Cal Poly Pomona, Organic Chemistry CHM 315, Dr. Laurie S. Starkey

Practice "Transforms"A–Z: Alcohols, Ethers and Epoxides (Answer Key)

A 1) PhMgBr; 2) H_3O^+

B 1) NaH; 2) $CH_3CH_2CH_2Br$
note: *opposite disconnection (1. PBr_3; 2. $CH_3CH_2CH_2ONa$) would give E2 rather than S_N2!*

C 1) mCPBA; 2) CH_3MgBr; 3) H_3O^+

D 1) PhMgBr; 2) H_3O^+; 3) PBr_3

E 1) BH_3-THF; 2) H_2O_2, NaOH; 3) $SOCl_2$
note: *3) HCl would probably rearrange, since strongly acidic conditions favor carbocations. Also, HCl/ROOR doesn't work - only for HBr!*

F 1) H_2SO_4, heat;
2) Br_2

G 1) TsCl, pyridine; 2) $NaSCH_3$
note: *no E2 with weak base $NaSCH_3$ (S_N2 is major)*

H 1) NaH; 2) CH_3CH_2Br

I 1) PCC; 2) NaOH, heat
note: *oxidize first so C=O will direct elimination to give stable, conjugated pi bonds.*

J 1) TsCl, pyridine, 2) t-BuOK
note: *no S_N2 on 3° RX, so $PhCH_2O^-$ + t-BuCl gives E2!*

K 1) CH_3CH_2MgBr; 2) H_3O^+;
3) $SOCl_2$ (or HCl)

L 1) $LiAlH_4$; 2) H_2O;
3) H_2SO_4, heat

M 1) TsCl, pyridine, 2) t-BuOK, heat
note*: to get this alkene, you need E2 anti-elim (there is only one anti H and tosylation preserves OH stereochem.); dehydration gives trisubstituted alkene*

N 1) Mg; 2) CH_3CHO;
3) H_3O^+

O 1) BH_3-THF
2) H_2O_2, NaOH
3) PCC

P 1) NaH; 2) CH_3I

Q 1) Mg; 2) CH_3CH_2CHO; 3) H_3O^+

R 1) H_2SO_4, heat; 2) mCPBA

S CH_3OH, H_2SO_4

T 1) H_3O^+; 2) NaH; 3) CH_3I
better hydration than H_3O^+:
1) $Hg(OAc)_2$; 2) $NaBH_4$
note: 1) HBr; 2) CH_3ONa gives E2

U 1) H_2, Lindlar's cat; 2) CH_3CO_3H, H_2O
or 1) Na, NH_3; 2) OsO_4
note: *We're adding two H's and two OH's. To achieve desired stereochemistry, we need to add one <u>syn</u> and the other <u>anti</u> (H_2, Lindlar's; OsO_4 gives wrong product).*

V 1) H_2SO_4, heat; 2) H_2, Pd
or 1) TsCl, pyridine; 2) $LiAlH_4$

W 1) NaOH; 2) PCC

X 1) H_2SO_4, heat; 2) HBr, ROOR

Y 1) BH_3-THF; 2) H_2O_2, NaOH; 3) NaH; 4) CH_3CH_2Br
or 1) HBr, ROOR; 2) CH_3CH_2ONa

Z 1) PBr_3; 2) Mg
note: *1) HBr would probably rearrange!*