

General Main Group Chemistry Exercises.

1. Which of the following species will have the larger first ionisation energy: (a) Li or Be; (b) N or O; (c) C or N; (d) Se or Se⁺; (e) K or Rb.
2. Use Valence Shell Electron Pair Repulsion (VSEPR) theory to predict the shape of the following molecules or ions: (a) SF₆; (b) SeF₂; (c) HCO₃⁻; (d) XeOF₄; (e) PF₃Cl₂; (f) [SF₂Cl]⁺; (g) [S₂O₄]²⁻
3. Which of the following has a bond angle greater than 109.5 degrees. Give reasons for your answer: (a) SF₂; (b) CF₄; (c) BF₃; (d) PF₅; (e) H₂S.
4. By constructing a molecular orbital (MO) diagram predict the bond order of B₂ and O₂²⁺. With which common molecule is O₂²⁺ isoelectronic? Would you predict that O₂³⁻ or O₂⁴⁻ can exist?