

Demonstrate understanding of the properties of organic compounds

Collated IUPAC naming and structural formula

2021:1

- (a) Complete the table below to show either the structural formula or the IUPAC (systematic) name for each organic molecule.

Structural formula	IUPAC (systematic) name
	2-methylbutanoic acid
$\text{CH}_3-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_2-\text{CH}_2-\text{CH}_3$	
	3-bromopentanoyl chloride
$\text{CH}_3-\text{CH}_2-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}-\text{CH}_3$	

2020

- (a) (i) Complete the table below to show either the structural formula or the IUPAC (systematic) name for each organic molecule.

	IUPAC (systematic) name	Structural formula
A	3-chloropropanamide	
B		$\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_2-\text{CH}_2-\text{CH}_3$
C		$\text{CH}_3-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}-\text{CH}_3$
D	2-methylbutanal	

2019:1

- (a) Complete the table below to show either the structural formula or the IUPAC (systematic) name for each organic molecule.

Structural formula	IUPAC (systematic) name
$\begin{array}{c} \text{Cl} \\ \\ \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{CH}_2 - \text{C} \begin{array}{l} \nearrow \text{O} \\ \searrow \text{H} \end{array} \end{array}$	
	Ethyl hexanoate
$\begin{array}{c} \text{O} \\ \\ \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{C} - \text{NH}_2 \\ \\ \text{CH}_3 \end{array}$	

2018:1

- (a) Complete the table below to show either the structural formula or the IUPAC (systematic) name for each organic molecule.

Structural formula	IUPAC (systematic) name
$\begin{array}{c} \text{Cl} \\ \\ \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{C} \begin{array}{l} \nearrow \text{O} \\ \searrow \text{Cl} \end{array} \end{array}$	
$\begin{array}{c} \text{O} \\ \\ \text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{C} - \text{CH}_3 \end{array}$	
	4-methylhexanal
	propanamide

2017:1

- (a) Complete the table below to indicate the IUPAC name, functional group, and/ or the structural formula for organic compounds that contain only four carbon atoms. The first row has been completed for you.

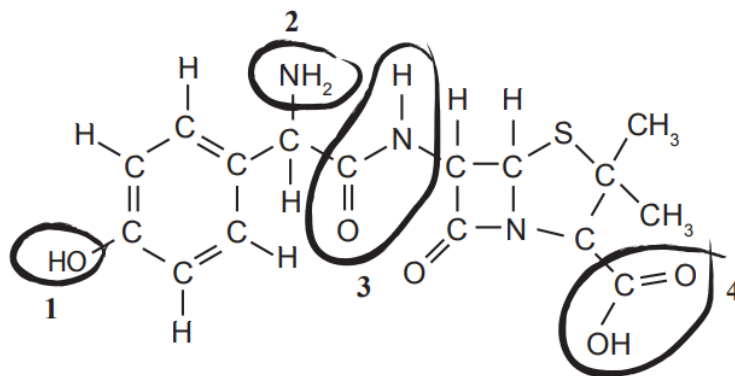
Functional group		Structural formula	IUPAC (systematic) name
alkene		$\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2$	but-1-ene
			2-methylpropan-1-amine
acyl chloride			
			propyl methanoate
		$\text{CH}_3\text{CH}_2-\overset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{CH}_3$	
aldehyde			
amide			butanamide

2016:1

- (a) Complete the table below by drawing the structural formula for the named compounds.

IUPAC systematic name	Structural formula
butylethanoate	
2-hydroxybutanal	
ethanamide	

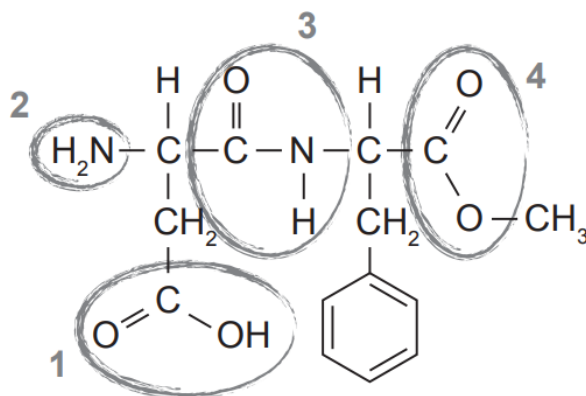
- (b) The structure of amoxicillin is given below. It is an antibiotic used in the treatment of bacterial infections.



Name the four different functional groups circled within the amoxicillin molecule above.

2015:1

- (a) The structure of aspartame is given below. Aspartame is often used as an artificial sweetener in drinks.



Identify the FOUR different functional groups within the aspartame molecule that are circled and numbered above.

- (b) Complete the table below by drawing the structural formula for the named compounds

IUPAC systematic name	Structural formula
propanoyl chloride	
3-bromopentan-2-one	
2-methylbutanal	

2014:1

- (a) Complete the table below giving the IUPAC systematic name or the structural formula for each compound.

Structural formula	IUPAC systematic name
$\begin{array}{c} \text{Cl} \quad \text{O} \\ \quad \\ \text{CH}_3 - \text{CH} - \text{C} - \text{CH}_3 \end{array}$	
	propanamide
$\begin{array}{c} \text{CH}_3 - \text{O} - \text{C} - \text{CH}_2 - \text{CH}_2 - \text{CH}_3 \\ \\ \text{O} \end{array}$	

Also Q 3(a) but this relies on identification of compounds A-G.

2013:1

- (a) Complete the table below by giving the IUPAC systematic name or the structural formula for each compound.

Structural formula	IUPAC systematic name
$\text{HO} - \text{CH}_2 - \text{CH}_2 - \begin{array}{c} \text{O} \\ // \\ \text{C} \\ \backslash \\ \text{H} \end{array}$	
	propanamide
$\begin{array}{c} \text{CH}_3 - \text{C} - \text{CH}_2 - \text{CH} - \text{CH}_3 \\ \quad \\ \text{O} \quad \text{CH}_3 \end{array}$	

Questions from expired AS 90698 which are still relevant.

2012:2

No similar question asked.

2011:3

(a) Write the IUPAC systematic names for the four compounds in the table below.

<p>A.</p> $\begin{array}{c} \text{O} \\ \parallel \\ \text{FH}_2\text{C}-\text{C} \\ \backslash \\ \text{OH} \end{array}$	<p>B.</p> $\begin{array}{c} \text{O} \\ \parallel \\ \text{H}_3\text{C}-\text{CH}_2-\text{C} \\ \backslash \\ \text{Cl} \end{array}$
<p>C.</p> $\text{H}_3\text{C}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{Br}$	<p>D.</p> $\begin{array}{c} \text{H}_3\text{C}-\text{C}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_3 \\ \parallel \\ \text{O} \end{array}$

2010:1

The following compounds, A and B, are both present in manuka honey.

(a) Complete the table by naming the functional groups in each molecule.

Structural formula	Functional groups
$\begin{array}{c} \text{CH}_2 - \text{C} - \text{CH}_2 \\ \quad \parallel \quad \\ \text{OH} \quad \text{O} \quad \text{OH} \end{array}$	
$\begin{array}{c} \text{CH}_3 - \text{C} - \text{CH} \\ \parallel \quad \parallel \\ \text{O} \quad \text{O} \end{array}$	

2010:3

(a) Write the IUPAC systematic names for the four compounds in the table below.

<p>A.</p> $\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{NH}_2$	<p>B.</p> $\begin{array}{c} \text{CH}_3-\text{C}-\text{CH}_2-\text{CH}_2-\text{CH}_3 \\ \parallel \\ \text{O} \end{array}$
<p>C.</p> $\begin{array}{c} \text{O} \\ \parallel \\ \text{CH}_3-\text{CH}_2-\text{CH}_2-\text{C} \\ \backslash \\ \text{Cl} \end{array}$	<p>D.</p> $\begin{array}{c} \text{H}-\text{C}-\text{NH}_2 \\ \parallel \\ \text{O} \end{array}$

2009:1

- (b) The structures of the three branched-chain primary alcohols with the formula $C_5H_{11}OH$ are given below.
- (i) Write systematic names for the three isomers in the spaces provided in the table.

Isomer	Name
<p>C</p> $\begin{array}{c} \text{CH}_3 \\ \\ \text{H}_3\text{C}-\text{CH}-\text{CH}_2-\text{CH}_2-\text{OH} \end{array}$	
<p>D</p> $\begin{array}{c} \text{CH}_3 \\ \\ \text{H}_3\text{C}-\text{CH}_2-\text{CH}-\text{CH}_2-\text{OH} \end{array}$	
<p>E</p> $\begin{array}{c} \text{CH}_3 \\ \\ \text{H}_3\text{C}-\text{C}-\text{CH}_2-\text{OH} \\ \\ \text{CH}_3 \end{array}$	

2009:2

- (a) Draw the structural formula for each of the organic compounds below.

propanoyl chloride	2-amino-3-methylbutane

pentanal	4-chlorobutanoic acid

2008:1

(a) Give the systematic IUPAC names for the following molecules.

(i)	$\text{H}_3\text{C}-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{NH}_2$	(ii)	$\text{H}_3\text{C}-\text{CH}_2-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_2-\text{CH}_3$
Name		Name	

(iii)	$\text{H}_3\text{C}-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}-\text{CH}_3$	(iv)	$\begin{array}{c} \text{CH}_3 \\ \\ \text{H}_3\text{C}-\text{C}-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{OH} \\ \\ \text{CH}_3 \end{array}$
Name		Name	

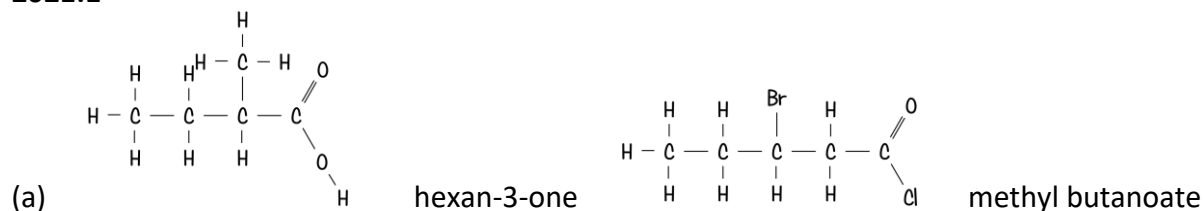
(b) Draw the structural formula of each of the organic compounds below.

(i)	(ii)
Name 3-aminopentane	Name ethanoyl chloride

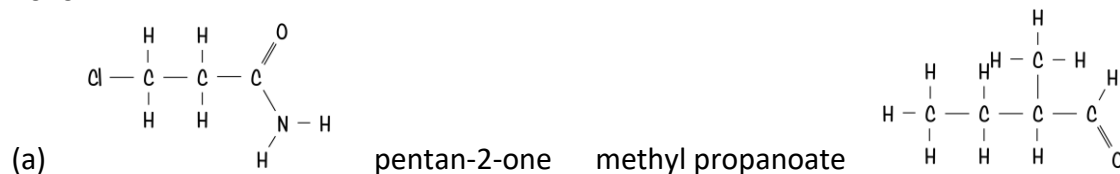
(iii)	(iv)
Name 2-chloropropan-1-ol	Name 2-methylbutanal

ANSWERS

2021:1

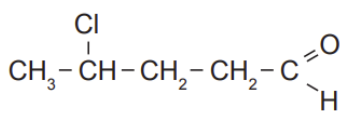
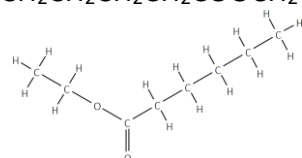
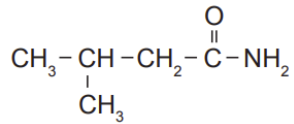


2020:1



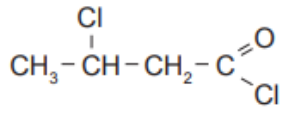
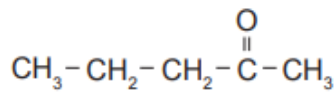
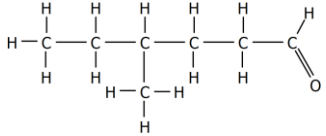
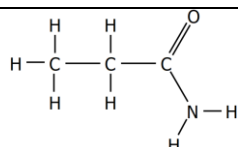
2019:1

(a)

Structural formula	IUPAC (systematic) name
	<i>4-chloropentanal</i>
$H_3CH_2CH_2CH_2CH_2COOCH_2CH_3$ 	Ethyl hexanoate
	<i>3-methylbutanamide</i>

2018:1

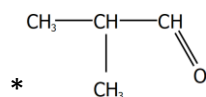
(a)

Structural formula	IUPAC (systematic) name
	<i>3-chlorobutanoyl chloride</i>
	<i>pentan-2-one</i>
	4-methylhexanal
	propanamide

2017:1

(a)

Functional group	Structural formula	IUPAC (systematic) name
alkene	$\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2$	but-1-ene
amine	$\begin{array}{c} \text{CH}_3\text{CHCH}_2-\text{N}-\text{H} \\ \quad \\ \text{CH}_3 \quad \text{H} \end{array}$	2-methylpropan-1-amine
acyl chloride	$\begin{array}{c} \text{CH}_3\text{CH}_2\text{CH}_2\text{C}-\text{Cl} \\ \\ \text{O} \end{array}$	butanoyl chloride 2-methylpropanoyl chloride
ester	$\begin{array}{c} \text{H}-\text{C}-\text{O}-\text{CH}_2\text{CH}_2\text{CH}_3 \\ \\ \text{O} \end{array}$	propyl methanoate
	$\begin{array}{c} \text{CH}_3\text{CH}_2-\text{C}-\text{CH}_3 \\ \\ \text{O} \end{array}$	Butanone Butan-2-one
aldehyde	$\begin{array}{c} \text{CH}_3\text{CH}_2\text{CH}_2-\text{C}-\text{H} \\ \\ \text{O} \end{array}$	Butanal 2-methylpropanal*
amide	$\begin{array}{c} \text{CH}_3\text{CH}_2\text{CH}_2-\text{C}-\text{NH}_2 \\ \\ \text{O} \end{array}$	butanamide



2016:1

(a)

IUPAC systematic name	Structural formula
butylethanoate	$\begin{array}{c} \text{O} \\ \\ \text{CH}_3-\text{C} \\ \\ \text{O}-\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3 \end{array}$
2-hydroxybutanal	$\begin{array}{c} \text{OH} \quad \text{O} \\ \quad // \\ \text{CH}_3\text{CH}_2-\text{CH}-\text{C} \\ \quad \quad \quad \\ \quad \quad \quad \text{H} \end{array}$
ethanamide	$\begin{array}{c} \text{O} \\ \\ \text{CH}_3-\text{C} \\ \\ \text{NH}_2 \end{array}$

(b) 1. Hydroxyl (alcohol). 2. Amine / amino. 3. Amide / peptide. 4. Carboxylic acid.

2015:1

(a) 1. Carboxylic acid or carboxyl 2. Amine or aminoalkane 3. Amide 4. Ester

(b)

IUPAC systematic name	Structural formula
propanoyl chloride	$\begin{array}{c} \text{O} \\ \parallel \\ \text{H}_3\text{CCH}_2\text{C} \\ \backslash \\ \text{Cl} \end{array}$
3-bromopentan-2-one	$\begin{array}{c} \text{O} \\ \parallel \\ \text{H}_3\text{C}-\text{C}-\text{CH}(\text{Br})-\text{CH}_2-\text{CH}_3 \end{array}$
2-methylbutanal	$\begin{array}{c} \text{O} \\ \parallel \\ \text{H}_3\text{C}-\text{CH}_2-\text{CH}(\text{CH}_3)-\text{C} \\ \backslash \\ \text{H} \end{array}$

2014:1

(b) Complete the table below giving the IUPAC systematic name or the structural formula for each compound.

Structural formula	IUPAC systematic name
$\begin{array}{c} \text{Cl} \quad \text{O} \\ \quad \parallel \\ \text{CH}_3-\text{CH}-\text{C}-\text{CH}_3 \end{array}$	3-chlorobutanone
$\text{CH}_3\text{CH}_2\text{CONH}_2$	propanamide
$\begin{array}{c} \text{CH}_3-\text{O}-\text{C}-\text{CH}_2-\text{CH}_2-\text{CH}_3 \\ \parallel \\ \text{O} \end{array}$	methylbutanoate

2013:1

(a) Complete the table below by giving the IUPAC systematic name or the structural formula for each compound.

Structural formula	IUPAC systematic name
$\text{HO}-\text{CH}_2-\text{CH}_2-\text{C} \begin{array}{l} \parallel \\ \text{O} \\ \backslash \\ \text{H} \end{array}$	3-hydroxy propanal / 3-hydroxyl propanal
$\begin{array}{c} \text{O} \\ \parallel \\ \text{CH}_3\text{CH}_2\text{C} \\ \backslash \\ \text{NH}_2 \end{array}$	propanamide
$\begin{array}{c} \text{CH}_3-\text{C}-\text{CH}_2-\text{CH}-\text{CH}_3 \\ \parallel \quad \\ \text{O} \quad \text{CH}_3 \end{array}$	4-methyl pentan-2-one

Questions from expired AS 90698 which are still relevant.

2012:2 No similar question asked.

2011:3

(b) Write the IUPAC systematic names for the four compounds in the table below.

<p>A.</p> $\text{FH}_2\text{C}-\overset{\text{O}}{\parallel}{\text{C}}-\text{OH}$	<p>B.</p> $\text{H}_3\text{C}-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{Cl}$
<p>fluoroethanoic acid</p>	<p>propanoyl chloride</p>
<p>C.</p> $\text{H}_3\text{C}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{Br}$	<p>D.</p> $\text{H}_3\text{C}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_3$
<p>1-bromobutane</p>	<p>hexan-2-one</p>

2010:1

Structural formula	Functional groups
$\begin{array}{c} \text{CH}_2 - \text{C} - \text{CH}_2 \\ \quad \parallel \quad \\ \text{OH} \quad \text{O} \quad \text{OH} \end{array}$	
$\begin{array}{c} \text{CH}_3 - \text{C} - \text{CH} \\ \parallel \quad \parallel \\ \text{O} \quad \text{O} \end{array}$	

2010:3

(c) Write the IUPAC systematic names for the four compounds in the table below.

<p>A.</p> $\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{NH}_2$	<p>B.</p> $\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_2-\text{CH}_2-\text{CH}_3$
<p>1-aminobutane / butan-1-amine</p>	<p>pentan-2-one</p>
<p>C.</p> $\text{CH}_3-\text{CH}_2-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{Cl}$	<p>D.</p> $\text{H}-\overset{\text{O}}{\parallel}{\text{C}}-\text{NH}_2$
<p>butanoyl chloride</p>	<p>methanamide</p>

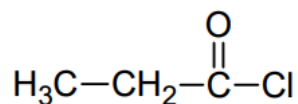
2009:1

- (b) (i) C: 3-methyl butan-1-ol
 D: 2-methyl butan-1-ol,
 E: 2,2 dimethyl propan-1-ol OR dimethyl propanol OR dimethylpropan-1-ol

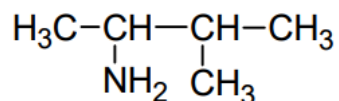
2009:2

(a)

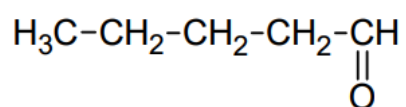
propanoyl chloride



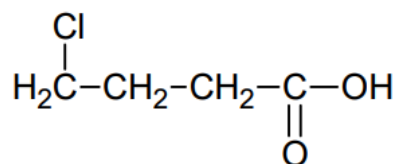
2-amino-3-methylbutane



pentanal



4-chlorobutanoic acid



2008:1

- (a) propanamide
 hexan-3-one
 methylpropanoate
 3,3-dimethylbutanoic acid

(b)

