MONYETLA BURSARY PROJECT

ORGANIC CHEMISTRY: NOMENCLATURE

GRADE 12

FS SEPT 2025

1.1 Which ONE of the following is an unsaturated hydrocarbon?

A C_4H_{10}

B $CH_3(CH)_2CH_3$

C $CH_3(CH_2)_2CH_3$

D $CH_3CH_2CH_2CH_3$ (2)

1.2 Consider the organic molecule below.

$C_4H_8O_2$

Its correct IUPAC name is …

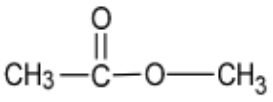
A butan-2-ol.

B butanoic acid.

C methyl butanoate.

D ethyl butanoate. (2)

1.3 Consider the organic structure below.



The IUPAC name of its FUNCTIONAL ISOMER is …

A methyl ethanoate.

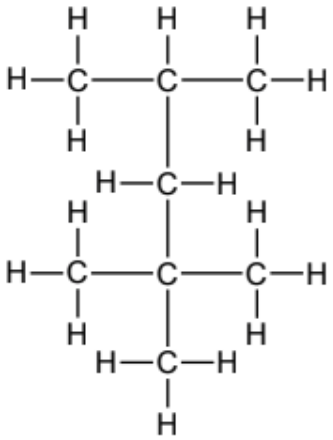
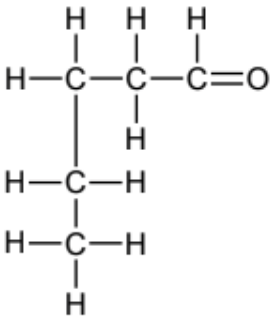
B propanoic acid.

C ethyl methanoate.

D ethanoic acid. (2)

QUESTION 2 (Start on a new page.)

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

A	$CH_3COCH(CH_3)_2$	**B**	3,3-dimethylhexane
C		**D**	
E	$C_2H_4O_2$	**F**	Propan-1-ol

2.1 Write down the letter(s) representing:

2.1.1 An aldehyde (1)

2.1.2 Functional isomers (1)

2.1.3 A carboxylic acid (1)

2.2 Write down the general formula of the homologous series to which compound **B** belongs. (2)

2.3 For compound **C**, write down the:

2.3.1 Letter of the molecule that is its structural isomer (1)

2.3.2 Type of structural isomerism named in QUESTION 2.2.1 (1)

2.3.3 IUPAC name (3)

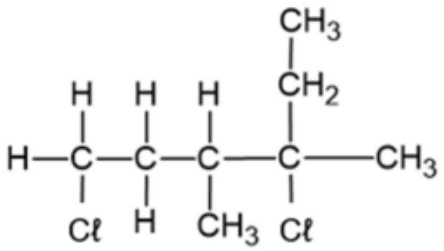
2.4 For compound **A**, write down the structural formula of its chain isomer. (3)

GAU SEPT 2025

1.1 Which of the following compounds has a formyl group as its functional group?

A Propan-1-ol
B Propanoic acid
C Prop-1-ene
D Propanal (2)

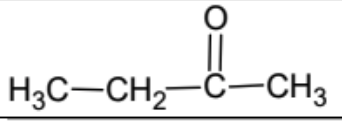
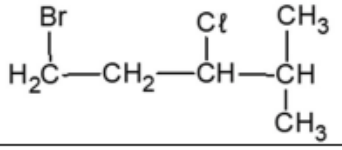
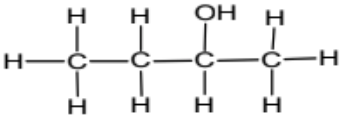
1.2 The correct IUPAC name for the structure shown below is:



A 1,4-dichloro-4-ethyl-3-methylpentane
B 2,4-dichloro-2-ethyl-3-methylpentane
C 3,6-dichloro-3,4-dimethylhexane
D 1,4-dichloro-3,4-dimethylhexane (2)

QUESTION 2 (Start on a new page.)

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

A		**B**	$CH_3CH(CH_3)CH_2CH_3$
C		**D**	CH_3COOH
E	Ethyne	**F**	

2.1 Name the homologous series to which each of the following compounds belong:

2.1.1 **A** (1)

2.1.2 **C** (1)

2.2 Write down the IUPAC name of compound **C**. (3)

2.3 Write down the letter for the compound that has a carbonyl group. (1)

2.4 Write down the structural formula for the:

2.4.1 Functional isomer of compound **A** (2)

2.4.2 Ester with the same molecular formula as compound **D** (2)

2.4.3 Tertiary alcohol of compound **F** (2)

2.5 Explain why compound **A** is not an unsaturated hydrocarbon. (2)

2.6 Which letter in the table above represents:

2.6.1 An unsaturated hydrocarbon (1)

2.6.2 The compound with the general formula $C_nH_{2n}O$ (1)

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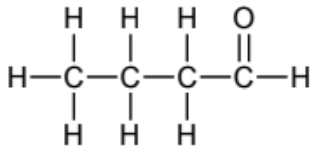
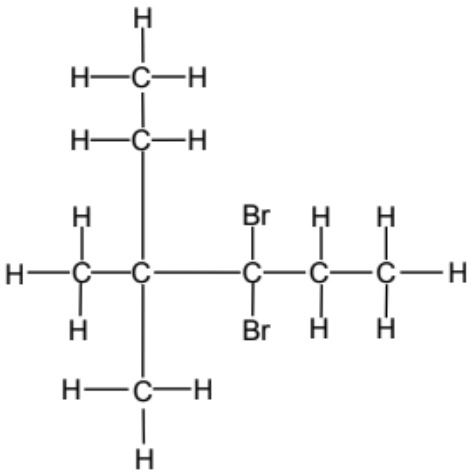
QUESTION 2 (Start on a new page.)

The letters **A** to **H** in the table below represent organic compounds.

A		**B**	
C	Butanone	**D**	$C_4H_{10}O$
E	$CH_3C(CH_3)_2CCCH_3$	**F**	$CH_3COO(CH_2)_2CH_3$
G	$C_4H_8O_2$	**H**	$CH_3C(CH_3)_2CH_2CH_3$

2.1 Write down the LETTER that represents EACH of the following:

2.1.1 An alcohol (1)

2.1.2 A compound with a formyl group (1)

2.1.3 An unsaturated compound (1)

2.2 Write down the IUPAC name of compound:

2.2.1 **B** (3)

2.2.2 **E** (3)

2.3 Two different compounds in the above table are functional isomers.

2.3.1 Define the term *functional isomer.* (2)

2.3.2 Write down the LETTERS that represent these functional isomers. (1)

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1.1 Which ONE of the following represents a straight chain SATURATED hydrocarbon?

A C_5H_8

B C_5H_{10}

C C_6H_{12}

D C_6H_{14} (2)

1.2 Which ONE of the following is a SECONDARY alcohol?

A $C(CH_3)_3OH$

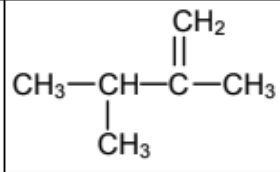
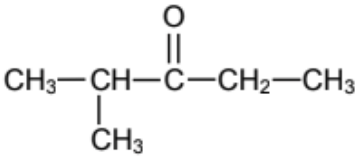
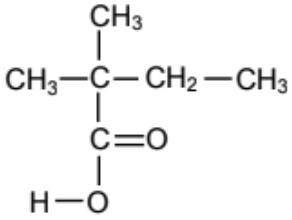
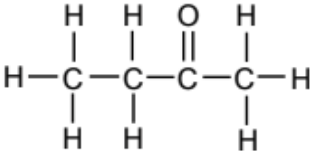
B $CH_3(CH_2)_3OH$

C $CH_3(CH_2)_2CHO$

D $CH_3CH_2CH(OH)CH_3$ (2)

QUESTION 2 (Start on a new page.)

The letters **A** to **H** in the table below represent eight organic compounds.

A	Heptanoic acid	**B**	$CH_3(CH_2)_3COOCH_3$
C	4-ethyl-3,3-difluorohexane	**D**	Hexanoic acid
E		**F**	
G		**H**	

2.1 Define the term *organic compound*. (1)

2.2 Write down the IUPAC name of compound:

2.2.1 **E** (2)

2.2.2 **H** (2)

2.3 Write down the:

2.3.1 STRUCTURAL formula of compound **B** (2)

2.3.2 STRUCTURAL formula of compound **C** (3)

2.3.3 General formula of the homologous series to which compound **E** belongs (1)

2.3.4 STRUCTURAL formula of the FUNCTIONAL group of compound **F** (1)

2.3.5 IUPAC name of the alcohol needed to produce compound **B** (2)

2.4 Write down the letter(s) of the compound(s) that:

2.4.1 Is a FUNCTIONAL isomer of compound **G** (1)

2.4.2 Are CHAIN isomers of each other (1)

[16]

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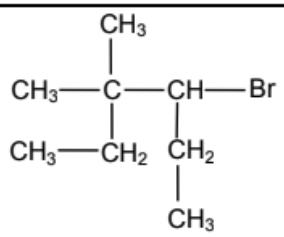
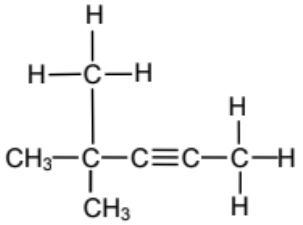
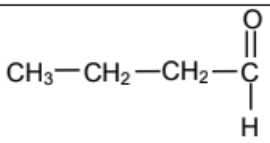
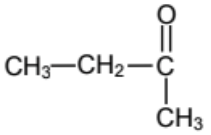
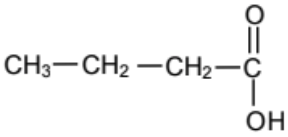
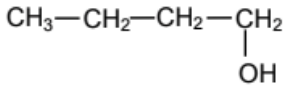
QUESTION 2 (Start on a new page.)

A to **F** in the table below represent six organic compounds.

A		**B**	
C		**D**	
E		**F**	

2.1 Write down the:

2.1.1 Letters that represent TWO organic compounds that are isomers of each other (1)

2.1.2 Type of isomers (CHAIN, FUNCTIONAL or POSITIONAL) identified in QUESTION 2.1.1 (1)

2.1.3 GENERAL FORMULA of the homologous series to which compound **B** belongs (1)

2.1.4 NAME of the functional group of compound **F** (1)

2.2 Write down the IUPAC name of:

2.2.1 Compound **A** (3)

2.2.2 Compound **B** (2)

2.2.3 Compound **C** (2)

2.3 Compound **F** reacts with a carboxylic acid to form compound **S** in the presence of a strong acid.

2.3.1 Write down the type of reaction that takes place. (1)

Compound **S** has an EMPIRICAL FORMULA of C_3H_6O and a molecular mass of 116 $g \cdot mol^{-1}$.

2.3.2 Write down the MOLECULAR FORMULA of the carboxylic acid. (3)
[15]