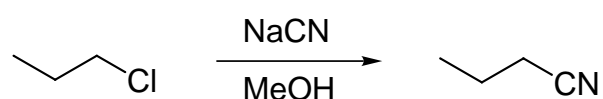
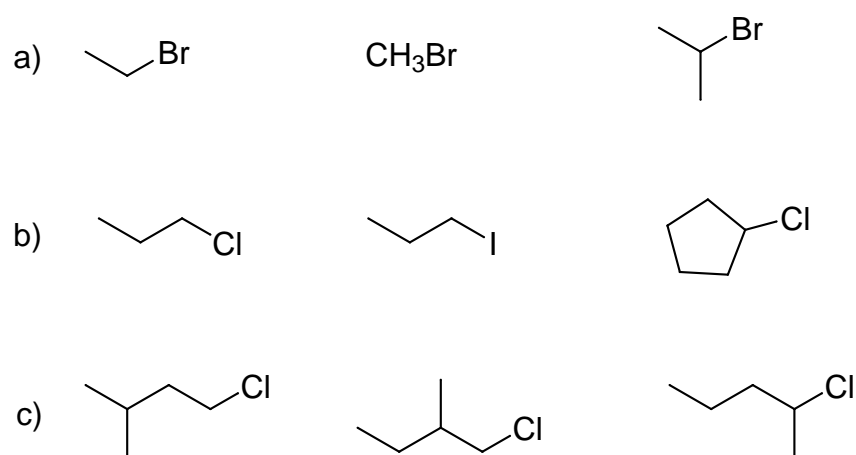


11. Predict the effect of the changes given below on the rate of the following reaction:



- change the halogen from Cl to I.
- change solvent from MeOH to DMSO
- change starting material from 1-chloropropane to 2-chloropropane

12. Rank the following sets in order of increasing  $S_N2$  reactivity



13. Rank the members of the following groups in order of basicity, nucleophilicity, and leaving group ability. Explain your answers.

