

Problem set 5; chem 131 (231)A

1. Draw a potential energy diagram to illustrate: Use ΔG as the label for the y-axis.

[a] an S_N1 reaction

[b] an S_N2 reaction

[c] a Diels-Alder reaction

[d] an exothermic process starting from a reactive intermediate

[e] an endothermic process leading to the formation of an intermediate

[f] a kinetically controlled process wherein the product of thermodynamic control differs from it.

[g] the Bell-Evans-Polanyi principle

[h] the Hammond postulate

2. [i, a-h] Provide a specific example for each of the cases of problem 1.

[ii] For '1a', label the transition state for the rate determining step and for the fast step. Draw a picture to illustrate what each transition state might look like. Pay attention to hybridization and geometry. Illustrate the overall energy change, and the free energy of activation.

3. Complete the following reactions and formulate a mechanism for each.

