

Question 33**(11 marks)**

Esters are chemical compounds derived from a carboxylic acid and an alcohol during esterification. An ethyl ester is synthesised using ethanol as the alcohol.

- (a) Two methods of producing ethanol industrially include fermentation of glucose and hydrolysis of ethene. Write a chemical equation for each process and state any conditions that are required. (8 marks)

Chemical formula for glucose: $C_6H_{12}O_6$

Fermentation of glucose:

Conditions:

Hydrolysis of ethene:

Conditions:

- (b) The ethanol produced was added to pentanoic acid along with a few drops of concentrated sulfuric acid. This mixture was then heated. Draw the structure and state the IUPAC name of the ester that is formed in this reaction. Include **all** atoms. (3 marks)

Structure:

IUPAC name: _____