

Lewis Structure - Answers

Formula	Lewis Structure	Molecular Geometry	Formula	Lewis Structure	Molecular Geometry
1. CH₄ Val. e ⁻ = 4 + 4(1) = 8 e ⁻ tot. e ⁻ = 8 + 4(2) = 16 e ⁻ # bonds = $\frac{1}{2}(16-8)$ = 4 bonds	$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{C}-\text{H} \\ \\ \text{H} \end{array}$	tetrahedral nonpolar	5. H₂O Val. e ⁻ = 2(1) + 6 = 8 e ⁻ tot. e ⁻ = 2(2) + 8 = 12 e ⁻ # bonds = $\frac{1}{2}(12-8)$ = 2 bonds	$\begin{array}{c} \text{H} \quad \ddot{\text{O}} \quad \text{H} \\ \quad \quad \quad \vdots \\ \quad \quad \quad \text{H} \end{array}$	bent polar
2. BF₃ Val. e ⁻ = 3 + 3(7) = 24 e ⁻ Violates Octet Rule	$\begin{array}{c} \ddot{\text{F}} \quad \text{B} \quad \ddot{\text{F}} \\ \vdots \quad \quad \quad \vdots \\ \quad \quad \quad \\ \quad \quad \quad \text{F} \\ \quad \quad \quad \vdots \end{array}$	trigonal planar nonpolar	6. ClO₃⁻ Cl = Chlorine Val. e ⁻ = 7 + 3(6) + 1 = 26 e ⁻ tot. e ⁻ = 9 + 3(8) = 32 e ⁻ # bonds = $\frac{1}{2}(32-26)$ = 3 bonds	$\left[\begin{array}{c} \ddot{\text{O}} \\ \\ \text{Cl}-\ddot{\text{O}} \\ \\ \ddot{\text{O}} \end{array} \right]^{-}$	trigonal pyramidal polar
3. HCN Val. e ⁻ = 1 + 4 + 5 = 10 e ⁻ tot. e ⁻ = 2 + 8 + 8 = 18 e ⁻ # bonds = $\frac{1}{2}(18-10)$ = 4 bonds	$\text{H}-\text{C} \equiv \text{N}:$	linear polar	7. H₃O⁺ Val. e ⁻ = 3(1) + 6 - 1 = 8 e ⁻ tot. e ⁻ = 3(2) + 8 = 14 e ⁻ # bonds = $\frac{1}{2}(14-8)$ = 3 bonds	$\left[\begin{array}{c} \text{H} \quad \ddot{\text{O}} \quad \text{H} \\ \quad \quad \quad \\ \quad \quad \quad \text{H} \end{array} \right]^{+}$	trigonal pyramidal polar
4. NH₃ Val. e ⁻ = 5 + 3(1) = 8 e ⁻ tot. e ⁻ = 8 + 3(2) = 14 e ⁻ # bonds = $\frac{1}{2}(14-8)$ = 3 bonds	$\begin{array}{c} \text{H} \quad \ddot{\text{N}} \quad \text{H} \\ \quad \quad \quad \\ \quad \quad \quad \text{H} \end{array}$	trigonal pyramidal polar	8. NH₂⁻ Val. e ⁻ = 5 - 2(1) + 1 = 8 e ⁻ tot. e ⁻ = 8 + 2(2) = 12 e ⁻ # bonds = $\frac{1}{2}(12-8)$ = 2 bonds	$\left[\begin{array}{c} \text{H} \quad \ddot{\text{N}} \quad \text{H} \\ \quad \quad \quad \vdots \end{array} \right]^{-}$	bent polar