

Name:

Chapter 9 Review Quiz

Multiple Choice

Identify the choice that best completes the statement or answers the question.

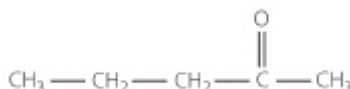
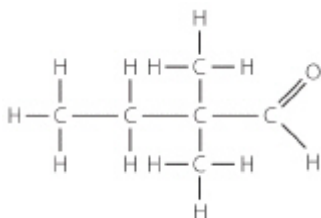
- ☐ 1. The functional group of aldehydes is:
- $\text{R}-\text{OH}$.
 - $\text{R}-\text{CO}-\text{R}$.
 - $\text{R}-\text{CHO}$.
 - $\text{R}-\text{COOH}$.
- ☐ 2. Aldehydes:
- are produced by the oxidation of a secondary alcohol.
 - contain COOH as the terminal carbon.
 - form dipole-dipole forces of attraction between molecules.
 - increase in solubility as the chain length increases.
- ☐ 3. What type of alcohol is the following?
- $$\begin{array}{ccccccc} & \text{H} & & \text{H} & & \text{H} & & \text{H} \\ & | & & | & & | & & | \\ \text{H} & -\text{C} & - & \text{C} & - & \text{C} & - & \text{C} & - & \text{O} & - & \text{H} \\ & | & & | & & | & & | \\ & \text{H} & & \text{H} & & \text{H} & & \text{H} \end{array}$$
- primary
 - secondary
 - tertiary
 - quaternary
- ☐ 4. Which of the following statements about functional groups is incorrect?
- They give the physical properties of a homologous series.
 - They give the chemical properties of a homologous series.
 - They are a group of identically arranged atoms in each member of a homologous series.
 - They allow prediction of chemical reactions of a homologous series.
- ☐ 5. What is the correct name of the molecule shown?
- $$\begin{array}{ccccccc} & \text{H} & & \text{CH}_3 & & \text{H} \\ & | & & | & & | \\ \text{H} & -\text{C} & - & \text{C} & - & \text{C} & - & \text{H} \\ & | & & | & & | \\ & \text{H} & & \text{OH} & & \text{H} \end{array}$$
- 2-methyl-2-propanone
 - 2-methyl-2-propanol
 - 2-butanol
 - 2-methylpropanol
- ☐ 6. Which of the following lists contains only isomers of 3-pentanol?
- 2-pentanol, 2-methyl-1-propanol, 1-pentanol
 - 2-pentanol, 2-methyl-1-butanol, 1-pentanol
 - 1-pentanol, 2,2-dimethyl-1-propanol, 2-methyl-1-pentanol
 - 2,2-dimethyl-1-propanol, 2-methyl-1-propanol, 2-pentanol
- ☐ 7. Ethanol has a significantly higher boiling point than ethane because:
- it has more atoms so forms stronger dispersion forces.
 - it has a larger molecular mass than ethane.
 - the alcohol functional group forms hydrogen bonds between molecules not present between ethane molecules.

d. ethanol is larger than the ethane molecule so has stronger forces between molecules.

- ▼ 8. Small chain alcohols like propanol and butanol are more soluble in water than comparable alkanes like propane and butane because:
- alcohols are larger molecules so form stronger dispersion forces to bond to water molecules than alkanes.
 - alkanes repel water while alcohols attract water.
 - alcohols contain a functional group that can form hydrogen bonds with water, but alkanes do not.
 - alcohols fit between water molecules better than alkane molecules.

- ▼ 9. Aldehydes and ketones:
- both have the carbonyl group at the end of the carbon chain.
 - have the general formula RCOH
 - have the same carbonyl group in different locations on the carbon chain.
 - have significantly different physical properties.

- ▼ 10. What are the correct names for the following aldehyde and ketone?



- aldehyde: 2,2-dimethylbutanal ketone: 2-pentanone
 - aldehyde: 2-methylpentanal ketone: 2-pentanal
 - aldehyde: 2,2-dimethylbutanal ketone: pentanone
 - aldehyde: dimethylbutanal ketone: 2-pentanone
- ▼ 11. Aldehydes and ketones like propanal and propanone are functional group isomers because:
- they have the same functional group.
 - they have different functional groups but the same molecular formula.
 - they have the same empirical formula but different structural formulas.
 - they have the same number of carbons.
- ▼ 12. Aldehydes and ketones have boiling points:
- higher than alkanes but lower than alcohols of similar size.
 - approximately the same as alkanes, but lower than alcohols of similar size.
 - higher than alkanes, but approximately the same as alcohols of similar size.
 - higher than both alkanes and alcohols of similar size.
- ▼ 13. The main intermolecular forces between aldehyde and ketone molecules is:
- dispersion forces.
 - dipole–dipole forces.
 - hydrogen bonds.
 - covalent bonds.
- ▼ 14. Carboxylic acids:
- contain the carbonyl functional group.
 - can have the functional group on a terminal carbon or in the middle of the carbon chain.
 - have a COOH functional group.
 - have lower boiling points than aldehydes and ketones of similar size.
- ▼ 15. Carboxylic acids have boiling points:
- significantly higher than other similar sized molecules due to stronger dispersion forces.
 - that are high due to their large size.
 - higher than aldehydes and alkanes, but lower than alcohols of similar size.
 - higher than alcohols, aldehydes and alkanes of similar size.
- ▼ 16. A dimer forms when:
- carboxylic acids form hydrogen bonds with water molecules.

- b. two carboxylic acids bond with each other with dispersion forces.
- c. two carboxylic acids bond with each other with hydrogen bonds.
- d. carboxylic acids form hydrogen bonds with other molecules like alcohols or aldehydes.

▼ 17. Which of the following statements about carboxylic acids is incorrect?

- a. Carboxylic acids are strong acids.
- b. The carboxylic acid group is monoprotic.
- c. Carboxylic acids are more soluble than alcohols of similar size.
- d. Carboxylic acid solubility decreases as chain length increases.

▼ 18. Amines:

- a. have the functional group —NH—CO— .
- b. have the general formula RNH_2 .
- c. can only have a primary and secondary form.
- d. have lower boiling points than alkanes of similar size.

▼ 19. Amides are often solids at room temperature because:

- a. they are large molecules with strong dispersion forces between molecules.
- b. they have very polar functional groups that form hydrogen bonds between molecules.
- c. they have stronger dispersion forces than molecules of similar size.
- d. they do not dissolve well in water.

▼ 20. Small amides and amines are very soluble in water because:

- a. they form strong dispersion forces with water.
- b. they form strong dipole–dipole forces with water.
- c. they form strong hydrogen bonds with water.
- d. they are small so fit between water molecules.

