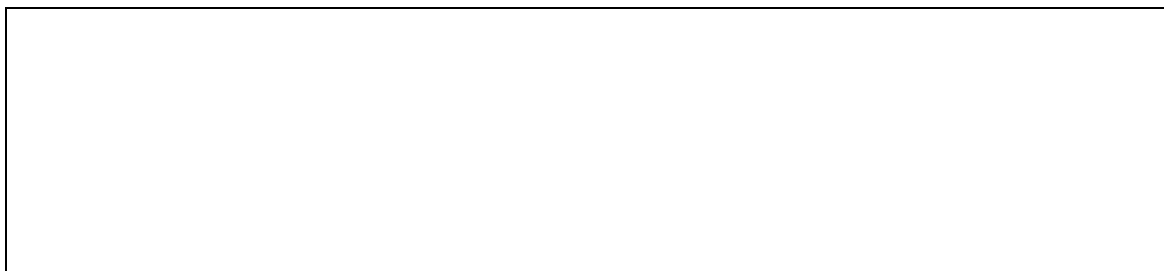


**Marks****7**

- Glycine,  $\text{NH}_2\text{CH}_2\text{COOH}$ , is the simplest of all naturally occurring amino acids. The  $\text{p}K_a$  of the acid group is 2.35 and the  $\text{p}K_a$  associated with the amino group is 9.78. Draw a structure that indicates the charges on the molecule at the physiological pH of 7.4.



Use your structure to illustrate the concept of resonance.



What are the hybridisation states and geometries of the two carbon atoms and the nitrogen atom in glycine?



Propionic acid,  $\text{CH}_3\text{CH}_2\text{COOH}$ , has a melting point of  $-20.7^\circ\text{C}$  while glycine has a melting point of  $292^\circ\text{C}$ . Suggest a reason why these two molecules have such different melting points.

