

**ASSIGNMENT 4 Task 4**

Due: 11:59pm on Friday, October 5, 2018

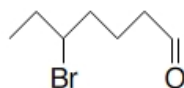
You will receive no credit for items you complete after the assignment is due. [Grading Policy](#)**Naming Aldehydes and Ketones**

The International Union of Pure and Applied Chemistry (IUPAC) determines the system for naming compounds. For compounds other than alkanes, the longest chain will be named like an alkane, but with the *e* replaced with a few letters that indicate a functional group. In the case of aldehydes and ketones, these letters are *al* and *one*, respectively.

C atoms	Alkane	Aldehyde	Ketone
1	methane	methanal	methanone
2	ethane	ethanal	ethanone
3	propane	propanal	propanone
4	butane	butanal	butanone
5	pentane	pentanal	pentanone
6	hexane	hexanal	hexanone
7	heptane	heptanal	heptanone
8	octane	octanal	octanone

**Part A**

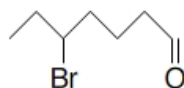
Name the aldehyde displayed below.



Enter the name.

**Hint 1. How to approach the problem**

1. Name the longest carbon chain by replacing the *e* in the alkane name with an *al*.
2. Name and number substituents as usual by numbering the carbon atoms from the carbonyl carbon, which is number one.

**Hint 2. Determine the number of carbon atoms in the longest chain**

How many carbon atoms are shown in the longest chain?

Express your answer numerically as an integer.

**Hint 1. How to interpret the line-bond formula**

Corners and ends of lines in a line-bond formula represent carbon atoms unless otherwise specified by a chemical symbol.

ANSWER:

**Hint 3. How to name a substituent on an aldehyde**

Carbon atoms in the longest chain are numbered from the carbonyl carbon, which is number one. Substituents are named with a number corresponding to the number of the carbon atom to which they are bonded.

If the substituent is another carbon chain, the name is the alkane name with the *e* replaced with *yl*. If the substituent is a halogen, the name is the element name with the *ine* replaced with *o*.

**Hint 4. Number the substituent of the aldehyde**

Select the correct number of the halide substituent.

ANSWER:

- The bromo- group is on the \_\_\_\_\_ carbon atom.
- first
  - second
  - third
  - fourth
  - fifth
  - sixth
  - seventh

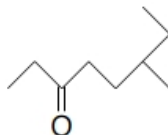
ANSWER:

5-bromoheptanal

Correct

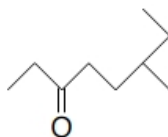
**Part B**

The ketone displayed below could potentially have any of the names listed. Choose the name that follows IUPAC guidelines.

**Hint 1. How to approach the problem**

The best method to determine which name is correct is to name the ketone yourself. Follow the steps below to name the ketone.

1. Name the longest chain of carbon atoms by replacing the *e* in the alkane name with *one*. If the ketone is attached to a ring, the prefix *cyclo-* is attached to the alkane name.
2. Number the carbon chain from the end nearest the ketone, and precede the name of the longest carbon chain with the number of the carbonyl carbon. If the ketone is in a ring, the carbon atoms are numbered with the carbonyl carbon as number one.
3. Name and number any substituents.

**Hint 2. Determine the alkane name of the longest carbon chain**

Select the name of the longest chain in the ketone below.

**Hint 1. How to interpret line-bond formulas**

Recall that corners and ends of lines in line-bond formulas represent carbon atoms unless otherwise specified by a chemical symbol.

ANSWER:

- hexanone
- heptanone
- octanone
- nonanone

**Hint 3. How to name a substituent on a ketone**

Carbon atoms in the longest chain are numbered from the end closest to the carbonyl carbon. Substituents are named with a number corresponding to the number of the carbon atom to which they are bonded.

If the substituent is another carbon chain, the name is the alkane name with the *e* replaced with *yl*. If the substituent is a halogen, the name is the element name with the *ine* replaced with *o*.

**Hint 4. Number the groups in the molecule**

This molecule contains a ketone group on the \_\_\_\_\_ carbon atom and a(n) \_\_\_\_\_ group on the \_\_\_\_\_ carbon atom.

Select the answer that correctly fills the blanks in order.

ANSWER:

- fifth / ethyl / second
- third / methyl / sixth
- third / ethyl / sixth
- sixth / methyl / third

ANSWER:

- 3-methyl-6-octanone
- 6-ethyl-3-heptanone
- 6-methyl-3-octanone
- 2-ethyl-5-heptanone
- 6-ethyl-6-methyl-3-hexanone

**Correct**

It is often possible to name a compound in different ways. IUPAC guidelines provide a common method for naming so that we can more easily understand each other.

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## Nomenclature: Draw the structure of enol tautomer of cyclopentanone

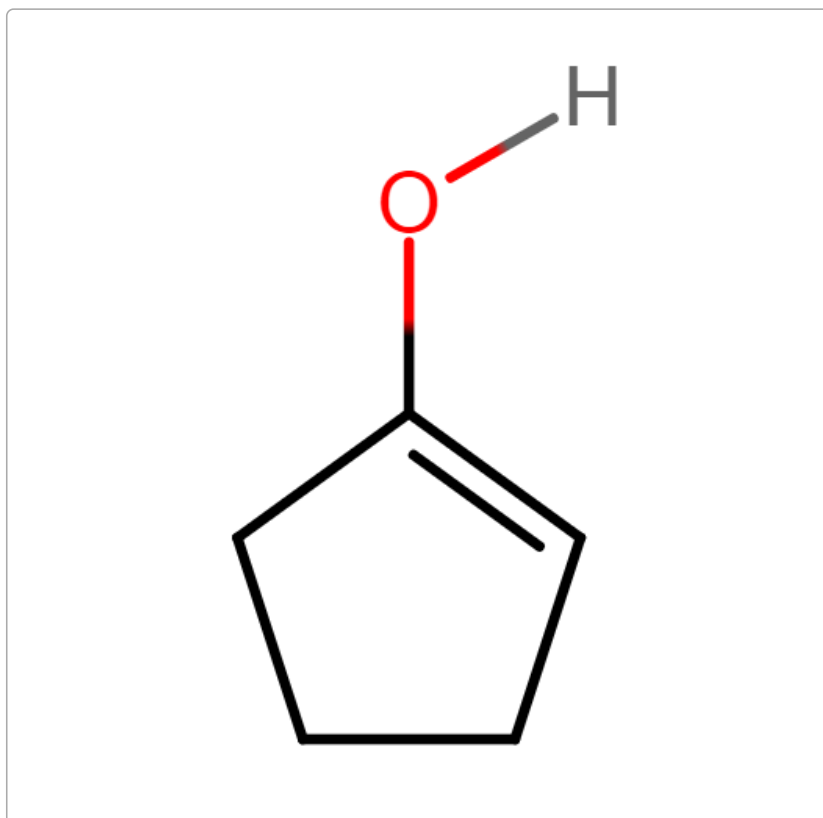
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### Part A

Draw the structural formula of the enol tautomer of cyclopentanone.

Draw the molecule on the canvas by choosing buttons from the Tools (for bonds), Atoms, and Advanced Template toolbars. The single bond is active by default.

ANSWER:



Correct

Excellent!

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### Problem 18-64

Hydration of alkynes (via oxymercuration) gives good yields of single compounds only with symmetrical or terminal alkynes. Show what the products would be from hydration of each compound.

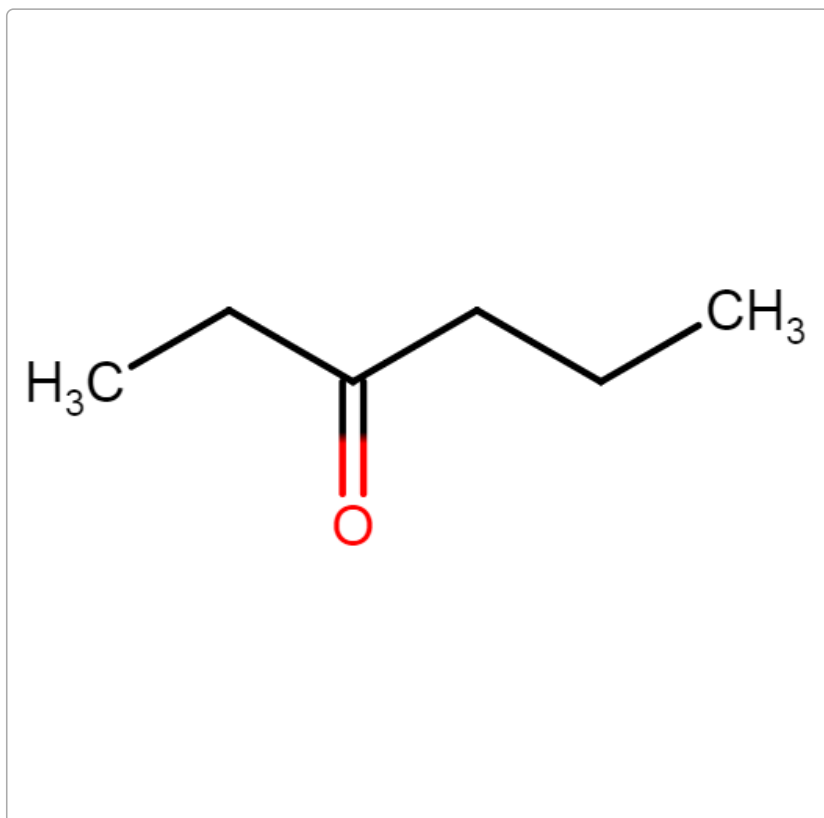
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#### Part A

hex-3-yne

Draw the molecule on the canvas by choosing buttons from the Tools (for bonds and charges), Atoms, and Templates toolbars.

ANSWER:



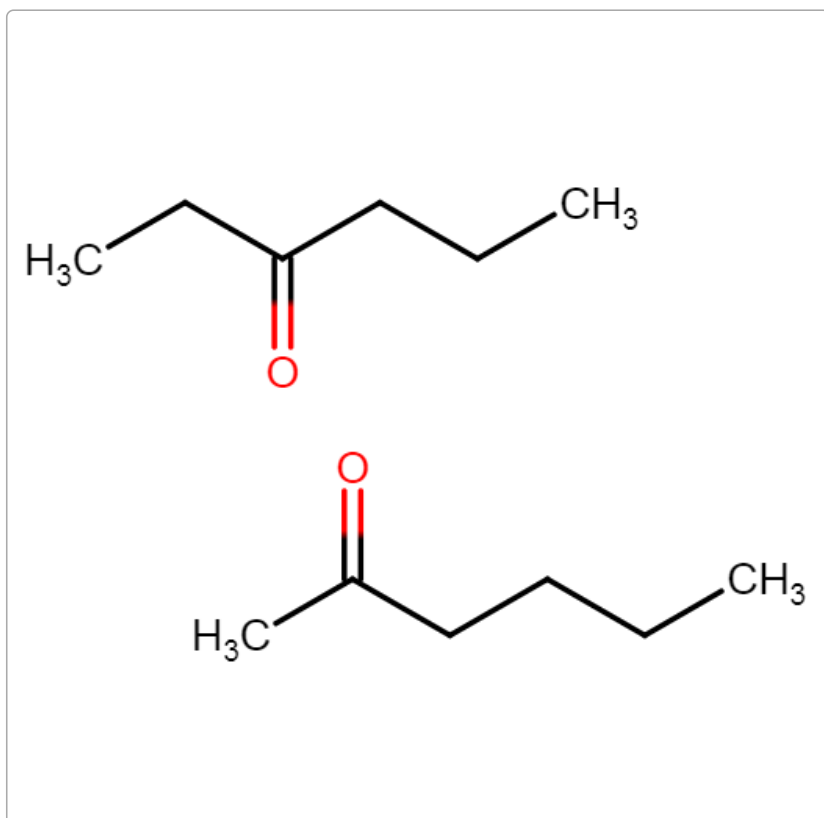
Correct

### Part B

hex-2-yne

Draw the molecules on the canvas by choosing buttons from the Tools (for bonds and charges), Atoms, and Templates toolbars.

ANSWER:



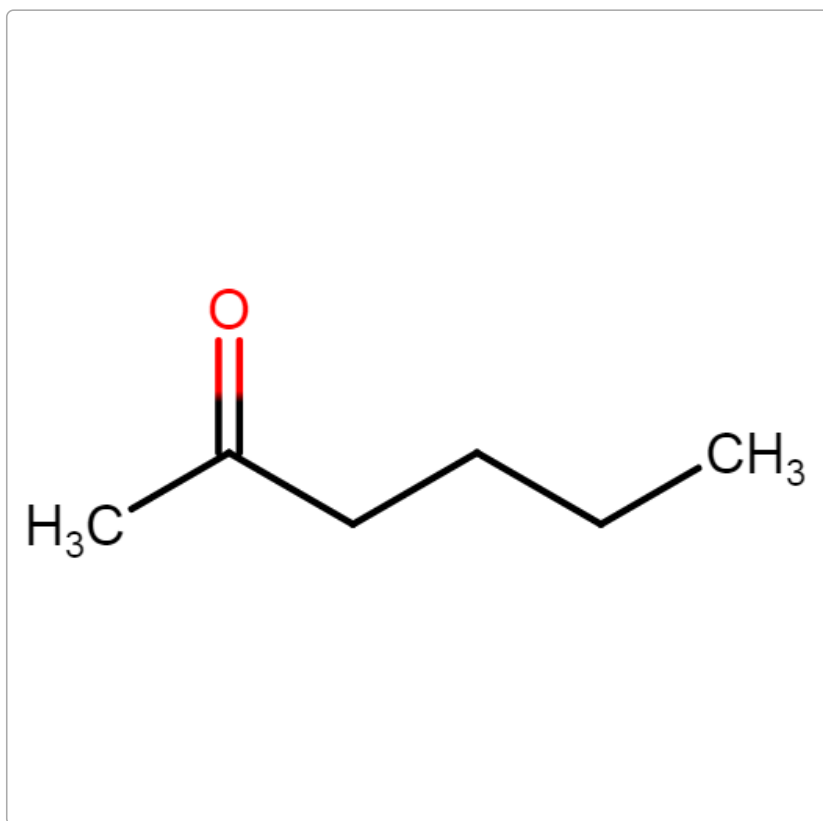
Correct

**Part C**

hex-1-yne

Draw the molecule on the canvas by choosing buttons from the Tools (for bonds and charges), Atoms, and Templates toolbars.

ANSWER:



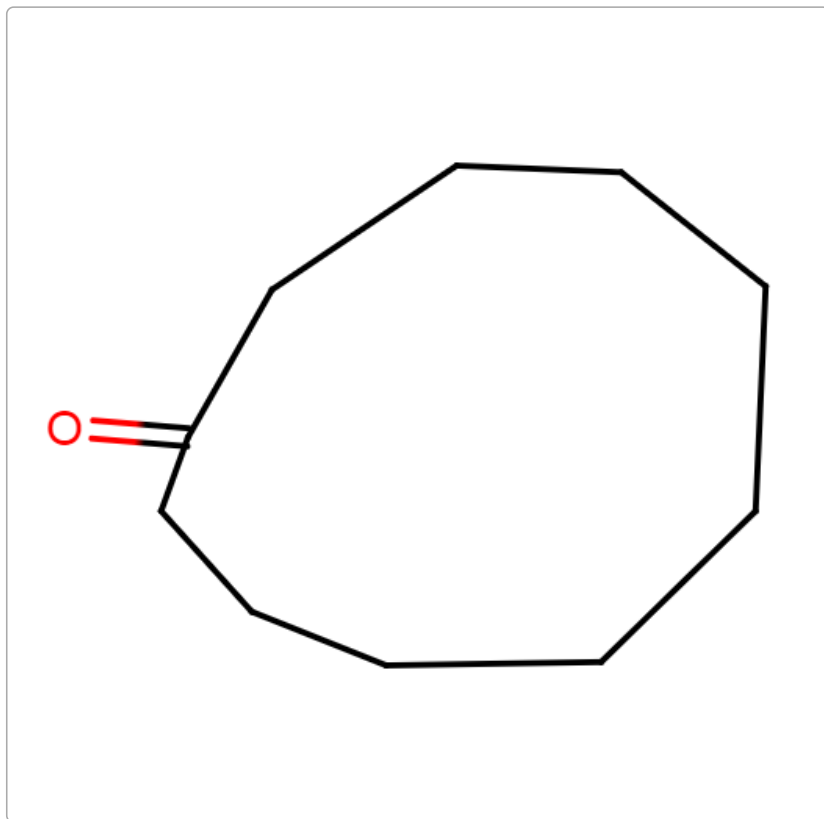
Correct

**Part D**

cyclodecyne

Draw the molecule on the canvas by choosing buttons from the Tools (for bonds and charges), Atoms, and Templates toolbars.

ANSWER:



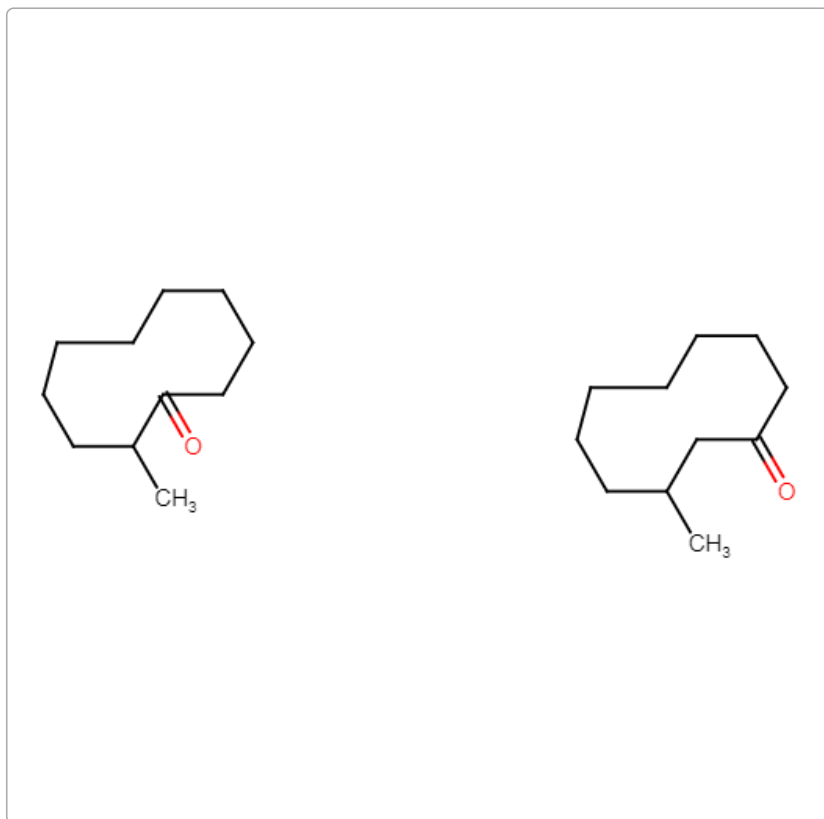
Correct

### Part E

3-methylcyclohexanone

Draw the molecules on the canvas by choosing buttons from the Tools (for bonds and charges), Atoms, and Templates toolbars.

ANSWER:

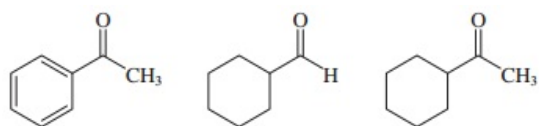


Correct

## Problem 18-67

Within each set of structures, indicate which will react fastest, and which slowest, toward nucleophilic addition in basic conditions.

## Part A



Drag the appropriate labels to their respective targets.

ANSWER:

Reset Help

Fastest

Slowest

Neither

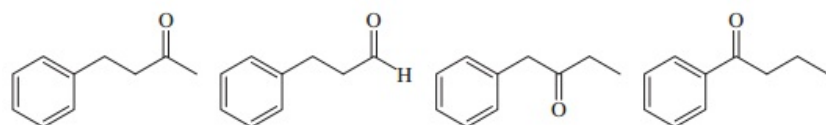
Slowest

Fastest

Neither

Correct

Part B



Drag the appropriate labels to their respective targets.

ANSWER:

<https://session.masteringchemistry.com/myct/assignmentPrintView?assignmentID=6602985>

8/9

Reset Help

Fastest

Slowest

Neither

Neither

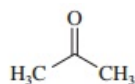
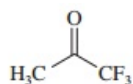
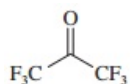
Fastest

Neither

Slowest

Correct

## Part C



Drag the appropriate labels to their respective targets.

ANSWER:

Reset Help

Fastest

Slowest

Neither

Fastest

Neither

Slowest

Correct

## Score Summary:

Your score on this assignment is 99.4%.

You received 3.98 out of a possible total of 4 points.