

1.9: Aldehydes and Ketones

Learning Objective

- How to name aldehydes and ketones.

A **carbonyl group** consists of a carbon atom double-bonded to an oxygen atom, written as **C=O**. **Aldehydes** and **ketones** are two compounds which contain the **carbonyl group**.



Figure 1.9.1. The R group can also be a hydrogen: **aldehyde**



Figure 1.9.2. The R groups can be the same or different: **ketone**

Aldehydes and **ketones** are **constitutional isomers**. For example, the aldehyde and ketone below both have the molecular formula C_3H_6O .

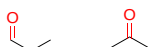


Figure 1.9.3: C_3H_6O

The simplest **aldehyde** is methanal, commonly known as formaldehyde, and used as a preservative.



Figure 1.9.4: methanal

The name of this molecule is butanal.



Figure 1.9.5: butanal

Practice Questions

- What is the name of Molecule A?

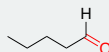


Figure 1.9.6: Molecule A

- This molecule is named 5-methylhexanal. Number the carbons.

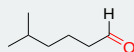


Figure 1.9.7: 5-methylhexanal

- Number the carbons. What is the name of Molecule B?



Figure 1.9.8: Molecule B

- This molecule is named 3-ethyl-4-methylhexanal. Number the carbons.

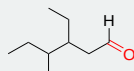


Figure 1.9.9: 3-ethyl-4-methylhexanal

- Number the carbons. What is the name of Molecule C?

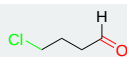


Figure 1.9.10: Molecule C

6. This molecule is named 3-pentenal. Number the carbons.

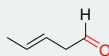


Figure 1.9.11: 3-pentenal

7. Number the carbons. What is the name of Molecule D?

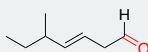


Figure 1.9.12: Molecule D

8. A well-known **ketone** is 2-propanone, commonly known as acetone, and used as a nail polish remover.



Figure 1.9.13: 2-propanone

This molecule is named 2-pentanone.



Figure 1.9.14: 2-pentanone

What is the name of Molecule E?

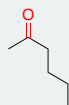


Figure 1.9.15: Molecule E

9. The name of this molecule is 5-ethyl-2-heptanone. Number the carbons.

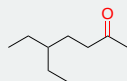


Figure 1.9.16: 5-ethyl-2-heptanone

10. Number the carbons. What is the name of Molecule F?



Figure 1.9.17: Molecule F

11. This molecule is named 6-chloro-4-ethyl-3-heptanone. Number the carbons.

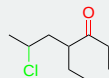


Figure 1.9.18: 6-chloro-4-ethyl-3-heptanone

12. Number the carbons. What is the name of Molecule G?

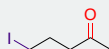


Figure 1.9.19: Molecule G

13. The name of this molecule is 3-bromocyclohexanone. Number the carbons.



Figure 1.9.20: 3-bromocyclohexanone

14. Number the carbons. What is the name of Molecule H?

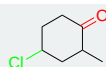


Figure 1.9.21: Molecule H

15. The name of this molecule is 4-hydroxy-2-butanone. Number the carbons.

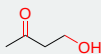


Figure 1.9.22: 4-hydroxy-2-butanone

16. Number the carbons. What is the name of Molecule I?

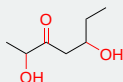


Figure 1.9.23: Molecule I

17. This molecule is named 5-chloro-4-oxohexanal. Number the carbons.

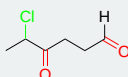


Figure 1.9.24: 5-chloro-4-oxohexanal

18. Number the carbons. What is the name of Molecule J?

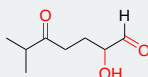


Figure 1.9.25: Molecule J

19. What additions do we make to our existing naming rules to name aldehydes and ketones?

20. Write the steps that you use to name an aldehyde or ketone in order, as instructions for a student who doesn't know how to do it.

21. Draw any aldehyde or ketone and go through the steps in naming your molecule.

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