

**2013 AP<sup>®</sup> CHEMISTRY FREE-RESPONSE QUESTIONS**

- (e) Using the axes provided below, draw a curve that shows the energy changes that occur during the progress of the reaction. The curve should illustrate both the proposed two-step mechanism and the enthalpy change of the reaction.



- (f) On the diagram above, clearly indicate the activation energy,  $E_a$ , for the rate-determining step in the reaction.