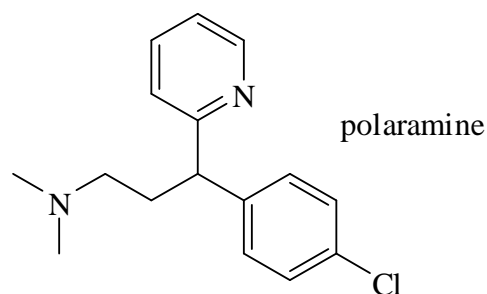
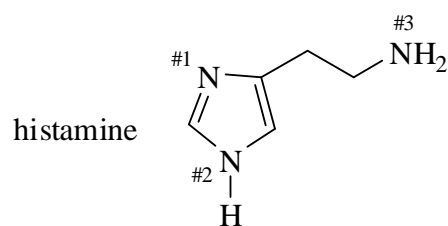


- The structures of histamine and polaramine are shown below.

**Marks**  
**6**



Indicate the hybridisation and geometry of bonds around each of the nitrogen atoms in histamine.

	Hybridisation	Geometry of bonds
N #1:		
N #2:		
N #3:		

Draw a tautomer of histamine.

In histamine, only one of the nitrogen atoms in the ring is easily protonated (basic). Indicate which it is and explain why.

**THIS QUESTION CONTINUES ON THE NEXT PAGE.**

The release of histamine in the body triggers nasal secretions and constriction of airways. Polaramine is one of many anti-histamine compounds used to treat allergies. Explain what structural features of polaramine might make it a suitable anti-histamine agent.

**Marks**  
**3**

(+)-2-[*p*-Chloro- $\alpha$ -[2-(dimethylamino)ethyl]benzyl]pyridine is another name for polaramine. What does the (+) in this name mean?