

Bonding and States of Matter Review Sheet

1. Why do atoms form chemical bonds?

to complete octet (8 ve-)

2. Define the following terms:

- octet rule : 8 ve-
- covalent bond : sharing of e- due to similar electronegativity
- ionic bond : electrostatic attraction due to transfer e-
- polar covalent bond : unequal sharing of e-
- network covalent : repeating single atom covalently bonded
- metallic bond : free-flowing e- buffering cations
- van der Waals forces : weakest force, due to e- movement
- dipole forces : polar covalent compounds (attraction of slight + & - charges)
- hydrogen bond : polar covalent compounds (H attached to N, O, F)

3. What is a Lewis dot structure?

represents ve-

4. Write dot structures for: potassium, arsenic, bromine, silicon, tellurium, aluminum, oxygen, sodium, and radon



5. Two atoms each provide 3 electrons that are shared by the two atoms. This is an example of a:

- a. single covalent bond b. double covalent bond
 c. triple covalent bond d. quadruple covalent bond

6. Two atoms each provide 1 electron that are shared by the two atoms. This is an example of a:

- a. single covalent bond b. double covalent bond
 c. triple covalent bond d. quadruple covalent bond

7. A certain nonmetal usually forms two covalent bonds in its compounds. How many valence electrons does this element have?

6  - needs 2 more e- to complete octet

8. Noble gases do not form chemical compounds because:

full octet

9. Which of the following compounds contains ionic and covalent bonds?

- a. SiO_2 b. BaF_2 c. Na_2CO_3 d. Cl_2O
 C I I C
 NP P

10. Complete the table for the following molecular compounds

Formula	Lewis Structure	Molecular geometry	Polar?	Intermolecular forces
SO ₂ 18		Bent 117°	Y	Dipole
SCl ₂ 20		Bent 105°	Y	dipole
CS ₂ 16		linear	N	VdW
CCl ₄ 32		tetrahedral	N	VdW
PCl ₃ 26		trigonal pyramidal	Y	dipole
O ₂ 12		linear	N	VdW
SO ₃ 24		trigonal planar	N	VdW
COCl ₂ 24		trigonal planar	Y	dipole

11. In order to melt solids of each of the following substances, tell what type of bonds or forces of attraction must be disrupted.

- Zinc - metal bond (free flowing e⁻)
- methane (CH₄) - VdW (non polar covalent)
- ammonia (NH₃) - H-bond (polar covalent)
- potassium chloride - ionic (transfer e⁻)

12. Give three characteristics of each of the three states of matter.

s → molecules vibrate in place, low KE, orderly l → molecules flow, medium KE, shaped
 can't flow

13. How do intermolecular forces affect the state of matter of a substance at room temperature?

Stronger force → l or s @ RT

molecules
 random movement
 high KE