

Draw the reaction coordinate diagram.

One Step

$$\Delta G = +15$$

$$E_a = +30$$

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Two Steps

$$\Delta G = -5$$

$$\Delta G_1 = +12$$

$$\Delta G_2 = -17$$

$$E_{a1} = +18$$

$$E_{a2} = +10$$

Reaction Rates



Overall rate

Double [RX]

Half [OH⁻]

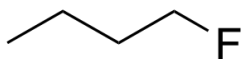
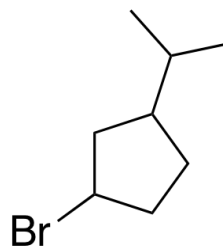
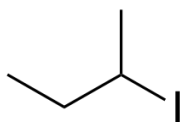
Double all reactant
conc.

Half solvent amount

Triple solvent
amount

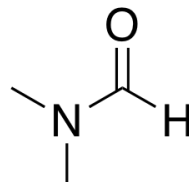
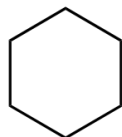
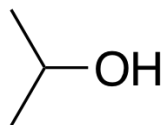
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Name the alkyl halide.



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Identify the type of solvent.



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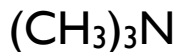
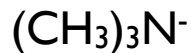
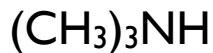
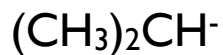
What concepts from previous chapters are coming up so far in Chapter 7?

- polarity
- resonance structures
- kinetics
- thermodynamics
- stereochemistry ...

Choose the stronger nucleophile.

Choice

Why?



p.a.



p.p.



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Nucleophile Breakdown

| Fantastic! | Good | Not so good |
|-----------------------------|----------------------|----------------------|
| RS^- | Br^- | F^- |
| NC^- | R_2S | HCO_3^- |
| I^- | NR_3 | R_2O |
| PR_3 | Cl^- | |
| R_3C^- | RCO_2^- | |
| R_2N^- | N_3^- | |
| $\text{RC}\equiv\text{C}^-$ | | |
| RO^- | | |

* Also good bases. Making bond with C will be in competition with stealing H

True or False?

- All good bases are good nucleophiles.

Mostly true. Exceptions are non-nucleophilic bulky bases such as *t*-butoxide, DBN, or DBU. More on these in ch 8.

- All good nucleophiles are good bases.

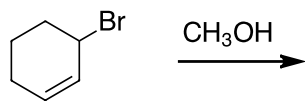
False. There are several good nucleophiles are poor bases.

See previous slide for examples.

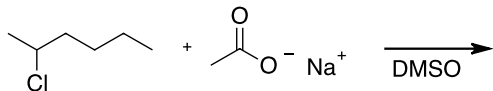
We need some volunteers!

Acting out nucleophiles
and solvents is fun!

Draw the expected substitution products.



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Reaction of cyanide ion with *n*-iodoheptane

Reaction of ethanol with 2-bromo-2-methylbutane