



AUGUST 2014

ALEXANDER ROAD HIGH SCHOOL

1 HOUR

IC

PHYSICAL SCIENCE CONTROL TEST

TOTAL = 50

GRADE 12

QUESTION 1: One-word questions

Give one word/term for each of the following descriptions.

- 1.1 The type of alcohol where the carbon atom with the -O-H group is part of the carbon chain which is joined directly to two carbon groups.
- 1.2 The type of reaction where an unsaturated hydrocarbon becomes saturated.
- 1.3 An atom or group of atoms that form the center of chemical activity in a molecule or compound.
- 1.4 The type of reaction where a hydrocarbon reacts with oxygen.

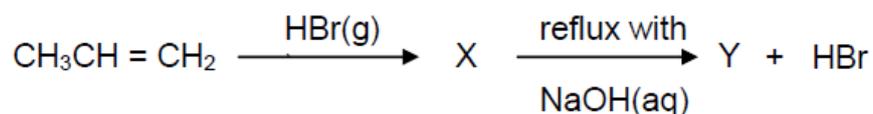
[4]

QUESTION 2: Multiple choice

Four possible options are provided as answers to the following questions. Each question has only 1 correct answer. Choose the correct answer and make a Cross (X) over the letter (A – D) next to the relevant question number (2.1 – 2.4)

- 2.1 Which of the following is an Ester
 - A. CH_3CHO
 - B. CH_3COCH_3
 - C. $\text{CH}_3\text{COOCH}_3$
 - D. CH_3COOH

2.2 A simple reaction scheme is shown below.



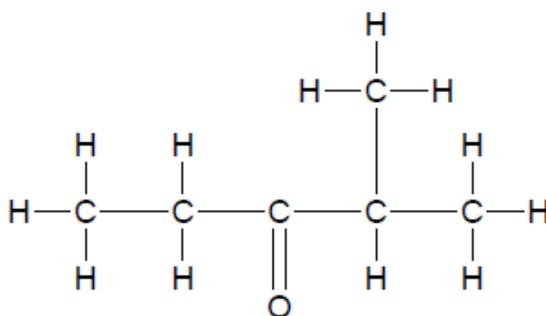
The formula for "Y" is...

- A. $\text{CH}_3\text{CH}_2\text{COOH}$
- B. $\text{CH}_3\text{CHOHCH}_3$
- C. $\text{CH}_3\text{CHBrCH}_2\text{OH}$
- D. $\text{CH}_3\text{CHOHCH}_2\text{Br}$

2.3 Which ONE of the following compounds will have the highest boiling point?

- A. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$
- B. $\text{CH}_3\text{CH}_2\text{CH}_2\text{COCH}_3$
- C. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$
- D. $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOCH}_3$

2.4 Consider the structural formula of an organic compound below...



Which ONE of the IUPAC names is correct for this compound?

- A. 4-methylpentan-3-one
- B. 2-methylpentan-3-one
- C. hexan-3-one
- D. 2-methylpentan-2-one

[4x2 = 8]

SUB – TOTAL: 12

SECTION B

QUESTION 3

The letters A to F in the table below represent 6 organic compounds...

A	Pent-2-ene	B	$\begin{array}{ccccccc} & \text{H} & & \text{H} & & \text{H} & \\ & & & & & & \\ \text{H} & - \text{C} & - & \text{C} & - & \text{C} & - \text{O} - \text{H} \\ & & & & & & \\ & \text{H} & & & & \text{H} & \\ & & & \text{H} & - & \text{C} & - \text{H} \\ & & & & & & \\ & & & & & \text{H} & \end{array}$
C	Propylmethanoate	D	2,5-dimethylheptane
E	$\begin{array}{ccccccc} & & & \text{O} & & & \\ & & & & & & \\ \text{CH}_3 & - \text{CH} & - & \text{CH}_2 & - & \text{C} & - \text{H} \\ & & & & & & \\ & \text{CH}_3 & & & & & \end{array}$	F	$\begin{array}{ccccccc} & & & \text{O} & & & \\ & & & & & & \\ \text{CH}_3 & - \text{CH}_2 & - & \text{CH}_2 & - & \text{C} & - \text{CH}_3 \\ & & & & & & \end{array}$

- 3.1 Write down the letter representing the compound which:
(note: A compound may be used more than once)
- 3.1.1 Is an aldehyde (1)
- 3.1.2 Has the general formula: C_nH_{2n} (1)
- 3.1.3 Is unsaturated (1)
- 3.1.4 Is a ketone (1)
- 3.1.5 Is a saturated hydrocarbon (1)
- 3.1.6 Can be prepared by the reaction of an alcohol with a carboxylic acid (1)
- 3.2 Write down the structural formula of...
- 3.2.1 Compound A (2)
- 3.2.2 Compound D (2)
- 3.3 Give the IUPAC name of compound B (2)

[12]

QUESTION 4

The molecular formula, $C_3H_6O_2$ corresponds to two FUNCTIONAL GROUP isomers

- 4.1 Give the definition of the term “structural isomers”. (2)
- 4.2 If the one molecule is an ester and the other a carboxylic acid...
- 4.2.1 Give the structural formula of the carboxylic acid and ester. (4)
- 4.2.2 Identify which (ester or carboxylic acid) will have the higher boiling point. (1)
- 4.2.3 Explain your answer to question 4.2.2. (4)

[11]

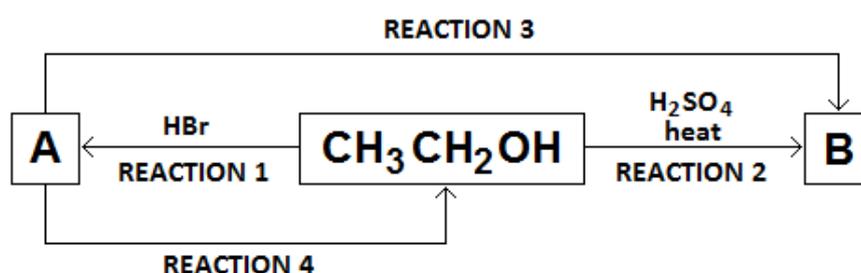
QUESTION 5

- 5.1 Using structural formulae, write a balanced equation for the esterification reaction that occurs between ethanol and butanoic acid. (4)
- 5.2 Give the FORMULA of the catalyst used in an esterification reaction. (1)
- 5.3 Give one everyday use for esters. (1)

[6]

QUESTION 6

The following flow diagram shows various exchanges that can occur between various chemical compounds...



- 6.1 Write a balanced chemical reaction, using CONDENSED STRUCTURAL formulae, for the preparation of compound A in reaction 1. (3)
- 6.2 Write a balanced chemical reaction, using STRUCTURAL formulae, for the preparation of compound B in reaction 2. (3)
- 6.3 Name the type of reaction (be specific) represented by reaction 3. (2)
- 6.4 Name the type of reaction represented by reaction 4. (1)

[9]

TOTAL: 50