

**Question 29****(7 marks)**

Formation of zwitterions is a characteristic property of  $\alpha$ -amino acids.

- (a) Describe the structure of a zwitterion and explain its formation from an  $\alpha$ -amino acid. Include the structural formula of the  $\alpha$ -amino acid, serine, as a zwitterion in your answer. (4 marks)

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Serine zwitterion structure

- (b) Explain why  $\alpha$ -amino acids have relatively high melting points compared to other polar compounds with similar molar mass. (3 marks)

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