ESTERS: INTRODUCTION

1. a) Name the following esters:

   (i) CH_3COOCH_3

   (ii) $CH_3CH_2COOCH_2CH_3$

   (iii) $HCOOCH_2CH_2CH_3$

   b) Draw the fully displayed structure for ethyl ethanoate.

   c) Write structures for the following esters, showing them as in part (a).

   (i) methyl butanoate

   (ii) butyl methanoate

2. a) What intermolecular forces are present in liquid ethyl ethanoate?

   b) Ethyl ethanoate is fairly soluble in water (8.7 g per 100 g of water). Explain why.

   c) As the esters get bigger the solubility in water falls quite quickly. Explain why.

3. a) Animal or vegetable fats and oils are big esters of propane-1,2,3-triol (glycerol) and long chain acids such as stearic acid, $CH_3(CH_2)_{16}COOH$. Draw the structure of the fat formed from these two compounds.

   b) Stearic acid is a saturated acid, oleic acid is monounsaturated, and linoleic acid is polyunsaturated. Explain what this means.

   c) Linoleic acid is known as an omega 6 acid. What does this mean?

   d) Unsaturated fats can be either cis or trans, although the naturally occurring ones are largely cis. Explain briefly what cis and trans refer to.

   e) The nature of the hydrocarbon chains has an effect on the melting points of these compounds. How does the melting point change as the amount of unsaturation increases? Briefly explain your answer.

   f) Explain briefly why cis fats and oils have lower melting points than trans ones.