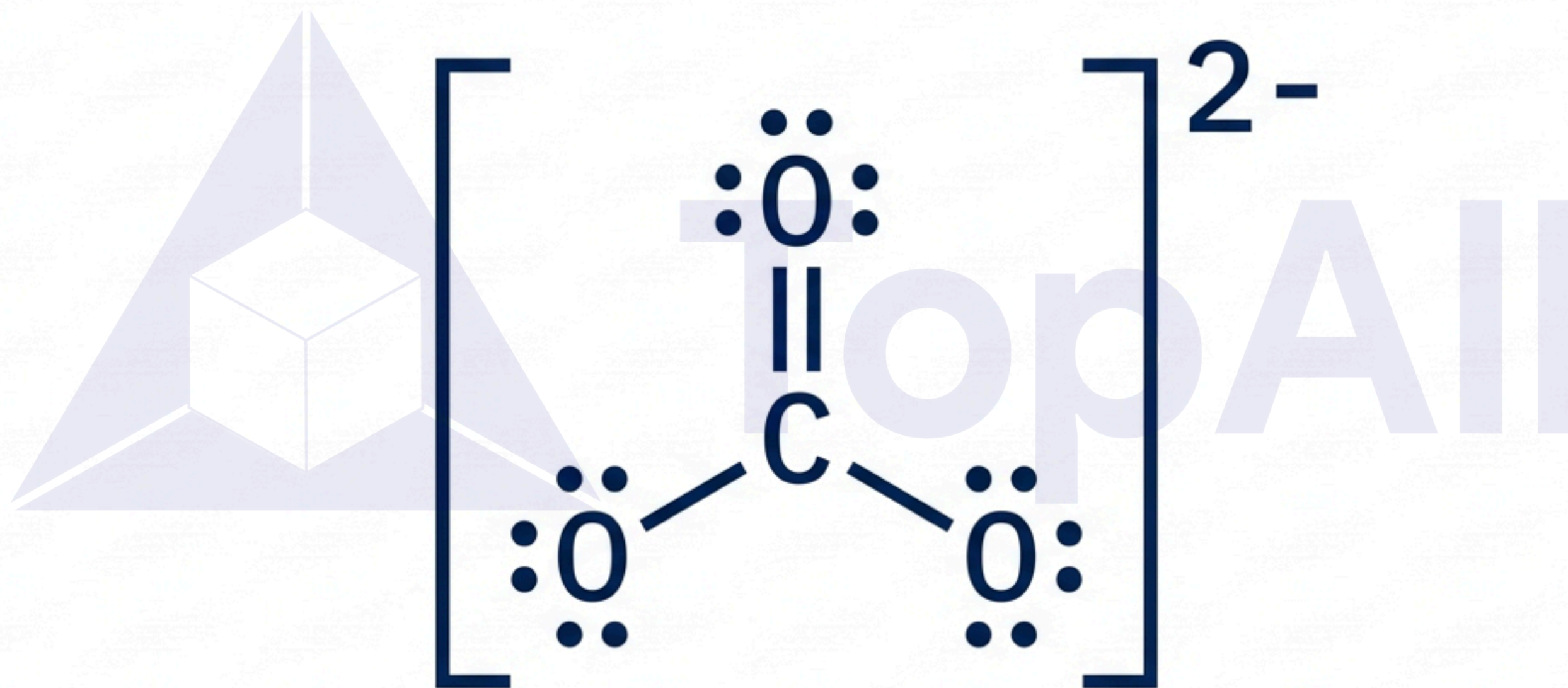


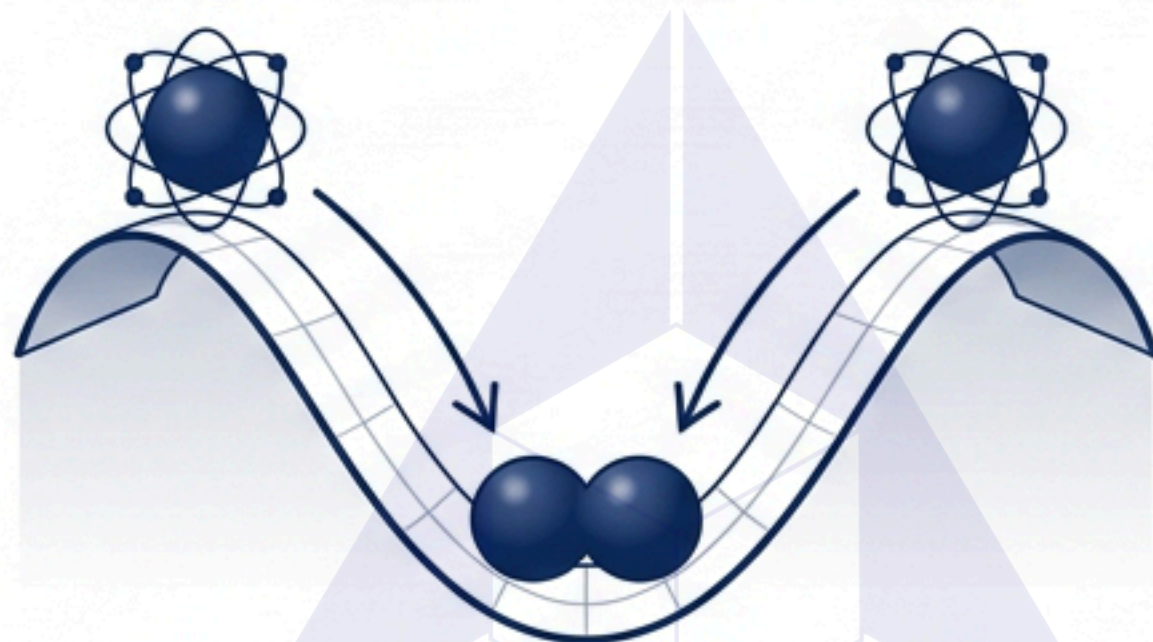
4.1.3 Lewis Representation of Simple Molecules



A Progressive Algorithmic Flow

The Architecture of Molecular Stability

Kössel-Lewis Approach



THE OCTET RULE:

Atoms transfer or share electrons to achieve a stable outer shell of eight electrons (matching noble gas configurations).

The Lewis Dot Structure

Bonding Electrons
(Shared)



Lone Pairs
(Non-bonding)

Every valid Lewis structure is a map showing how a specific number of valence electrons is distributed to satisfy the octet for all atoms.

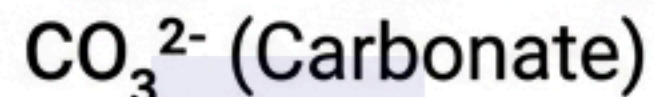
Step 1: Count Total Valence Electrons

$$[\text{Sum of Valence } e^-] + [\text{Anion Charge}] - [\text{Cation Charge}] = \text{Total Available } e^-$$



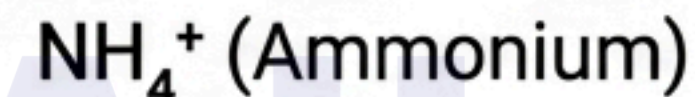
$$\begin{aligned} &4(\text{C}) + \\ &[4 \times 1(\text{H})] \\ &= 8 e^- \end{aligned}$$

Neutral



$$\begin{aligned} &4(\text{C}) + \\ &[3 \times 6(\text{O})] \\ &+ 2(\text{Charge}) \\ &= 24 e^- \end{aligned}$$

Add e⁻ for Negative Charge



$$\begin{aligned} &5(\text{N}) + \\ &[4 \times 1(\text{H})] \\ &- 1(\text{Charge}) \\ &= 8 e^- \end{aligned}$$

Subtract e⁻ for Positive Charge



**You've Learned the Theory.
Let's Test Them Now.**

$$E=mc^2$$



Turn theory into marks with **unlimited MCQs, smart analysis, and focused revision.**

Practice Now



At prep.topall.app

Key Highlights

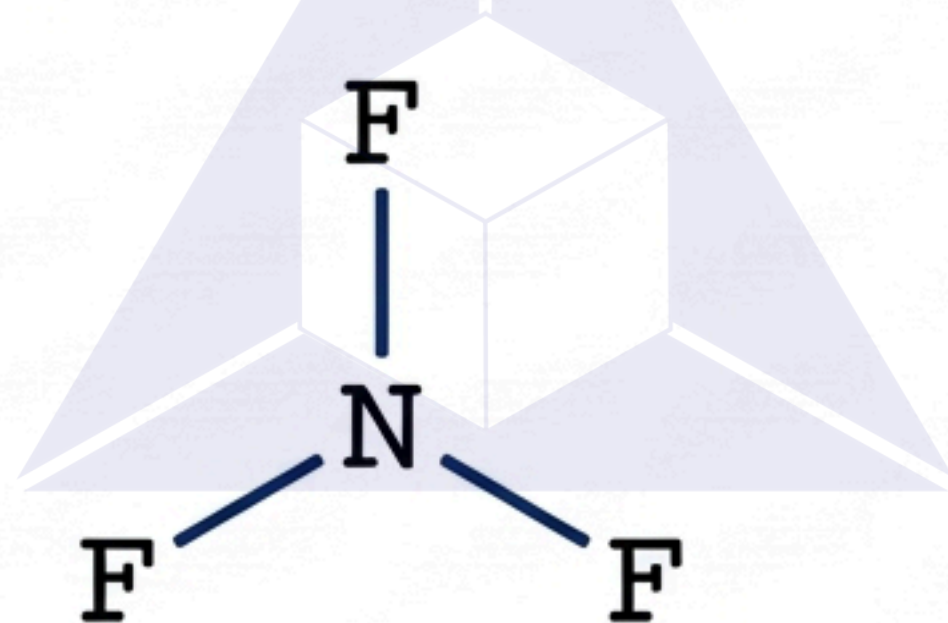
- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
- » Climb the Leaderboard Among Fellow Aspirants
- » Practice Unlimited MCQs for NEET & JEE
- » Get Clear Explanations, Not Just Marks
- » Track Your Performance Smarter



Step 2: Establish the Skeletal Structure

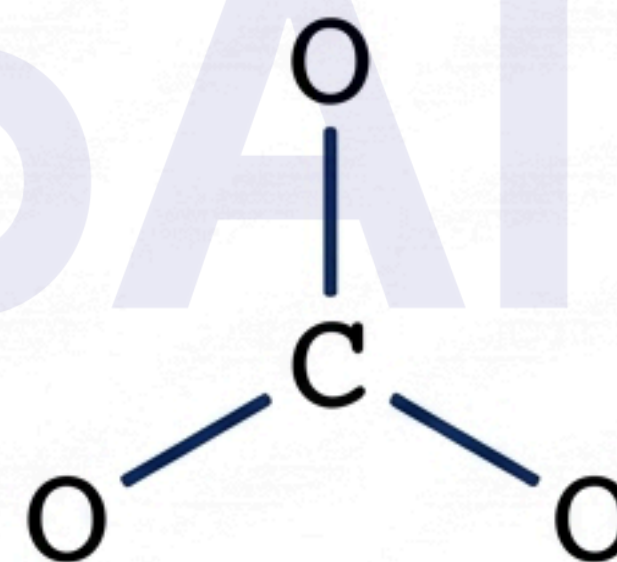
 **CENTRAL ATOM RULE:** The least electronegative atom occupies the central position. (Hydrogen is always a terminal atom).

NF₃ Molecule



Nitrogen is less electronegative than Fluorine.
N is central. F occupies terminal positions.

CO₃²⁻ Ion



Carbon is less electronegative than Oxygen.
C is central. O occupies terminal positions.

Step 3: Distribute Single Bonds and Lone Pairs

Worked Example: Nitrite Ion (NO_2^-) | Total e^- : 18



Draw single bonds.

$$18 - 4 = 14 \text{ } e^- \text{ remaining}$$



Complete octets on terminal atoms first.

$$14 - 12 = 2 \text{ } e^- \text{ remaining}$$



Place leftover electrons on the central atom.

$$2 - 2 = 0 \text{ } e^- \text{ remaining}$$

Step 4: Form Multiple Bonds if Octet is Incomplete

The Problem



⚠ Central atom is hungry (Octet not satisfied).

The Solution



✅ OCTET SATISFIED: Both Oxygen atoms and the central Nitrogen now have 8 electrons.

The Blueprint Matrix: Worked Examples

Molecule Formula	Total Valence e ⁻	Final Lewis Structure
H_2 Duplet (He configuration)	$1 + 1 = 2 \text{ e}^-$	$\text{H}:\text{H}$
O_3 (Ozone)	$6 \times 3 = 18 \text{ e}^-$	$\begin{array}{c} \text{:}\ddot{\text{O}}\text{:} \\ \text{:}\ddot{\text{O}}=\ddot{\text{O}}-\ddot{\text{O}}\text{:} \\ \text{:}\ddot{\text{O}}\text{:} \end{array}$
CO_3^{2-}	$4 + 18 + 2 = 24 \text{ e}^-$	$\left[\begin{array}{c} \text{:}\ddot{\text{O}}\text{:} \\ \text{:}\ddot{\text{O}}-\text{C}=\ddot{\text{O}}\text{:} \\ \text{:}\ddot{\text{O}}\text{:} \end{array} \right]^{2-}$
C_2H_4 (Ethene)	$8 + 4 = 12 \text{ e}^-$	$\begin{array}{c} \text{H} & & \text{H} \\ & \backslash & / \\ & \text{C}=\text{C} \\ & / & \backslash \\ \text{H} & & \text{H} \end{array}$



You've Learned the Theory.

Now Let's Test It.

Reading notes gets you knowledge.

Practicing MCQs gets you marks.

That's exactly what TopAll Pro is built for.

Try TopAll Pro Now

What TopAll Pro Does Differently

-  **Stuck? Snap it. Solve it. — Doubts AI**
Photo → step-by-step solution in seconds, 24/7
-  **Your AI Coach finds your blind spots**
Concept-level weakness detection — not just chapter-level
-  **4.5 Lakh+ questions. Never run out.**
13× more content than any other prep app in India
-  **Build your own test in 60 seconds**
Pick a chapter, set difficulty — AI does the rest instantly.
-  **AI Recommendation that helps you improve**
AI Recommendation Analysis your Tests and tell you where you need to improve.



Practice the moment you finish studying
Jump in while the concept is still fresh in your head

4.5L+
MCQs

1.5L+
Students

AI Powered
In-Depth Analysis