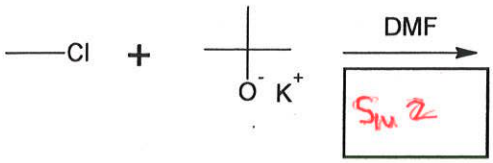
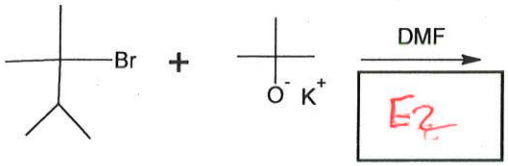
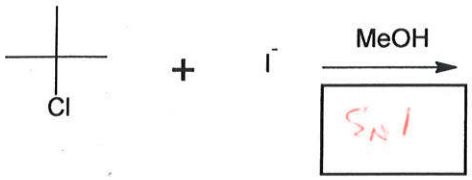
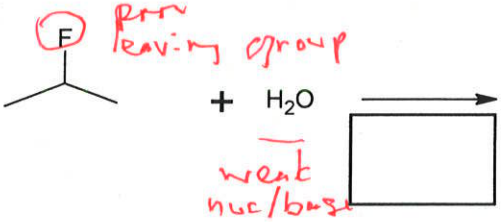
Review questions for exam 3 (Fong)

Predict the major products and mechanism for the proposed reactions below. (Put mechanism guess in box).

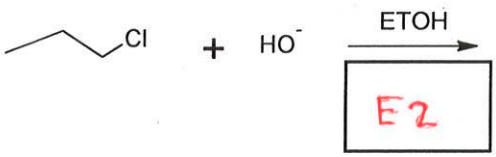


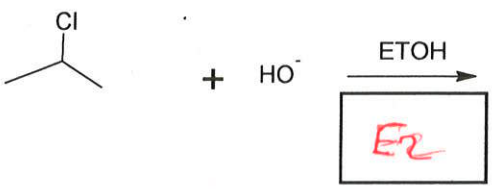




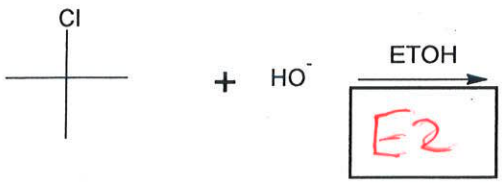


NR





some SN2

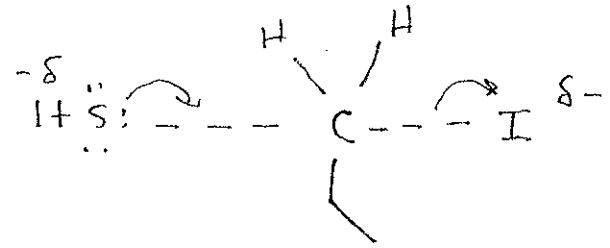


Which will run faster (and why):

polar protic favors

S_N1	t-butyl bromide in CH_3CN solvent with I^-	or	t-butyl bromide in MeOH with I^-
S_N2	$(CH_3)_2CH\text{-}CH_2Br$ in DMF with t-BuO^-K^+ 1°	or	CH_3Br in DMF with t-BuO^-K^+ 0° sterically preferred
	$(CH_3)_3C\text{-}Cl$ in EtOH with OH^- < strong base	or	$(CH_3)_3C\text{-}Cl$ with H_2O
1°	1-bromobutane in acetone with I^-	or	2-bromobutane in acetone with I^- 2°

What does the transition state look like for the S_N2 reaction of $CH_3CH_2CH_2\text{-}I^-$ with HS^- ?



Order the reactions below in order from fastest to slowest for S_N2 substitution:

E > C > D > B > A

reaction		Substrate	solvent	nucleophile
A	3°	2-fluoro-2-methyl propane	Methanol	Cl^-
B		1-iodopropane	ethanol	methoxide (CH_3O^-)
C	1°	1-iodoethane	CH_3CN	cyanide (CN^-)
D		bromomethane	methanol	I^-
E	0°	bromomethane	DMF	F^-

Order the reactions below in order from fastest to slowest for S_N1 substitution:

C > A > D > B > E

Reaction	Substrate	solvent
A	t-butyl-chloride	acetone
B	ethyl iodide	DMF
C	t-butyl iodide	ethanol
D	2-iodopropane	ethanol
E	methyl bromide	CH_3CN

True or False

S_N2 reactions run faster in polar, protic solvents	T	(F)
S_N1 reactions are preferred from 3° alkyl halides	(T)	F
E_2 is preferred with weak nucleophiles/weak bases	T	(F)
E_2 is preferred with strong bases/weak nucleophiles	(T)	F
OH^- and OR^- are strong bases and strong nucleophiles	(T)	F
I^- is a strong nucleophile but a weak base	(T)	F
Adding R groups at the β-C of alkyl halide increases the rate of S_N2	T	(F)

Give examples of: a) strong base/strong nucleophile OH^-, OCH_3^- b) strong base/ weak nucleophile DBN

c) weak base/ strong nucleophile I^- d) weak base/ weak nucleophile H_2O

If the choices above, which are most likely to force a reaction to run E2 ?