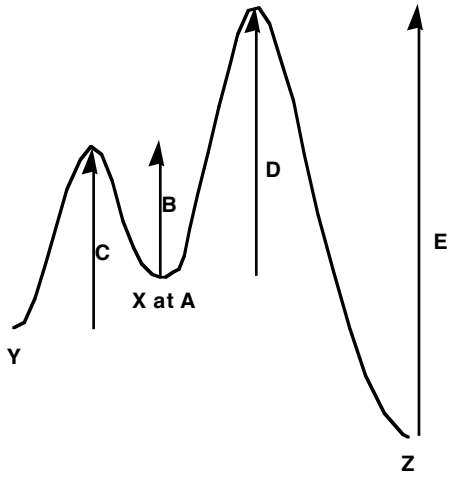
Problem 78, Chemistry 301X - 2006

Let's do a thought experiment. Imagine a flask containing molecule **X** at energy **A** in the diagram below. Now, allow the temperature to increase slowly. Describe what happens to the contents of the flask as the temperature increases. What molecule(s) will be present when there is only **B** amount of energy? What molecule(s) will be present when there is **C** amount of energy? What molecule(s) will be present when there is **D** amount of energy? What molecule(s) will be present when there is **E** amount of energy? Be sure to tell us what the major compound present will be under each conditions.



(Yes, we know that the world described above is unreal, and that molecules exist in Boltzmann distributions of energy, but go through the exercise anyway, please.)