



CHEMISTRY 3.5

An assessment for AS90698

Describe aspects of organic chemistry.

Credits: Five

INSTRUCTIONS

Answer **ALL** questions.

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You are advised to spend 60 minutes answering the questions in this booklet.

- (b) Compare the reaction of sodium borohydride (NaBH_4) with butanal and with butanone in terms of the type of reaction that occurs and the expected organic reaction products.

QUESTION TWO

(a) Give the IUPAC systematic names for the following compounds.

	Compound	IUPAC systematic name
1	$\text{H}_3\text{C}-\text{CH}_2-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{NH}_2$	
2	$\text{H}_3\text{C}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{Cl}$	
3	$\begin{array}{c} \text{CH}_2-\text{O}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3 \\ \text{H}_3\text{C}-\text{HC} \\ \text{CH}_3 \end{array}$	

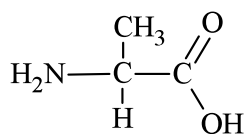
(b) Draw and name two isomers of the Compound 3 from the table above with

(i) the same functional group

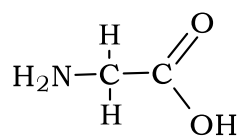
(ii) a different functional group.

QUESTION THREE

- (a) In biological systems amino acids are linked, in enzyme catalysed reactions, to form polymers called polypeptides. Structures of two amino acids, alanine and glycine, are given below.

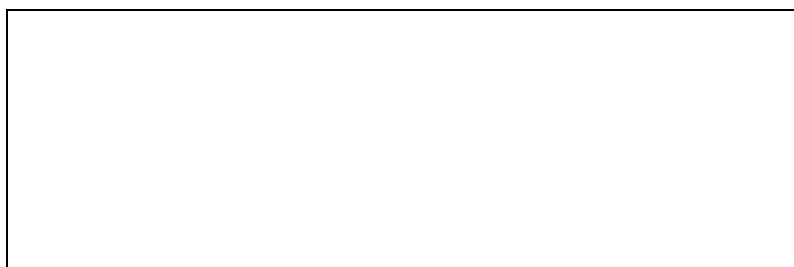


Alanine



Glycine

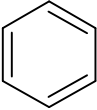
- (i) Draw the structure of a dipeptide that could be made when these two amino acids are joined.

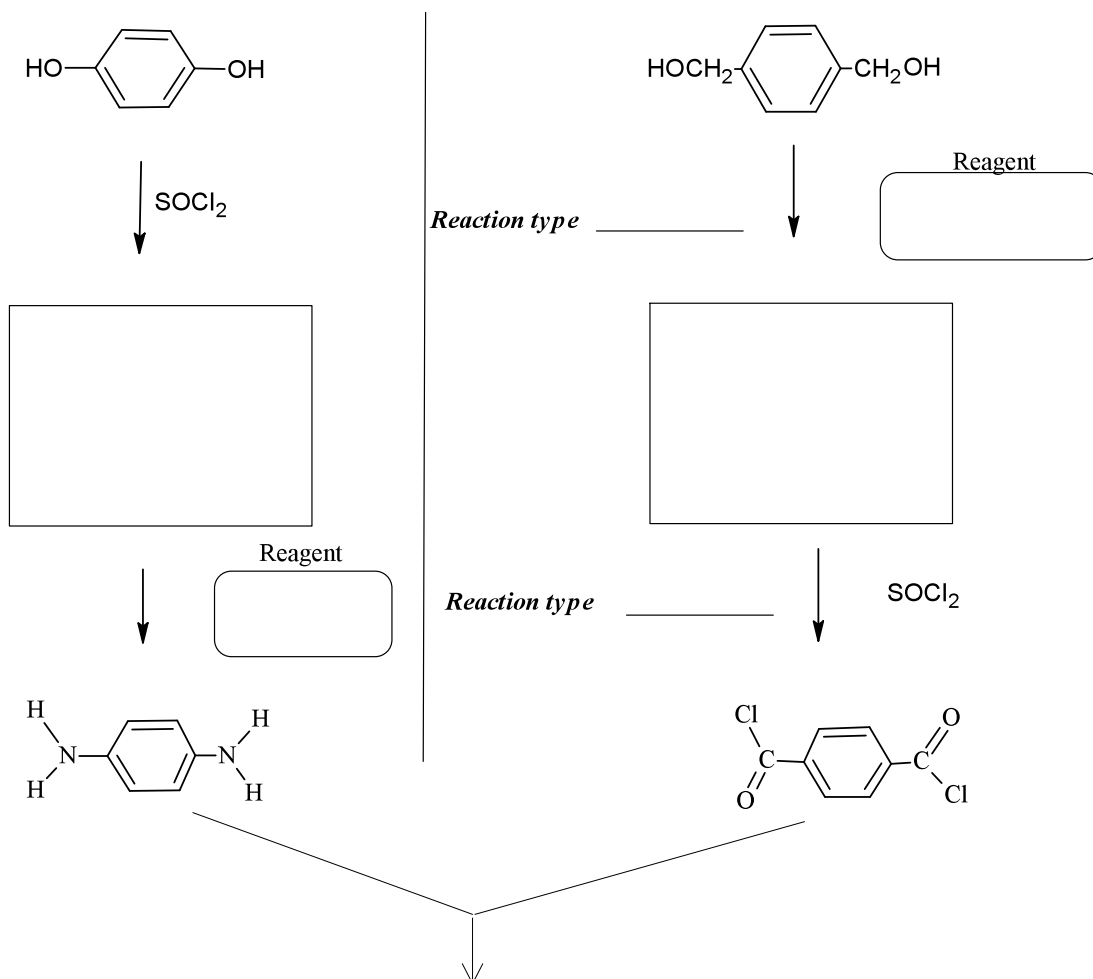


- (ii) Circle the peptide link in the dipeptide drawn above.
- (iii) Explain why it is possible for these amino acids to form a polymer.

- (b) Compare and contrast the **structural features** of the two amino acids given related to their ability to form enantiomers. Include 3-D molecular structures to illustrate your answer.

- (c) Kevlar is a polymer with high tensile strength. Complete the reaction scheme below for the formation of this polymer. The final product should show two repeating sections of the polymer.

Note:  is a **benzene ring** and should be treated as a hydrocarbon chain. It is not a functional group and does not change during the chemical reaction.



Polymer (two repeating units)

