Question #: 1

Which two elements are necessary to classify a molecule as organic?

A. nitrogen  
B. sulfur  
C. carbon  
D. oxygen  
E. hydrogen

Question #: 2

Fluorine has 1 valence electrons.  
Fluorine usually forms 2 bond(s) in organic molecules  
Enter your answers as whole numbers. Do NOT include units in your answer.

1. ________  
2. ________
Question #: 3

The molecular formula of the compound below is C\textsubscript{1}H\textsubscript{2}. Enter your answers as whole numbers. Do NOT include chemical symbols in your answers.

1. __________
2. __________

Question #: 4

Count the number of implied hydrogen atoms bonded to the molecule below. Enter your answers as whole numbers. Do NOT include units in your answer. Check that you put the right value with the right carbon (C\textsubscript{1}, C\textsubscript{2}, C\textsubscript{3}). Scroll down to see the order for the answers.

1. __________
2. __________
3. __________
Count the number of implied lone pairs of electrons on the indicated atoms in the molecule below. Enter your answers as whole numbers. Do NOT include units in your answer. Check that you put the right value with the right atom (O₁, N₁, Cl₁). Scroll down to see the order for the answers.

1. O₁
2. N₁
3. Cl₁

1. __________
2. __________
3. __________
Question #: 6

What is the condensed formula of the molecule below? Scroll down to ensure you see the entire molecule.

A. CH₃CH₂CH₂OCOCH₂CH₃
B. CH₃CH₂CH₂CHOCH₂CH₃
C. CH₃(CH₂)₂CO₂CH₂CH₃
D. CH₃CH₂CH₂OOCCH₂CH₃
E. CH₃(CH₂)₃CO₂CH₂CH₃

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Question #: 7

What is the condensed formula of the molecule below? Scroll down to ensure you see the entire molecule.
A.

\[
\begin{align*}
&\text{CO} \\
&(\text{H}_3\text{C})_2\text{HC} \\
&(\text{H}_3\text{C})_2\text{HC}
\end{align*}
\]

B.

\[
\begin{align*}
&\text{CHO} \\
&(\text{H}_3\text{C})_2\text{HC} \\
&(\text{H}_3\text{C})_2\text{HC}
\end{align*}
\]

C.

\[
\begin{align*}
&\text{CHO} \\
&\text{H}_3\text{CH}_3\text{CHC} \\
&\text{CHO}
\end{align*}
\]

D.

\[
\begin{align*}
&\text{CHO} \\
&\text{H}_3\text{CH}_2\text{CH}_2\text{C}
\end{align*}
\]
Question #: 8

Predict the shape around the indicated atoms in the molecule below. Choose between: **linear**, **bent**, **tetrahedral**, **trigonal planar**, and **trigonal pyramidal**. Scroll down to see the order for the answers.

1. __________
2. __________
3. __________
Question #: 9

Label the molecules below as an alkane, alkene, or alkyne.

Molecule 1

Molecule 2

Molecule 3

1. Molecule 1
2. Molecule 2
3. Molecule 3

1. 
2. 
3. 

Question #: 10

What functional group does not contain a carbonyl (C=O) bond in its structure?

A. Amide
B. Aldehyde
C. Ester
D. Carboxylic Acid
E. Alcohol
Question #: 11

Determine the number of each functional group present in the molecule.

1. **amine groups**
2. **amide groups**
3. **carboxylic acid groups**

Enter your answers as **whole numbers**.

1. _______
2. _______
3. _______

---

Question #: 12

Consider the molecule below and answer the following questions:

The molecule contains **1** heteroatoms and is a **2** [fat-soluble or water-soluble] vitamin.

1. _______
2. _______
Question #: 13

Which structure is a correct **three-dimensional representation** of ethane, C₂H₆?

A. 

B. 

C. 

D.
Answer the following questions about methanol pictured below:

How many polar bonds does methanol possess? 1
Is methanol polar or non-polar? 2
Enter your answers as **whole numbers**. Do **NOT** include units in your answers.

1. __________
2. __________

Identify each molecule as **polar or non-polar**:

1. [polar or non-polar]

2. [polar or non-polar]

CH₂Br₂ 3. [polar or non-polar]

1. __________
2. __________
3. __________
Question #: 16

Which formula represents an acyclic alkane?

A. \( \text{C}_3\text{H}_6 \)
B. \( \text{C}_3\text{H}_8 \)
C. \( \text{C}_4\text{H}_8 \)

Question #: 17

Select the two molecules that are isomers. You must select the two correct molecules to get credit for this problem.

A. 

B. 

C. 
Question #: 18

Select the two molecules that are isomers. You must select the two correct molecules to get credit for this problem.

A.

B.
Question #: 19

The longest continuous carbon chain in the molecule below is \_1\_ carbons long. Enter your answer as a whole number. Do NOT include units in your answer.

1. __________
**Question #**: 20

The longest continuous carbon chain in the molecule below is __1__ carbons long. Enter your answer as a whole number. Do NOT include units in your answer.

![Molecule](image)

1. _________

---

**Question #**: 21

The number of carbon atoms in a propyl group is __1__. Enter your answer as a whole number. Do NOT include units in your answer.

1. _________

---

**Question #**: 22

Name the molecule with the condensed formula: 
(\(\text{CH}_3\))\(_2\)\(\text{CHCH(\text{CH}_3)}\)\(_2\)

A. hexane  
B. 2,3-dimethylbutane  
C. 1,1,2,2-tetramethylethane  
D. 1,2-diethylethane
Question #: 23

Identify the molecule with the name 4-ethyldecane:

A. 

B. 

C. 

D. 

______________________________
**Question #: 24**

Name the molecule below:

![Molecule Diagram]

A. cyclohexane  
B. 1-methyl-4-ethylcyclohexane  
C. 1-ethyl-4-methylcyclohexane  
D. 3,6-diethylheptane

**Question #: 25**

Identify the molecule with the name butylcyclopentane:

A.  
B.  

Which **two elements** are necessary to classify a molecule as organic?

A. nitrogen  
B. sulfur  
✓C. carbon  
D. oxygen  
✓E. hydrogen

**Question #: 2**

Fluorine has ___ valence electrons.  
Fluorine usually forms ___ bond(s) in organic molecules  
Enter your answers as **whole** numbers. Do **NOT** include units in your answer.
Question #: 3

The molecular formula of the compound below is \(\text{C} \quad \underline{1} \quad \text{H} \quad \underline{2} \). Enter your answers as whole numbers. Do NOT include chemical symbols in your answers.

Question #: 4

Count the number of implied hydrogen atoms bonded to the molecule below. Enter your answers as whole numbers. Do NOT include units in your answer. Check that you put the right value with the right carbon \((C_1, C_2, C_3)\). Scroll down to see the order for the answers.
Question #: 5

Count the number of implied lone pairs of electrons on the indicated atoms in the molecule below. Enter your answers as whole numbers. Do NOT include units in your answer. Check that you put the right value with the right atom (O₁, N₁, Cl₁). Scroll down to see the order for the answers.
Question #: 6

What is the condensed formula of the molecule below? Scroll down to ensure you see the entire molecule.

A. $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCOCH}_2\text{CH}_3$
B. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHOCH}_2\text{CH}_3$
C. $\text{CH}_3(\text{CH}_2)_2\text{CO}_2\text{CH}_2\text{CH}_3$
D. $\text{CH}_3\text{CH}_2\text{CH}_2\text{OOCCH}_2\text{CH}_3$
E. $\text{CH}_3(\text{CH}_2)_3\text{CO}_2\text{CH}_2\text{CH}_3$

---

Question #: 7

What is the condensed formula of the molecule below? Scroll down to ensure you see the entire molecule.

A. $\text{CH}_3$
Predict the shape around the indicated atoms in the molecule below. Choose between: **linear**, **bent**, **tetrahedral**, **trigonal planar**, and **trigonal pyramidal**. Scroll down to see the order for the answers.
Question #: 9

Label the molecules below as an alkane, alkene, or alkyne.
Molecule 3

1. Molecule 1
2. Molecule 2
3. Molecule 3

1. alkyne
2. alkane
3. alkene

**Question #: 10**

What functional group does not contain a carbonyl (C=O) bond in its structure?

A. Amide
B. Aldehyde
C. Ester
D. Carboxylic Acid
✓ E. Alcohol

**Question #: 11**

Determine the number of each functional group present in the molecule.

1. amine groups
2. amide groups
3. carboxylic acid groups
Enter your answers as **whole numbers**.

1. 1
2. 2
3. 1

**Question #: 12**

Consider the molecule below and answer the following questions:

![Molecule Image]

The molecule contains **1** heteroatoms and is a **2** [fat-soluble or water-soluble] vitamin.

1. 13
2. water-soluble

**Question #: 13**

Which structure is a correct **three-dimensional representation** of ethane, \( \text{C}_2\text{H}_6 \)?

A. 

![Ethane Structure Image]
How many polar bonds does methanol possess? 1
Is methanol polar or non-polar? 2
Enter your answers as **whole numbers.** Do **NOT** include units in your answers.
Question #: 15

Identify each molecule as **polar or non-polar**: 

1. Non-polar
2. Polar
3. Polar

Question #: 16

Which formula represents an acyclic alkane?

A. C₃H₆
Select the two molecules that are isomers. You must select the two correct molecules to get credit for this problem.
Select the two molecules that are isomers. You must select the two correct molecules to get credit for this problem.

✓ A.

B.

C.

✓ D.

E.

Question #: 19

The longest continuous carbon chain in the molecule below is \[1\] carbons long. Enter your answer as a whole number. Do NOT include units in your answer.
Question #: 20

The longest continuous carbon chain in the molecule below is _1_ carbons long. Enter your answer as a **whole number**. Do **NOT** include units in your answer.

Question #: 21

The number of carbon atoms in a **propyl** group is _1_. Enter your answer as a **whole number**. Do **NOT** include units in your answer.
Question #: 22

Name the molecule with the condensed formula:
\((\text{CH}_3)_2\text{CHCH(CH}_3)_2\)

A. hexane
B. 2,3-dimethylbutane  ✓
C. 1,1,2,2-tetramethylethane
D. 1,2-diethylethane

Question #: 23

Identify the molecule with the name 4-ethyldecane:

A.  

B.  ✓

C.  ✓

D.  

Question #: 24

Name the molecule below:

A. cyclohexane
B. 1-methyl-4-ethylcyclohexane
✓C. 1-ethyl-4-methylcyclohexane
D. 3,6-diethylheptane

Question #: 25

Identify the molecule with the name butylcyclopentane:

A.  

✓B.  
