



ALEXANDER ROAD HIGH SCHOOL
GRADE 12 PHYSICAL SCIENCES POST-PRACTICAL ASSESSMENT

1 HOUR

60 marks

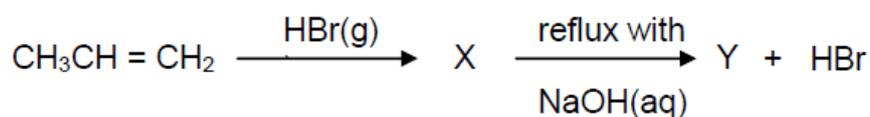
QUESTION 1: Multiple choice

Choose the correct answer and write its letter next to the question number on the answer sheet.

1.1 Which of the following is an Ester

- A. CH_3CHO
- B. CH_3COCH_3
- C. $\text{CH}_3\text{COOCH}_3$
- D. CH_3COOH

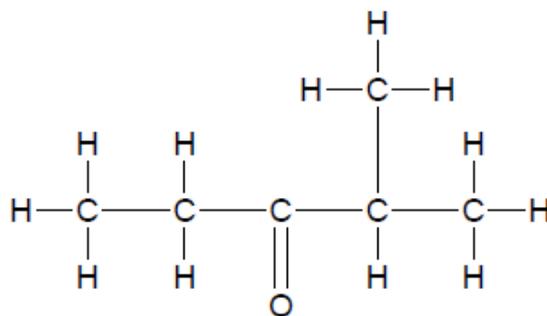
1.2 A simple reaction scheme is shown below.



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. $\text{CH}_3\text{CHOHCH}_2\text{Br}$
- 1.3 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. $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOCH}_3$
- 1.4 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.
- A. tertiary
 - B. secondary
 - C. primary
 - D. homologous series

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

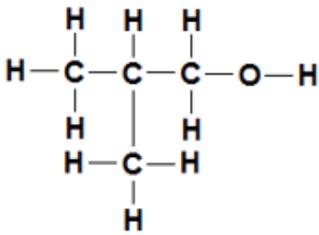
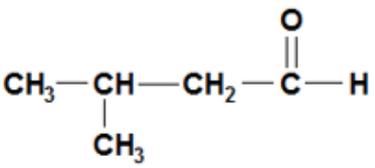
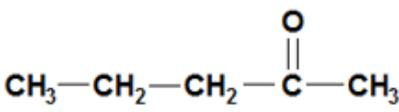


Which ONE of the IUPAC names is correct for this compound?

- A. 4-methylpentan-3-one
 - B. 2-methylpentan-3-one
 - C. hexan-3-one
 - D. 2-methylpentan-2-one
- 1.6 The functional group is the...
- A. The type of reaction where an unsaturated hydrocarbon becomes saturated.
 - B. An atom or group of atoms that form the center of chemical activity in a molecule or compound.
 - C. The type of reaction where a hydrocarbon reacts with oxygen.
 - D. The group in which different functions of molecules are performed.
- 1.7 In the fertiliser industry, the processes to prepare sulphuric acid and nitric acid, respectively, are:
- A. Haber and Ostwaldt
 - B. Ostwaldt and Contact
 - C. Sasol-Lurgi and Contact
 - D. Contact and Ostwaldt

QUESTION 2

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

A	Pent-2-ene	B	
C	Propylmethanoate	D	2,5-dimethylheptane
E		F	

2.1 Write down the letter(s) representing the compound(s) which:

(note: A compound may be used more than once)

2.1.1 Is an aldehyde (1)

2.1.2 Has the general formula: C_nH_{2n} (1)

2.1.3 Are isomers (1)

2.1.4 Is a ketone (1)

2.1.5 Is a saturated hydrocarbon (1)

2.1.6 Can be prepared by the reaction of an alcohol with a carboxylic acid. (1)

2.2.1 Write down the structural formula of Compound C (2)

2.2.2 Give the IUPAC name of compound B (2)

2.2.3 What type of polymerisation would take place with a molecule of the same functional group as compound A? (1)

2.2.4 Give the structural formula of the monomer of polyethene. (1)

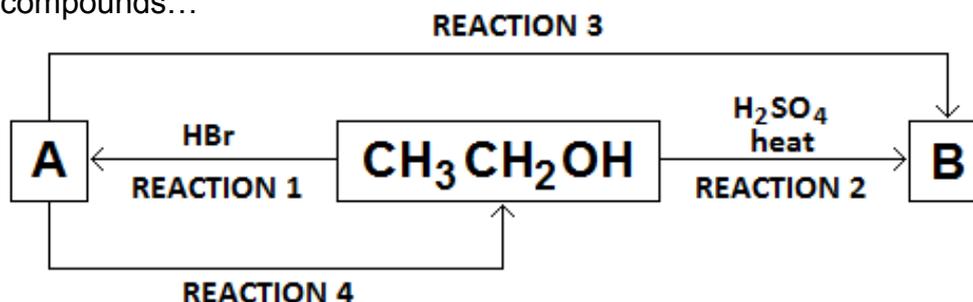
[12]

QUESTION 3

- 3.1 The molecular formula, $C_3H_6O_2$, corresponds to two FUNCTIONAL GROUP isomers.
- 3.1.1 What type of structural isomers are they? (1)
- 3.1.2 Give the definition of the term “structural isomers”. (2)
- 3.1.3 If the one molecule is an ester and the other a carboxylic acid...
- (a) Give the structural formula of the carboxylic acid. (2)
- (b) Identify which (ester or carboxylic acid) will have the higher boiling point. (1)
- (c) Explain your answer to question (b). (4)
- 3.2.1 Using structural formulae, write a balanced equation for the esterification reaction that occurs between ethanol and butanoic acid. (4)
- 3.2.2 Give the NAME of the catalyst used in an esterification reaction. (1)
- 3.2.3 Give one everyday use for esters. (1)
- 3.3 Write the balanced molecular equation for the combustion reaction of an alkane with 7 carbon atoms. (2)

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



- 4.1 Write a balanced chemical reaction, using CONDENSED STRUCTURAL formulae, for the preparation of compound A in reaction 1. (3)
- 4.2 Write a balanced chemical reaction, using STRUCTURAL formulae, for the preparation of compound B in reaction 2. (3)
- 4.3 Name the specific type of reaction represented by reaction 3. (2)
- 4.4 Name the type of reaction represented by reaction 4. (1)

[9]

- 5.1 Give the chemical names of two fertilisers. (2)
- 5.2 Name one advantage for the use of inorganic fertilisers. (1)
- 5.3 The numbers 3:3:4 (25) are printed on a 5kg bag of fertiliser, calculate the mass of potassium in the bag. (3)
- 5.4 What could be a socio-economical disadvantage of eutrophication? (1)

[7]

TOTAL: 60