

2009 AP[®] CHEMISTRY FREE-RESPONSE QUESTIONS

6. Answer the following questions related to sulfur and one of its compounds.
- (a) Consider the two chemical species S and S²⁻.
- Write the electron configuration (e.g., 1s²2s² . . .) of each species.
 - Explain why the radius of the S²⁻ ion is larger than the radius of the S atom.
 - Which of the two species would be attracted into a magnetic field? Explain.
- (b) The S²⁻ ion is isoelectronic with the Ar atom. From which species, S²⁻ or Ar, is it easier to remove an electron? Explain.
- (c) In the H₂S molecule, the H–S–H bond angle is close to 90°. On the basis of this information, which atomic orbitals of the S atom are involved in bonding with the H atoms?
- (d) Two types of intermolecular forces present in liquid H₂S are London (dispersion) forces and dipole-dipole forces.
- Compare the strength of the London (dispersion) forces in liquid H₂S to the strength of the London (dispersion) forces in liquid H₂O. Explain.
 - Compare the strength of the dipole-dipole forces in liquid H₂S to the strength of the dipole-dipole forces in liquid H₂O. Explain.

STOP

END OF EXAM