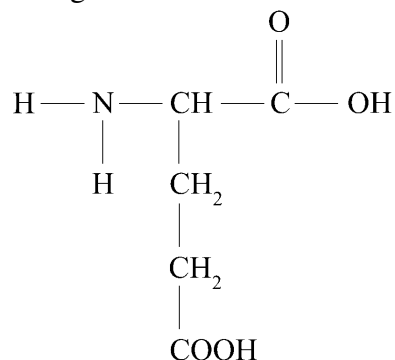
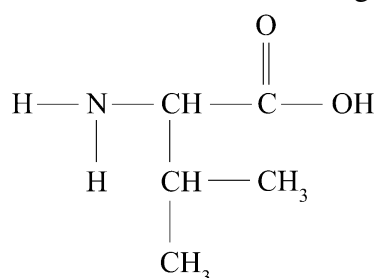


Year 12 Chemistry
Organic & Biological Chemistry
Formative Test: 4.9 – 4.11

1. One section of a protein chain is made from the glutamic acid monomer. The structural formula of the glutamic acid molecule is shown in the diagram below:



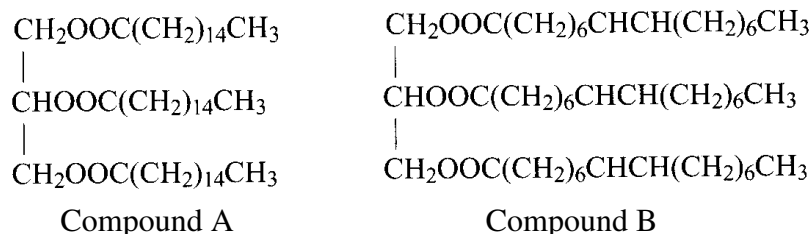
- (a) Name the monomers that are used to make proteins. /1
 (b) Name the functional group that makes up the peptide link between amino acids in a protein chain. /1
 (c) Draw the structural formula of a section of a protein chain that contains the glutamic acid unit. /2
 (d) When the glutamic acid unit is replaced with a valine unit, the biological function of this protein is changed. The structural formula of valine is shown in the diagram below:



Explain why replacing the glutamic acid unit with a valine unit will change the biological function of this protein. /3

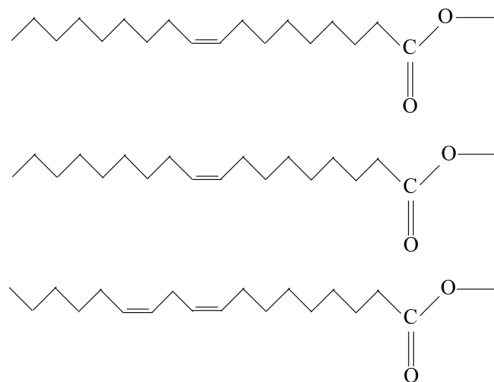
- (e) Valine self-ionises in aqueous solution.
 (i) Draw the structural formula of the ion formed after valine self-ionises. /2
 (ii) Describe how this ion is formed. /2
 (f) State the type of bond holding the H and N atoms together in valine shown above. /1

2. Consider the following two triglycerides:

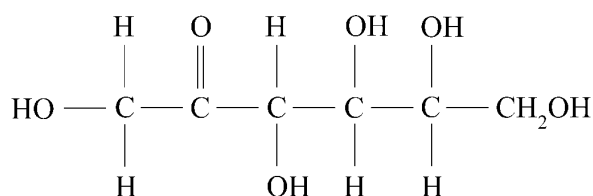


- (a) State and explain which compound, A or B is more likely to be a liquid at room temperature. /2
 (b) State a likely source for triglycerides which are solid at room temperature. /1

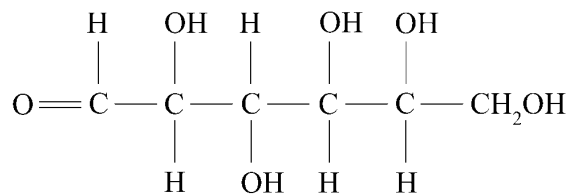
3. The structural formula of one triglyceride molecule is shown in the diagram below:



- (a) Draw the structural or skeletal formula of a fatty acid formed by hydrolysis of the triglyceride above. /1
 (b) State whether the fatty acid in (a) would decolourise a solution of iodine. /1
 (c) State two necessary reaction conditions for hydrogenation of liquid triglycerides. /2
 (d) State one effect of hydrogenation on the physical properties of a triglyceride. /1
4. Fructose and glucose are carbohydrates with the molecular formula $C_6H_{12}O_6$. The structural formulae of fructose and glucose are shown below:



fructose



glucose

- (a) State why fructose is classified as a carbohydrate. /1
 (b) State what you would expect to observe if samples of fructose and glucose were each placed in separate test tubes containing ammoniacal silver nitrate and warmed. Support this observation with an equation. /3
 (c) Both of these compounds are soluble in water. Explain. /2

TOTAL /26