

“A bundle of joy”

Name _____

A) I₂ B) K C) KCl D) H₂O

Questions 1 to 5 are based on the four substances listed above.

- _____ 1. Conducts electricity in the solid state.
- _____ 2. Melts at a temperature of 273 K
- _____ 3. An ionic solid
- _____ 4. A molecular solid consisting of nonpolar molecules
- _____ 5. Consists of positively charged kernels surrounded by a sea of mobile electrons

A) triangular pyramid, or trigonal pyramid B) linear C) bent D) tetrahedral .

(questions 6 to 10 refer to the shapes above)

_____ 6. NH₃ _____ 7. CO₂ _____ 8. HCl _____ 9. H₂S _____ 10. CCl₄

- _____ 11. Of the following the bond with the greatest ionic character is
A) H–N B) H–Cl C) H–I D) H–O
- _____ 12. A shiny solid that conducts electricity is most likely to also be
A) molecular B) metallic C) ionic D) covalently bonded
- _____ 13. Which is NOT a dipole ? A) NH₃ B) HBr C) H₂O D) CO₂
- _____ 14. When a calcium atom bonds to an oxygen atom, the **calcium** atom
A) becomes an ion with a charge of 2+ B) becomes an ion with a charge of 2–
C) becomes slightly +, or δ⁺ D) becomes slightly – , or δ[–]
- _____ 15. Of the following, the element with the weakest attraction for shared electrons is
A) Na B) K C) Mg D) Cl
- _____ 16. Hydrogen bonds are formed between molecules of A) NH₃ B) H₂S
C) NO₂ D) HI
- _____ 17. Of the following, the molecule with the **weakest** London dispersion forces is
A) F₂ B) Br₂ C) Cl₂ D) I₂

- _____ 18. Which of the following substances is likely to have the **highest** melting point?
A) H_2S B) NCl_3 C) SBr_2 D) KF
- _____ 19. The nitrogen atoms in a molecule of N_2 are **sharing** a total of A) 2 electrons
B) 3 electrons C) 4 electrons D) 6 electrons.
- _____ 20. The most active metal in period 5 is A) Rb B) Cs C) K D) Br
- _____ 21. Which element often loses electrons from TWO principal energy levels?
A) Mg B) Al C) O D) V
- _____ 22. The least reactive element in period 4 is A) K B) Br C) Kr D) Xe
- _____ 23. The element that is most similar chemically to Mg is A) Ca B) Na
C) O D) Ti
- _____ 24. Which element tends to form ions that have larger radii than its atoms?
A) Mg B) O C) Al D) Co

Draw dot structures for the following substances. For those that are **molecular** indicate the shape of the molecule, and indicate whether the molecule is a dipole. For those that are **ionic** simply write the word "ionic" under your dot structure. (4 pts each)

- A) CS_2 B) CF_4 C) BaO D) Cl_2

Extra credit: A. Draw the dot structure of the molecule C_2Cl_4 (note that the chlorines bond **ONLY** to the carbons)

(The octet rule applies)

B. Is the molecule a dipole? Explain your answer

C. Draw the dot structure of formaldehyde, H_2CO . (Both hydrogens are attached to the carbon.) Indicate what the shape of this molecule is.