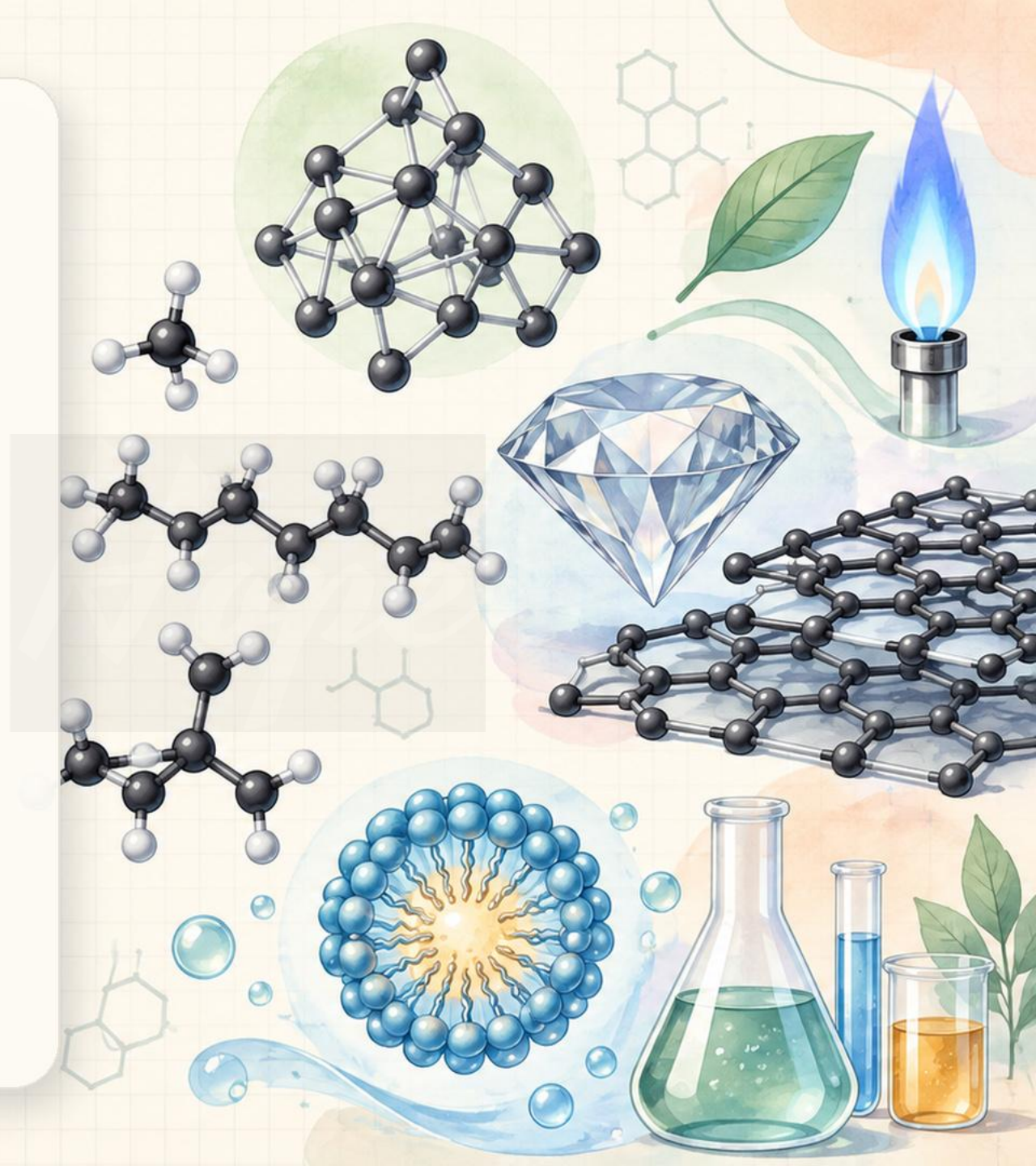


SCIENCE • CLASS 10

CHAPTER 4

Carbon and Its Compounds

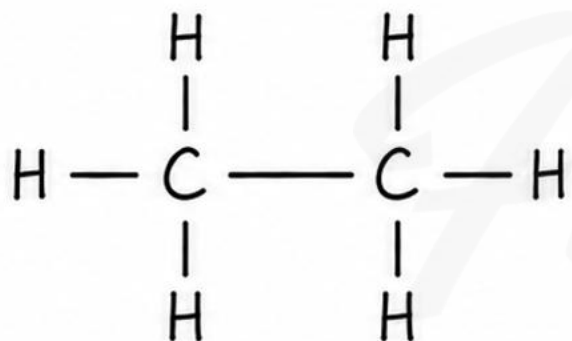
NCERT SOLUTIONS



CARBON BONDS AND FUNCTIONAL GROUPS

Exercise 1 — Ethane, C_2H_6 , has how many covalent bonds?

- (a) 6 (b) 7 (c) 8 (d) 9



There are six carbon-hydrogen bonds and one carbon-carbon bond.

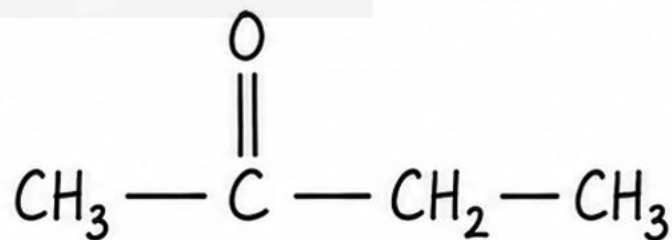
$$6 + 1 = 7$$

Answer: (b) 7 covalent bonds.

Exercise 2 — Butanone is a four-carbon compound with which functional group?

- (a) Carboxylic acid (b) Aldehyde
(c) Ketone (d) Alcohol

Its carbonyl group lies between two carbon atoms in the chain.



Answer: (c) Ketone.

COMBUSTION AND CARBON FUELS

Exercise 3 — The bottom of a cooking vessel becomes black on the outside. What does this mean?

- (a) The food is not cooked completely.
- (b) The fuel is not burning completely.
- (c) The fuel is wet.
- (d) The fuel is burning completely.

Answer: (b) The fuel is not burning completely.

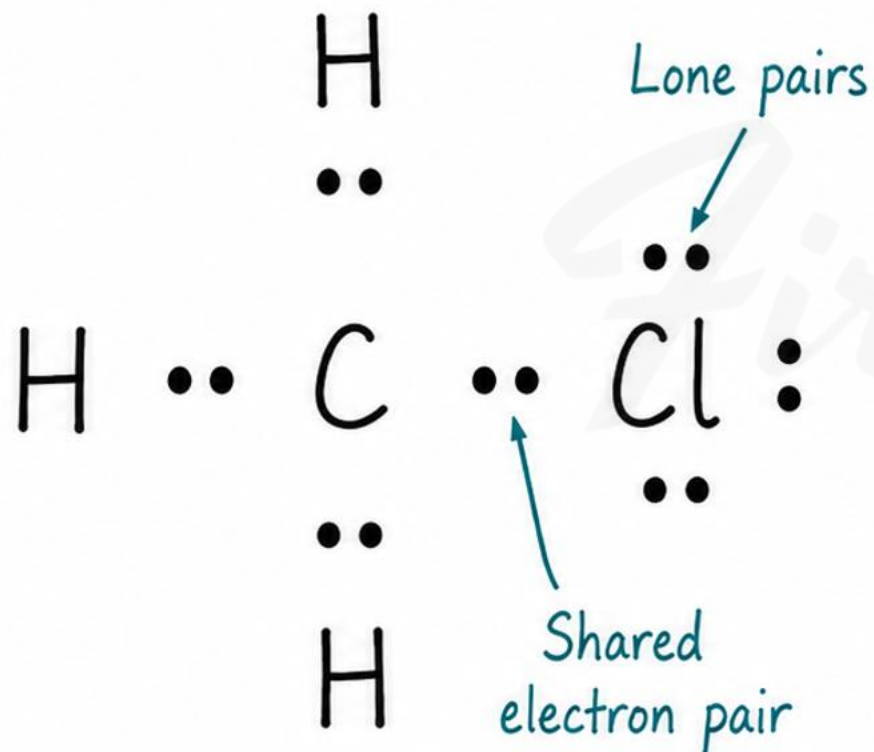
With insufficient oxygen, incomplete combustion can produce soot. This carbon deposits on the vessel.

Exercise 9 — Why are carbon and its compounds used as fuels for most applications?

Many release a large amount of heat on combustion. They are useful energy sources for cooking, heating, transport and industry. A good fuel gives useful heat efficiently.

COVALENT BONDING IN CHLOROMETHANE

Exercise 4 — Explain the nature of the covalent bond using bond formation in CH_3Cl .



A covalent bond forms when atoms share electron pairs.

Carbon has four valence electrons. It shares one electron pair with each of three hydrogen atoms and one chlorine atom.

Each single bond is one shared electron pair.

Carbon and chlorine each complete an octet; each hydrogen completes a duet.

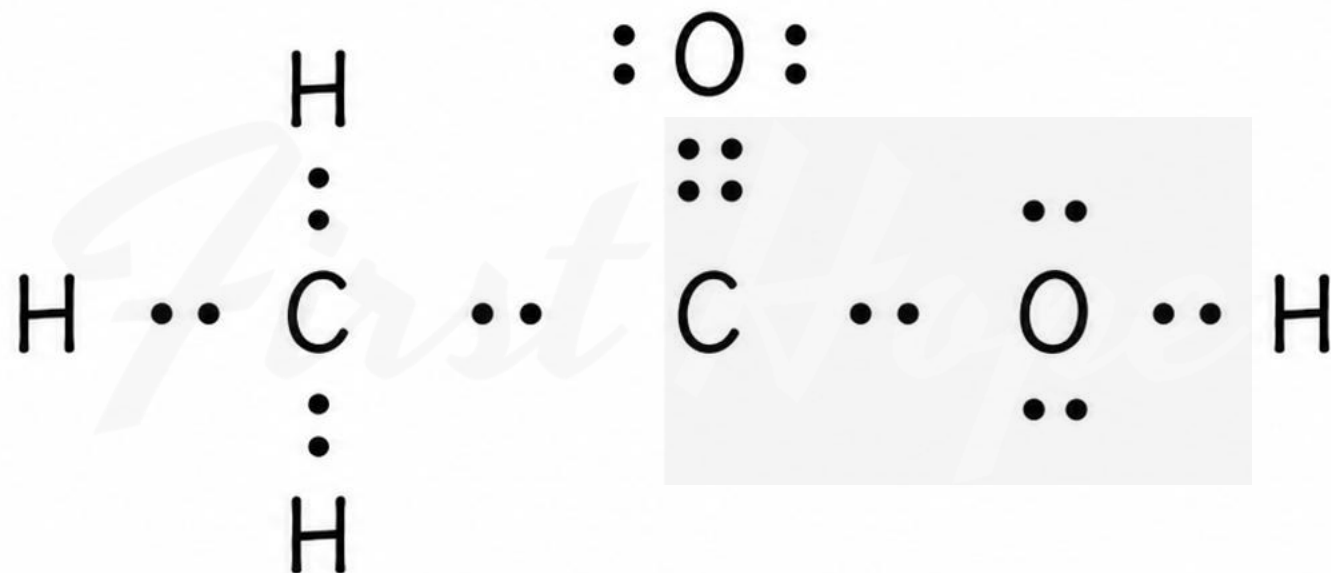
Chlorine also has three lone pairs.

CH_3Cl : three C-H bonds and one C-Cl bond.

ELECTRON DOTS: ETHANOIC ACID

Exercise 5(a) – Draw the electron dot structure of ethanoic acid.

Ethanoic acid: CH_3COOH



- Each single bond contains one shared electron pair. The double bond contains two shared pairs.
- Each oxygen atom has two lone pairs.
- Every carbon and oxygen has an octet; every hydrogen has a duet.



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