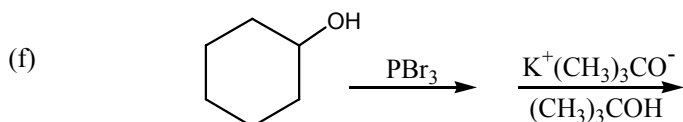
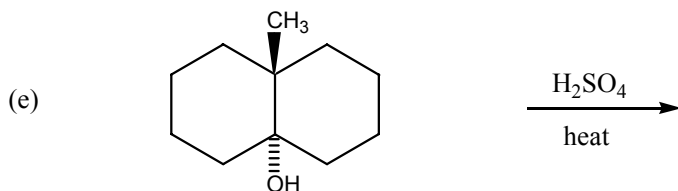
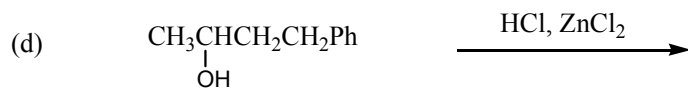
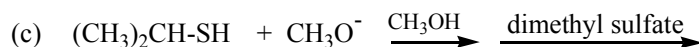
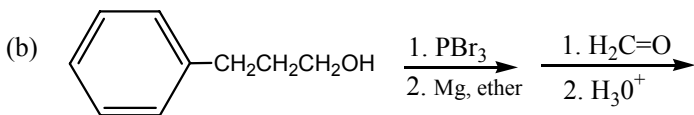
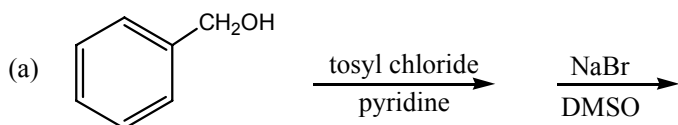


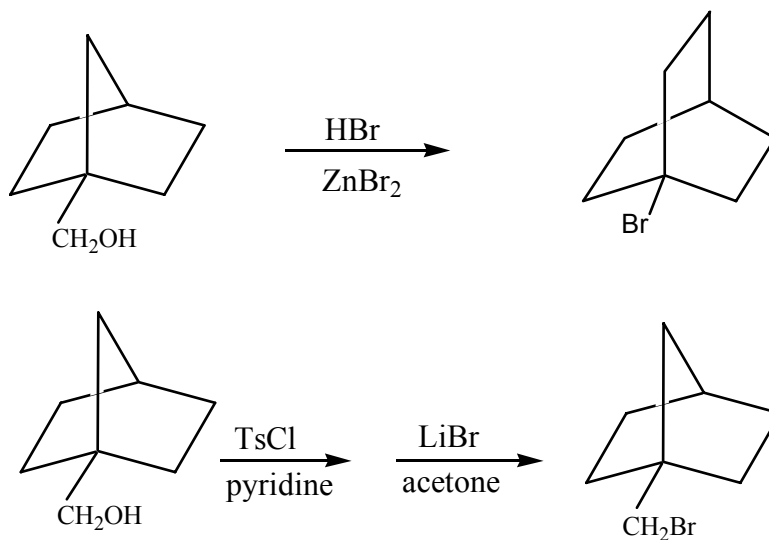
1. Give the principal product(s) when 1-butanol reacts with each of the following reagents.

- aqueous HBr, heat
- HNO₃
- NaH, THF
- CrO₃, pyridine, HCl
- p*-toluenesulfonyl chloride, pyridine
- propylmagnesium bromide
- SOCl₂, pyridine
- product of (a) + Mg in ether
- product of (e) + *t*-BuO⁻K⁺ in *t*-BuOH

2. Complete the following by giving the principal organic product(s) formed in each case.



3. Explain the origin of the different products from the following alcohol under the different conditions.



4. Devise an efficient synthesis of

- 2-deuterio-2-methylpentane from 2-methylpentan-2-ol
- 2-methylpent-1-ene from 2-methylpentan-2-ol
- $\text{PhCH}_2\text{CH}_2\text{Br}$ from bromobenzene (PhBr)