

**2018 Chemistry ATAR**

# **Unit 4 Part II**

Organic chemistry

Empirical formula

Isomerism

IMF

Revision package II

Propan-2-ol can be readily oxidised using an acidified potassium permanganate solution.

- (a) In the space below, **draw** the structural formula and **name** the organic product formed from this reaction. (2 marks)

Name \_\_\_\_\_

- (b) In the space below, **draw** and **name** an isomer of propan-2-ol that will react with acidified potassium permanganate solution to produce a carboxylic acid. (2 marks)

Name \_\_\_\_\_

- (c) With reference to part (b) above, write a balanced redox equation for the reaction that will occur. (2 marks)

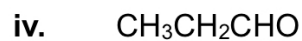
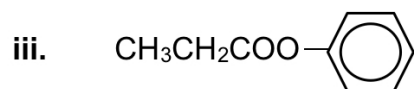
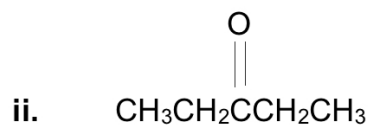
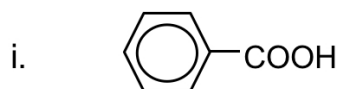
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- (d) If some propan-1-ol and butanoic acid were mixed together and warmed in the presence of sulfuric acid, **draw** and **name** the major organic product formed in the space below. (2 marks)



Which one of the following lists places the compounds in their correct class?

	<b>i.</b>	<b>ii</b>	<b>iii</b>	<b>iv</b>
(a)	Ester	Aldehyde	Ketone	Carboxylic acid
(b)	Carboxylic acid	Ketone	Ester	Aldehyde
(c)	Carboxylic acid	Ester	Ketone	Aldehyde
(d)	Aldehyde	Ketone	Carboxylic acid	Ester

Which of the compounds shown above can be identified by using litmus paper alone?

- (a) **i and iv**
- (b) **i and ii**
- (c) **ii and iii**
- (d) **i only.**

What type of reaction is represented by the conversion of butan-1-ol to butanoic acid?

- (a) Addition
- (b) Hydrolysis
- (c) Oxidation
- (d) Substitution

An organic substance has an empirical formula of  $C_3H_6O_2$ . Which of the following is NOT a possible identity of the substance?

- (a) Propanoic acid
- (b) Ethyl methanoate
- (c) Methyl methanoate
- (d) Methyl ethanoate

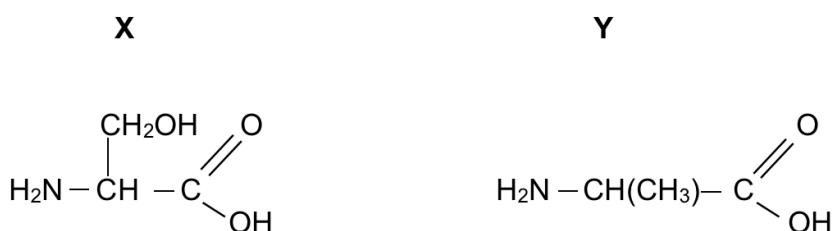
Which of the following statement about the primary structure of proteins is correct?

- (a) They exhibit mainly hydrogen bonding within their structure.
- (b) They have been isolated from the same species of living organisms.
- (c) They have a specific sequence of amino acids.
- (d) They perform a similar function

Which of the following pairs of compounds would form ethyl butanoate when warmed with concentrated sulfuric acid?

- (a)  $CH_3CH_2OH$  and  $CH_3CH_2COOH$
- (b)  $CH_3CH_2CH_2CH_2OH$  and  $CH_3COOH$
- (c)  $CH_3CH_2CH_2COOH$  and  $CH_3CH_2OH$
- (d)  $CH_3COOH$  and  $CH_3CH_2CH_2OH$

Consider the two  $\alpha$ -amino acids, **X** and **Y**, shown below.



The correct names for these two  $\alpha$ -amino acids are:

- (a) alanine and valine respectively.
- (b) valine and threonine respectively.
- (c) serine and alanine respectively.
- (d) serine and lysine respectively.

Coconut oil contains an ester which gives the oil its distinctive odour. The ester was extracted and a series of experiments were carried out to determine the formula of this ester, which was known to contain only carbon, hydrogen and oxygen.

A 1.680 g sample was burned in excess oxygen and 4.100 g of carbon dioxide was produced.

A separate 1.990 g sample was burned in excess oxygen and 1.990 g of water was produced.

(a) Calculate the empirical formula of the ester in the coconut oil. (8 marks)

A further sample weighing 0.8100 g was vaporised and the gas produced was found to occupy a volume of 226.0 mL at 140.0 °C and 85.20 kPa.

(b) From this information, calculate the molecular formula of the ester. (4 marks)

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(c) This same ester can also be synthesised in the laboratory by reacting pentan-1-ol and a carboxylic acid, using sulfuric acid as a catalyst.

Using this information, draw the structural formula of the ester present in coconut oil.