ANSWER KEY.

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Bond Polarity

Chemistry | ANSWER KEY

Use the electronegativity (EN) values below. For each bond, find ΔEN (big − small) and classify the bond as nonpolar covalent, polar covalent, or ionic. Label δ+ and δ− on each polar covalent bond.

Element	H	C	N	O	F	Na	Mg	S	Cl	K	Br
EN	2.20	2.55	3.04	3.44	3.98	0.93	1.31	2.58	3.16	0.82	2.96

1. N–H

ΔEN: 3.04 − 2.20 = 0.84. Polar covalent. N is δ−, H is δ+.

2. C–O

ΔEN: 3.44 − 2.55 = 0.89. Polar covalent. O is δ−, C is δ+.

3. the bond between potassium and bromine

ΔEN: 2.96 − 0.82 = 2.14. Ionic (greater than 2.0).

4. S–H

ΔEN: 2.58 − 2.20 = 0.38. Nonpolar covalent (less than 0.5). No partial charges.

5. C–Cl

ΔEN: 3.16 − 2.55 = 0.61. Polar covalent. Cl is δ−, C is δ+.

6. the bond between magnesium and oxygen

ΔEN: 3.44 − 1.31 = 2.13. Ionic (greater than 2.0).

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7. Br–Br

ΔEN: 2.96 − 2.96 = 0. Nonpolar covalent. No partial charges.

8. the bond between oxygen and fluorine

ΔEN: 3.98 − 3.44 = 0.54. Polar covalent. F is δ−, O is δ+.

9. Rank these bonds from least polar to most polar: O–H, C–H, N–H. Show ΔEN for each.

C–H (0.35) < N–H (0.84) < O–H (1.24)

10. A student finds ΔEN for a C–F bond by doing 2.55 − 3.98 = −1.43. Explain the mistake. Then give the correct ΔEN, the bond type, and the partial charges.

Always subtract the smaller EN from the larger one, so ΔEN is never negative. ΔEN = 3.98 − 2.55 = 1.43. Polar covalent. F is δ−, C is δ+.

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