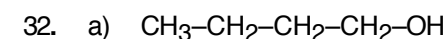


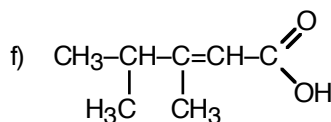
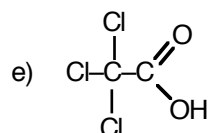
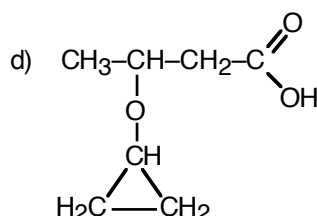
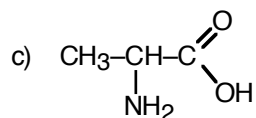
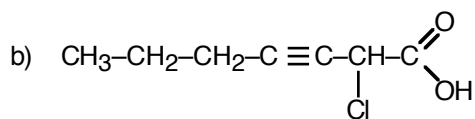
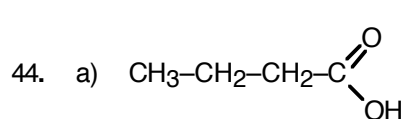
ANSWERS TO FUNCTIONAL GROUPS: A REVISION



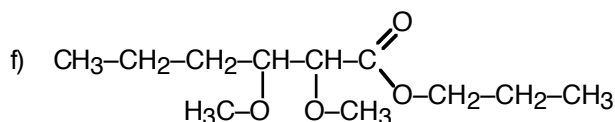
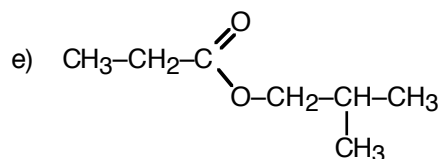
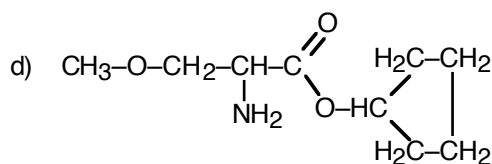
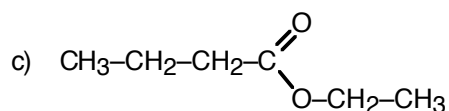
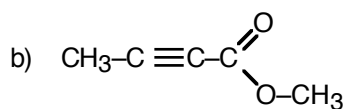
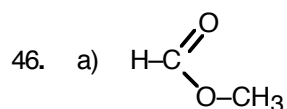
Hebden: Answers to Functional Groups - 2

38. a) $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-C}\begin{matrix} \text{O} \\ // \\ \text{H} \end{matrix}$ b) $\text{CH}_3\text{-C}\equiv\text{C-CH}_2\text{-C}\begin{matrix} \text{O} \\ // \\ \text{H} \end{matrix}$
- c) $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}\begin{matrix} \text{O} \\ // \\ \text{H} \\ | \\ \text{CH}_2\text{-CH}_3 \end{matrix}$ d) $\text{O}_2\text{N-CH=CH-C}\begin{matrix} \text{O} \\ // \\ \text{H} \end{matrix}$
- e) $\text{CH}_3\text{-CH}\begin{matrix} \text{O} \\ // \\ \text{H} \\ | \\ \text{NH}_2 \end{matrix}$ f) $\text{CH}_3\text{-C}\begin{matrix} \text{O} \\ // \\ \text{H} \\ | \\ \text{CH}_3 \end{matrix}\text{-CH-CH}\begin{matrix} \text{O} \\ // \\ \text{H} \\ | \\ \text{NH}_2 \end{matrix}$
39. a) propanal b) aminoethanal c) propynal
 d) 3-nitro-2-butenal e) 2-methyl-3-methoxypentanal f) 3,3-diamino-2-methylbutanal
40. a) $\text{Br-CH}_2\text{-C}\begin{matrix} \text{O} \\ // \\ \text{CH}_2\text{-CH}_2\text{-CH}_3 \end{matrix}$ b) $\text{CH}_3\text{-CH}_2\text{-O-CH}_2\text{-C}\begin{matrix} \text{O} \\ // \\ \text{CH}_2\text{-O-CH}_2\text{-CH}_3 \end{matrix}$
- c) $\text{O=C}\begin{matrix} \text{CH}_2 \\ | \\ \text{CH}_2 \end{matrix}$ d) $\text{O}_2\text{N-CH-CH}_2\begin{matrix} \text{C=O} \\ | \\ \text{CH-CH}_2 \\ | \\ \text{O}_2\text{N} \end{matrix}$
- e) $\text{CH}_3\text{-C}\begin{matrix} \text{H}_3\text{C} & \text{O} & \text{Cl} \\ | & || & | \\ \text{CH}_3 & \text{C} & \text{CH-CH}_2\text{-CH}_3 \end{matrix}$ f) $\text{CH}_3\text{-CH}\begin{matrix} \text{O} \\ // \\ \text{CH}_3 \end{matrix}\text{-C}\begin{matrix} \text{O} \\ // \\ \text{CH}_3 \end{matrix}\text{-CH}\begin{matrix} \text{NH}_2 \\ | \\ \text{CH}_3 \end{matrix}\text{-CH}_2\text{-CH}_2\text{-CH}_3$
41. a) butanone b) 4-nitro-2-pentanone c) 2-bromo-4-chloro-3-pentanone
 d) 2-aminocyclobutanone e) methoxypropanone f) 2,4-dimethyl-3-hexanone
42. a) $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_2\text{-C}\begin{matrix} \text{O} \\ // \\ \text{NH}_2 \end{matrix}$ b) $\text{H}_2\text{C}\begin{matrix} \text{H}_2\text{C} \\ | \\ \text{CH-CH}_2\text{-C}\begin{matrix} \text{O} \\ // \\ \text{NH}_2 \end{matrix} \\ | \\ \text{H}_2\text{C} \end{matrix}$
- c) $\text{CH}_3\text{-CH}_2\text{-CH}\begin{matrix} \text{O} \\ // \\ \text{NH}_2 \\ | \\ \text{CH}_3 \end{matrix}$ d) $\text{CH}_3\text{-C}\begin{matrix} \text{O} \\ // \\ \text{NH}_2 \\ | \\ \text{Cl} \end{matrix}\text{-CH-CH}_2\text{-C}\begin{matrix} \text{O} \\ // \\ \text{NH}_2 \end{matrix}$
- e) $\text{Cl-C}\begin{matrix} \text{O} \\ // \\ \text{NH}_2 \end{matrix}$ f) $\text{CH}_3\text{-C}\equiv\text{C-CH}\begin{matrix} \text{O} \\ // \\ \text{NH}_2 \\ | \\ \text{Cl} \end{matrix}\text{-CH}\begin{matrix} \text{O} \\ // \\ \text{NH}_2 \\ | \\ \text{Br} \end{matrix}$
43. a) methanamide b) 3-aminobutanamide c) 4-ethoxy-2-pentanamide
 d) propynamide e) 2,3-dimethyl-2-pentanamide f) 3-cyclohexyl-3-propanamide

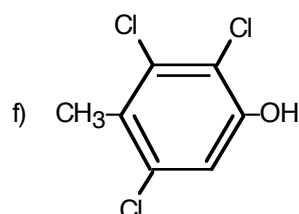
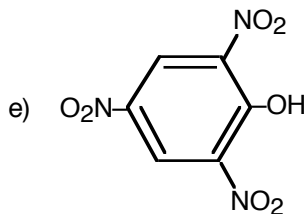
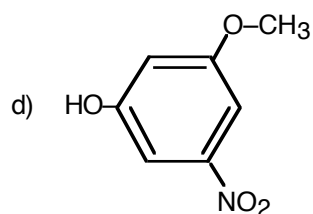
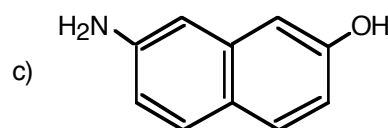
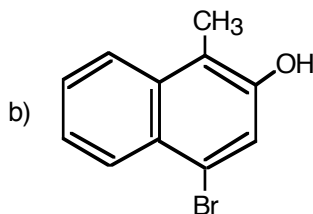
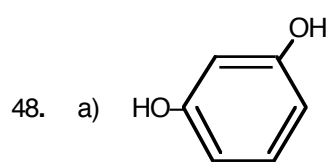
Hebden: Answers to Functional Groups - 3



45. a) 2-pentenoic acid b) 3,3-dimethylbutanoic acid c) trifluoroethanoic acid
 d) 2-amino-3-pentenoic acid e) 3-bromo-3-chlorobutanoic acid f) propenoic acid



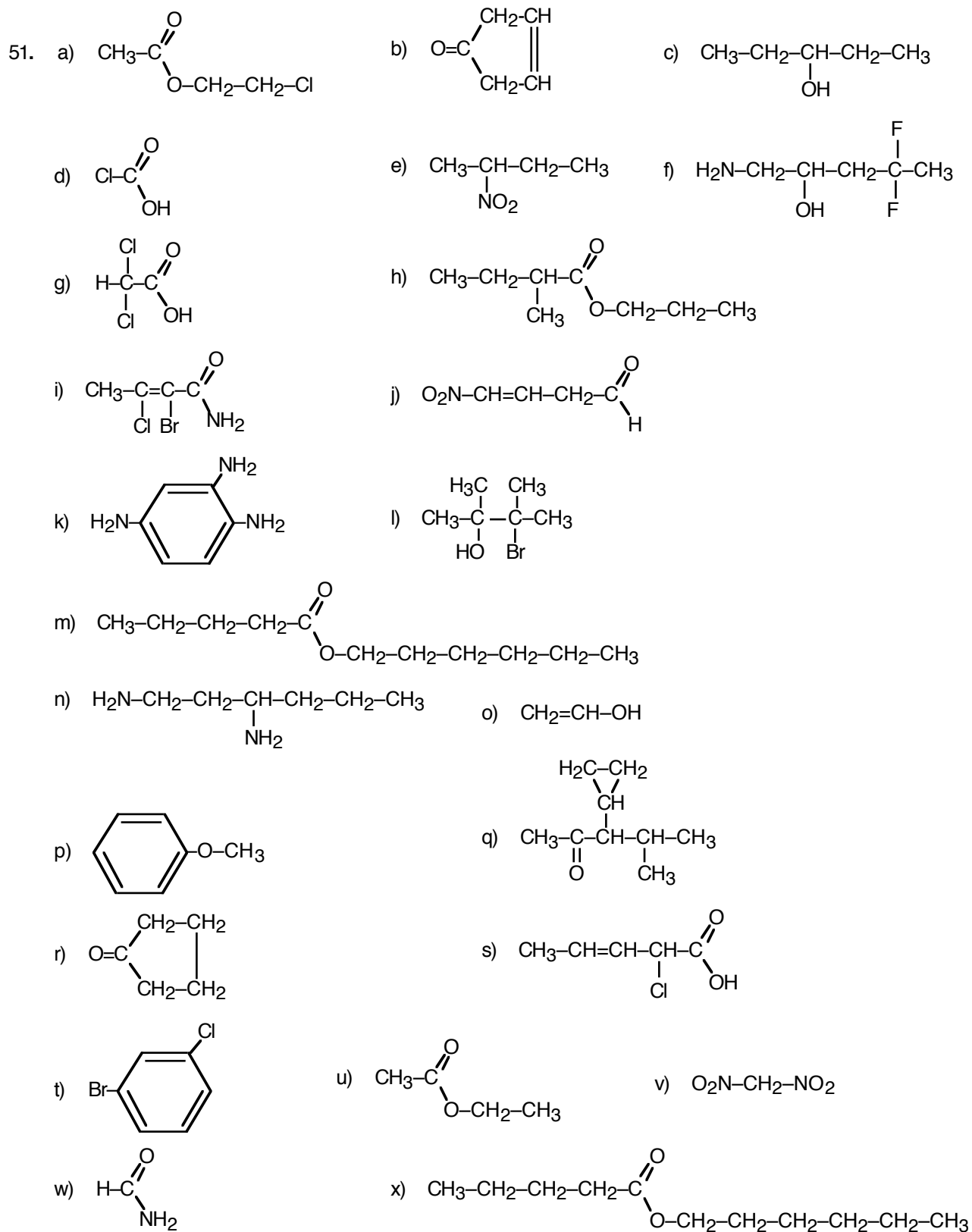
47. a) propyl propanoate b) methyl methylpropanoate
 c) 1,2-dichloroethyl methanoate d) 2-chloroethyl 3-chloropropanoate
 e) cyclohexyl 3-aminopropanoate f) propyl propynoate

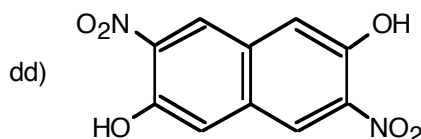
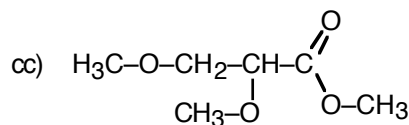
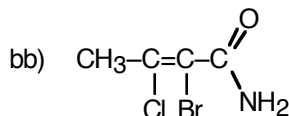
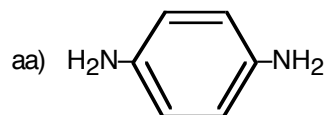
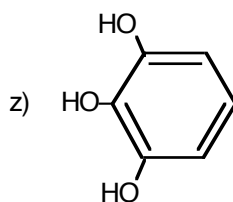
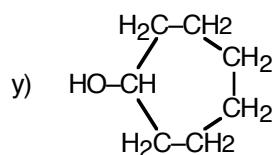


49. a) 1,2-dihydroxybenzene b) 2,5-dihydroxy-1,3-dimethoxybenzene
 c) 1,8-dihydroxynaphthalene d) 4-nitro-1-hydroxybenzene
 e) 2,3,4-trichloro-1-hydroxynaphthalene f) 2-amino-4-chloro-1-hydroxy-5-nitrobenzene

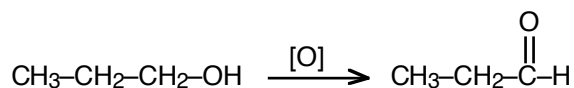
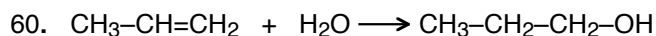
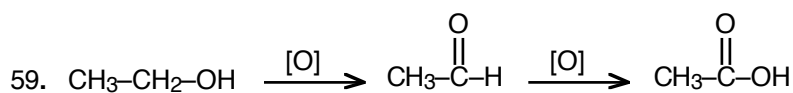
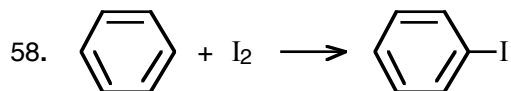
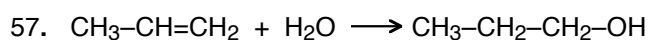
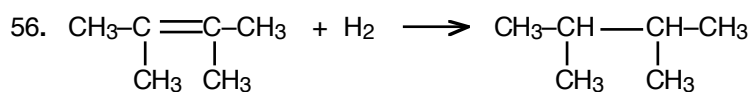
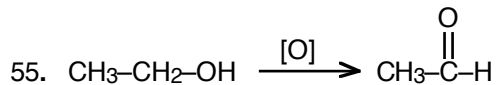
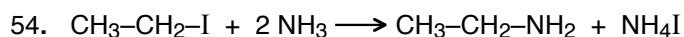
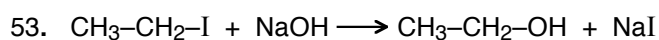
Hebden: Answers to Functional Groups - 4

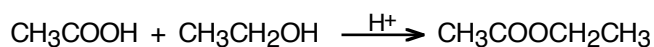
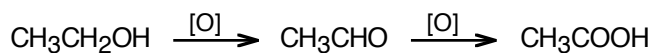
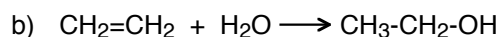
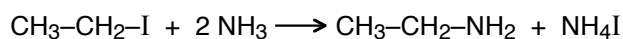
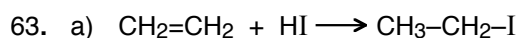
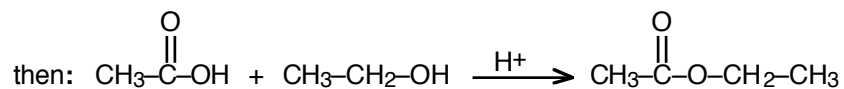
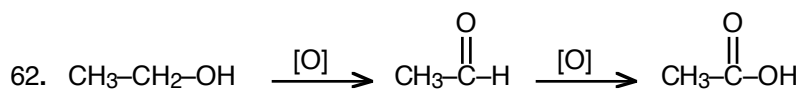
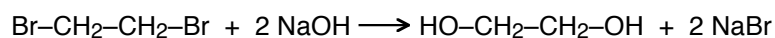
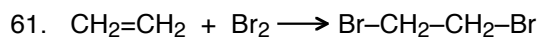
50. a) carboxylic acids b) aldehydes c) amines
 d) amides e) esters f) amines
 g) esters h) nitro compounds i) ethers





52. a) 1-chloro-2-methoxyethane
 c) cyclohexanol
 e) 2,4-dinitro-3-pentanol
 g) methyl propenoate
 i) 2-pentanol
 k) 5-ethoxy-1,3-difluoro-2-methylbenzene
 m) 4-amino-2-butanol
 o) cyclopropoxycyclopropane
 q) 3-nitrophenol
 s) 2-bromo-2-chloropropanoic acid
 u) pentanamide
 w) cyclobutanone
 y) 2,3-dimethyl-1-cyclobutanol
 aa) methyl propynoate
 bb) 1,3-dichloro-2-ethoxypropane
- b) 1-nitro-2-propene
 d) 1-amino-2-methyl-1-propanol
 f) dimethylpropanoic acid
 h) ethanamide
 j) ethoxypropanone
 l) cyclopentoxycyclohexane
 n) 4-nitro-2-pentenal
 p) 4-amino-4-cyclopropoxybutanoic acid
 r) 2-chloro-4-methoxy-1-methylbenzene
 t) 1,1,2,2-tetraminoethane
 v) ethyl pentanoate
 x) cyclopropyl ethanoate
 z) 5-iodo-3-pentenal
 bb) 5-nitro-3-pentynoic acid
 dd) 1-amino-3-bromobutanone





c) Repeat the steps for 63 b), then:

