Unit 9 · Organic Compounds

WORKSHEET

Full marks 49

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 49

1 Key words [3]

Match each word in Column A with its description in Column B. Write the letter in the box. One description in Column B is not needed. Each match carries 0.5 mark.

Column A		Column B
1. tetracovalency	☐	**a.** carbon atoms joining to each other in chains and rings
2. catenation	☐	**b.** compounds with the same group, each differing from the next by CH_2
3. alkyl group	☐	**c.** the atom or group of atoms that decides a compound's chemical properties
4. functional group	☐	**d.** having only single bonds between its carbon atoms
5. homologous series	☐	**e.** having a double or triple bond between carbon atoms
6. saturated	☐	**f.** what is left of an alkane when one hydrogen atom is taken off
		g. carbon's property of forming four covalent bonds

2 Multiple choice [5]

Choose the correct option for each of the following questions.

i. Who first made an organic compound, urea, from an inorganic one? [1]

a. Berzelius **b.** Wöhler
c. Kekulé **d.** van 't Hoff

ii. The general formula of the alkenes is: [1]

a. C_nH_{2n+2} **b.** C_nH_{2n}
c. C_nH_{2n-2} **d.** C_nH_{2n+1}

iii. Which of these is counted as an inorganic compound, although it contains carbon? [1]

a. CH_4 **b.** CH_3COOH
c. Na_2CO_3 **d.** C_2H_5OH

iv. Which compound is the third member of the homologous series of carboxylic acids? [1]

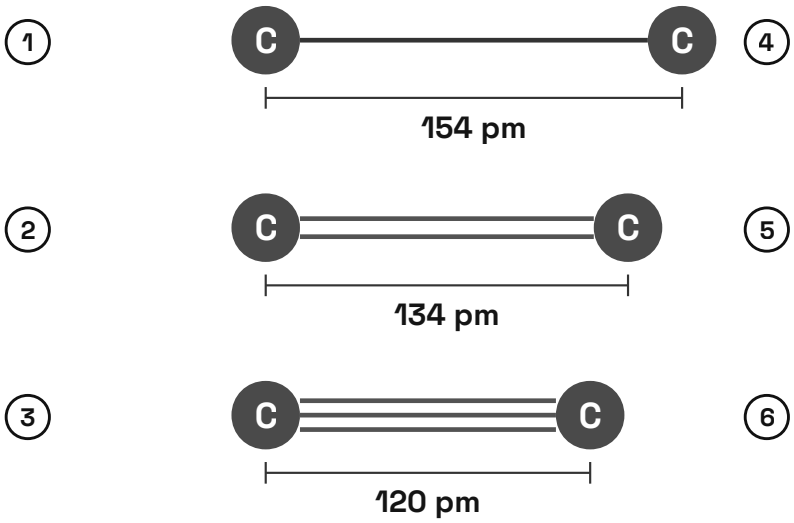
a. ethanoic acid **b.** propanoic acid
c. butanoic acid **d.** methanoic acid

v. Which pair has the same molecular formula? [1]

a. ethanol and methoxymethane **b.** ethanol and ethanal
c. propanone and propan-2-ol **d.** ethene and ethyne

3 Label the diagram [3]

The diagram shows the carbon–carbon bond in three compounds, drawn to scale. Write what belongs at each numbered blank: for a compound, its name and condensed formula; for a bond, its kind and energy. Each carries 0.5 mark.



1. _____ **2.** _____

3. _____ **4.** _____

5. _____ **6.** _____

4 Very short answers [4]

Write very short answers to the following questions.

a. What did Wöhler heat in 1828 to make urea? [1]

b. Name the alkyl group $C_2H_5–$. [1]

c. To which family does CH_3COCH_3 belong? [1]

d. By how much does the molecular mass change from one member of a homologous series to the next? [1]

5 Short answers [8]

Write short answers to the following questions.

a. Give a reason: carbon forms covalent compounds rather than ionic ones. [2]

b. Give a reason: the –CHO group of an aldehyde never needs a number in its name. [2]

c. Why does a double bond between two carbons make a compound react more readily than one with only single bonds? [2]

d. Name the two compounds with the formula C_3H_6O that belong to different families, and give the family of each. [2]

6 Long answers [8]

Write long answers to the following questions.

a. What is catenation? Why does carbon show catenation much more than any other element? [4]

b. Define a homologous series. Write any three of its characteristics, with the alcohols as an example. **[4]**

7 Names and formulas **[8]**

Write the name or formula asked for.

a. Write the IUPAC name of $CH_3–CH(CH_3)–CH_2–CH_2–CH_3$. **[1]**

b. Write the IUPAC name of $CH{\equiv}C–CH_2–CH_3$. **[1]**

c. Write the condensed formulas of 3-methylbut-1-ene and 2,2-dimethylbutane. **[2]**

d. Find the mistake in each name and correct it: a. 3-methylbutane, b. 2-ethylpropane, c. but-3-ene, d. 1-methylpropane. **[4]**

8 Numerical problems [7]

Solve the following problems. Show your working. Use C = 12, H = 1, O = 16.

a. An alkane has a molecular mass of 58. Find its formula, and write the condensed formulas of the two compounds it could be. [2]

Answer: _____

b. An alkane has 22 hydrogen atoms. How many carbon atoms does it have? What are its name and molecular mass? [2]

Answer: _____

c. The first member of a homologous series has a molecular mass of 46. What is the molecular mass of its fifth member? Which series could it be? [3]

Answer: _____

9 Think [3]

A student writes the name of $CH_2{=}CH{-}CH_2{-}CH(CH_3){-}CH_3$ as "2-methylpent-4-ene", numbering from the right so that the methyl gets the number 2. Is the student right? Give the correct name and explain the rule.

10 Activity: In water and in kerosene

(not marked)

You need six test tubes or small clear glasses, water, kerosene, and a pinch or a few drops of each substance below. Half fill a tube with water, add the substance, shake and leave for a minute. Repeat with fresh samples in kerosene, away from any flame.

Substance	Organic or inorganic?	Dissolves in water?	Dissolves in kerosene?
common salt			
copper sulphate			
washing soda			
candle wax			
naphthalene			
cooking oil			

Which rule do your results show?