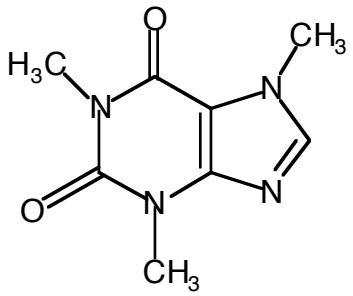
Problem 46, Chemistry 301X - 2006

In orgo lab, some of you converted caffeine, present in analgesic powder, into a water-soluble salt by protonation with aqueous 3N HCl. The question is, “which nitrogen atom in caffeine was protonated?”



a) We’ll tell you that it is one of the nitrogens in the five-membered ring that was protonated. Which one, and why?

b) If it had been the other ring that was protonated (it wasn’t) would protonation be on N or O? Which one would it be, and why?