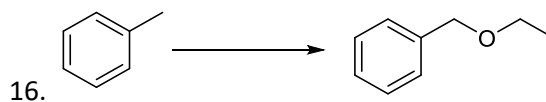
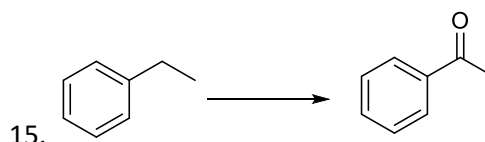
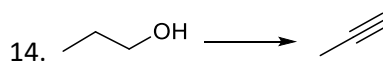
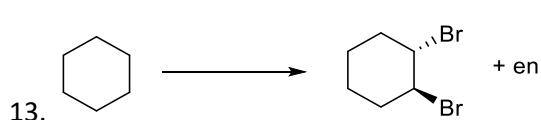
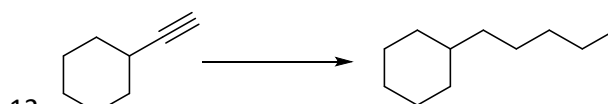
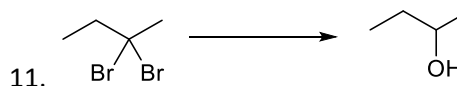
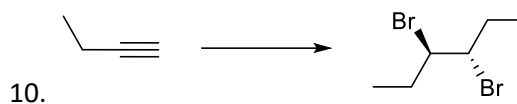
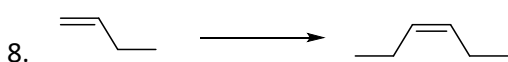
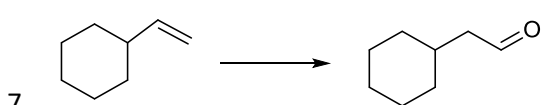
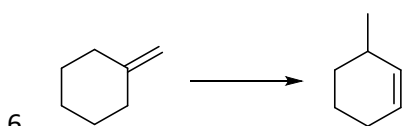
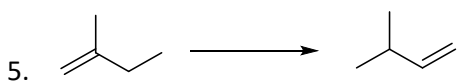
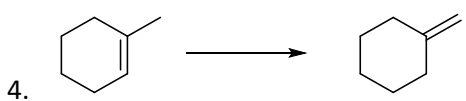
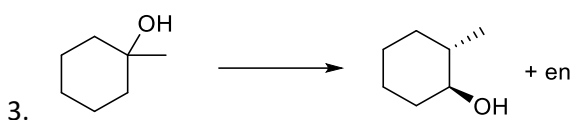
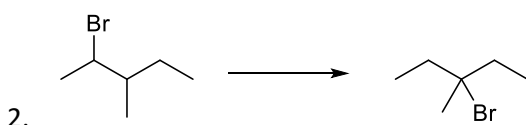
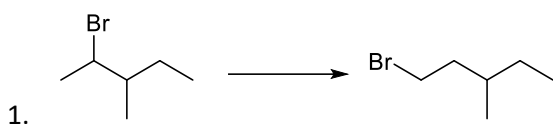


Overall Synthesis Practice**Note: For synthesis involving EAS, please consult problem set 10**

For each of the following multistep syntheses, propose a synthetic scheme. A minimum of two steps are required. Please note that there could be multiple plausible syntheses.



Solutions

Note: In these solutions only the steps are listed; however, a synthesis would need to include the intermediates after each step

1. 2 steps
 - i. tBuOK, tBuOH, heat
 - ii. HBr, ROOR
2. 2 steps
 - i. NaOMe, heat
 - ii. HBr
3. 2 steps
 - i. H₂SO₄, heat
 - ii. 1. BH₃/THF, 2. H₂O₂, OH⁻, H₂O
4. 2 steps
 - i. HBr
 - ii. tBuOK, tBuOH, heat
5. 3 steps
 - i. NBS
 - ii. H₂, Pd/C
 - iii. tBuOK, tBuOH, heat
6. 3 steps
 - i. NBS
 - ii. H₂, Pd/C
 - iii. tBuOK, tBuOH, heat
7. 3 steps
 - i. Br₂, CCl₄
 - ii. 1. 3 eq NaNH₂, 2. H₂O
 - iii. 1. BH₃/THF, 2. H₂O₂, OH⁻, H₂O
8. 3 steps
 - i. Br₂, CCl₄
 - ii. 1. 3 eq NaNH₂, 2. CH₃CH₂Br
 - iii. H₂, Lindlar's
9. 2 steps
 - i. H₂, Lindlar's (or Na/NH₃(l))
 - ii. 1. Hg(OAc)₂/THF-H₂O, 2. NaBH₄, OH⁻
10. 3 steps
 - i. 1. NaNH₂, 2. CH₃CH₂Br
 - ii. Na/NH₃(l)
 - iii. Br₂, CCl₄
11. 3 steps
 - i. 1. 2 eq NaNH₂
 - ii. H₂, Lindlar's (or Na/NH₃(l))
 - iii. H₂SO₄, H₂O
12. 2 steps
 - i. 1. NaNH₂, 2. CH₃CH₂CH₂Br
 - ii. H₂, Pd/C
13. 3 steps
 - i. Br₂, light
 - ii. NaOCH₃, heat
 - iii. Br₂, CCl₄
14. 3 steps
 - i. H₂SO₄, heat
 - ii. Br₂, CCl₄
 - iii. 1. 3 eq NaNH₂, 2. H₂O
15. 5 steps
 - i. NBS, light (first bromination)
 - ii. NBS, light (second bromination)
 - iii. 1. 3 eq NaNH₂, 2. H₂O
 - iv. H₂SO₄, H₂O
16. 2 steps
 - i. NBS, light
 - ii. NaOEt