

- Alanine ($R = \text{CH}_3$) and lysine ($R = \text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$) are two common amino acids. Using *ala* and *lys* to represent the two amino acids, represent all constitutional isomers of the tripeptide formed from one *ala* and two *lys* units.

Three tripeptides are possible: *ala-lys-lys*, *lys-ala-lys* and *lys-lys-ala*

Comment, giving your reason, on whether the tripeptide(s) will be acidic, neutral or basic in character.

Lysine has a basic, amine sidechain ($R = \text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$) whilst alanine has a neutral sidechain ($R = \text{CH}_3$). The tripeptide(s) will thus be basic.

Draw the constitutional formulas, indicating the correct ionic state, of the products formed from acid hydrolysis of one of your tripeptides.

Each tripeptide will be hydrolysed to give alanine and lysine. In acid, these will be present with the basic amine groups (including the sidechain of lysine) and the carboxylic acid groups in the protonated forms:

