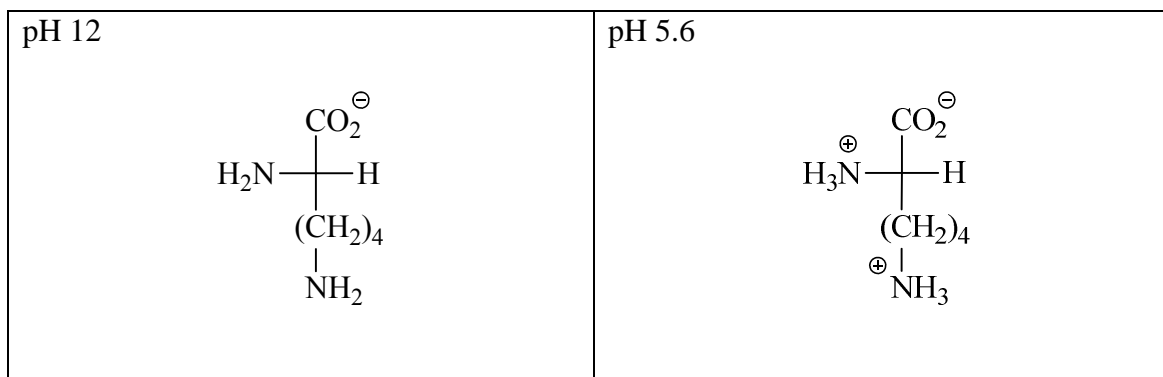
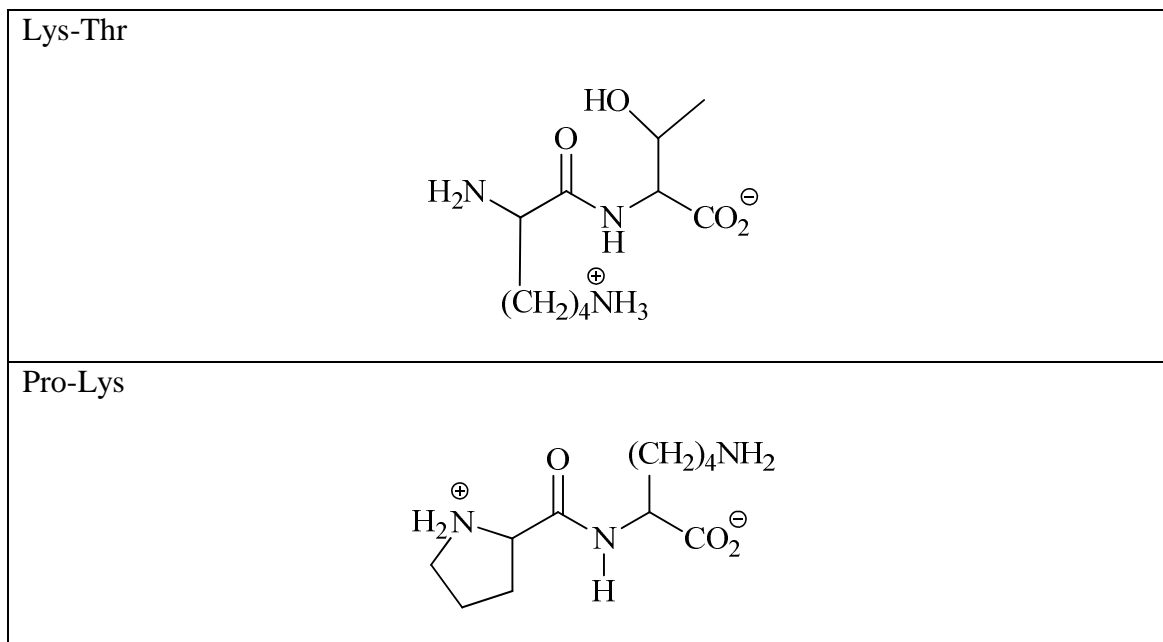


Marks
4

What is the major species present when lysine (Lys) is dissolved in water at pH 12 and pH 5.6. The pK_a values of lysine are 1.82 (α -COOH), 8.95 (α -NH₃[⊕]) and 10.53 (side chain).



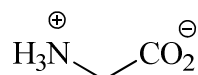
Give the constitutional formulas for the following dipeptides in their zwitterionic states. The pK_a values of proline are 1.95 and 10.64.



2

- Glycine, NH₂CH₂COOH, is the simplest of the naturally occurring amino acids. It has a melting point of 238 °C, while CH₃CH₂COOH has a melting point of -21 °C. Give one reason for this difference.

Glycine is an amino acid and has the following zwitterionic structure.



Propionic acid has strong hydrogen bonds, giving it a relatively high m.p. However, glycine has very strong ionic bonds between the NH₃⁺ and CO₂⁻ groups giving it very high melting point.