1. Explain how ionization energy and electron affinity determine whether atoms of elements will combine to form ionic compounds.

2. Write the Lewis dot symbols for the following atoms and ions:
   a. I, I⁻
   b. S, S²⁻
   c. P, P³⁻
   d. Na, Na⁺
   e. Mg, Mg²⁺
   f. Al, Al³⁺

3. In which of the following states would NaCl be electrically conducting? Explain your answer.
   a. Solid
   b. Molten
   c. Dissolved in water

4. An ionic bond is formed between a cation A⁺ and an anion B⁻. How would the energy of the ionic bond be affected by the following changes?
   a. Doubling the radius of A⁺
   b. Tripling the charge on A⁺
   c. Doubling the charges on A⁺ and B⁻
   d. Decreasing the radii of A⁺ and B⁻ to half their original values

5. Give the empirical formulas and names of the compounds formed from the following pairs of ions:
   a. Rb⁺ and I⁻
   b. Cs⁺ and SO₄²⁻
   c. Sr²⁺ and N³⁻
   d. Al³⁺ and S²⁻

6. Use Lewis dot symbols to represent the formation of the following compounds
   a. Barium hydride
   b. Sodium fluoride
   c. Potassium sulfide

7. For each of the following pairs of elements, state whether the binary compound they form is likely to be ionic or covalent. Write the empirical formula and name of the compound:
   a. B and F
   b. K and Br

8. What is lattice energy and what role does it play in the stability of ionic compounds?

9. Specify which compound in the following pairs of ionic compounds has the higher lattice energy, and explain your choice:
   a. KCl or MgO
   b. LiF or LiBr
   c. Mg₃N₂ or NaCl

10. Calculate the lattice energy of calcium chloride given:
    Energy needed to dissociate 1 mole of Cl₂ into Cl atoms = 242.8 kJ
    \[ \Delta H^{\text{sub}}_{\text{Ca}} = 121 \text{ kJ/mol} \]
    \[ \Delta H_f^{\text{CaCl}_2} = -795 \text{ kJ/mol} \]