1. What occurs when potassium reacts with chlorine to form potassium chloride?

   A) Electrons are shared and the bonding is ionic.
   B) Electrons are shared and the bonding is covalent.
   C) Electrons are transferred and the bonding is ionic.
   D) Electrons are transferred and the bonding is covalent.

2. Which element reacts with oxygen to form ionic bonds?

   A) calcium B) hydrogen
   C) chlorine D) nitrogen

3. Which element forms an ionic compound when it reacts with lithium?

   A) K B) Fe C) Kr D) Br

4. As a chlorine atom becomes a negative ion, the atom

   A) gains an electron and its radius increases
   B) gains an electron and its radius decreases
   C) loses an electron and its radius increases
   D) loses an electron and its radius decreases

5. What occurs when an atom loses an electron?

   A) The atom's radius decreases and the atom becomes a negative ion.
   B) The atom's radius decreases and the atom becomes a positive ion.
   C) The atom's radius increases and the atom becomes a negative ion.
   D) The atom's radius increases and the atom becomes a positive ion.

6. A neutral atom with the electron configuration 2-6 would most likely form a bond with an atom having the configuration

   A) 2 B) 2-2 C) 2-8 D) 2-8-8

7. When ionic bonds are formed, metallic atoms tend to

   A) lose electrons and become negative ions
   B) lose electrons and become positive ions
   C) gain electrons and become negative ions
   D) gain electrons and become positive ions

8. Which is the formula of an ionic compound?

   A) $SO_2$ B) $CO_2$
   C) $CH_3OH$ D) NaOH

9. Which sample of matter has a crystal structure?

   A) $Hg(l)$ B) $H_2O(l)$
   C) $NaCl(s)$ D) $CH_4(g)$

10. A sample of a substance has these characteristics:

    • melting point of 984 K
    • hard, brittle solid at room temperature
    • poor conductor of heat and electricity as a solid
    • good conductor of electricity as a liquid on in an aqueous solution

    This sample is classified as

    A) a metallic element
    B) a radioactive element
    C) a molecular compound
    D) an ionic compound

11. A solid substance was tested in the laboratory. The test results are listed below.• dissolves in water
    • is an electrolyte
    • melts at a high temperature

    Based on these results, the solid substance could be

    A) Cu B) $CuBr_2$
    C) C D) $C_6H_{12}O_6$

12. The data table below represents the properties determined by the analysis of substances *A*, *B*, *C*, and *D*.

| Substance | Melting Point (°C) | Boiling Point (°C) | Conductivity |
|---|---|---|---|
| *A* | −80 | −20 | none |
| *B* | 20 | 190 | none |
| *C* | 320 | 770 | as solid |
| *D* | 800 | 1250 | in solution |

Which substance is an ionic compound?

A) *A* B) *B* C) *C* D) *D*

13. A student determined the solubility of an unknown solid in various solvents as shown in the table below.

| Solvent | Solubility |
|---|---|
| benzene | insoluble |
| water | soluble |
| ethanol | slightly soluble |
| toluene | insoluble |

Based on these solubility results, the unknown solid is best described as

A) ionic B) nonpolar
C) network D) metallic

14. A substance has a high melting point and conducts electricity in the liquid phase. This substance is

A) Ne B) Hg C) NaCl D) SiC

15. Compared to the boiling point and the freezing point of water at 1 atmosphere, a 1.0 M $CaCl_2(aq)$ solution at 1 atmosphere has a

A) lower boiling point and a lower freezing point
B) lower boiling point and a higher freezing point
C) higher boiling point and a lower freezing point
D) higher boiling point and higher freezing point

16. A substance that does not conduct electricity as a solid but does conduct electricity when melted is most likely classified as

A) an ionic compound
B) a molecular compound
C) a metal
D) a nonmetal

17. Which of the following solids has the highest melting point?

A) $H_2O(s)$ B) $Na_2O(s)$
C) $SO_2(s)$ D) $CO_2(s)$

18. Which sample is composed of particles arranged in a regular geometric pattern?

A) $Cl_2(g)$ B) $CCl_4(\ell)$
C) LiCl(s) D) LiCl(aq)

19. A characteristic of ionic solids is that they

A) have high melting points
B) have low boiling points
C) conduct electricity
D) are non-crystalline

20. As $NaC_2H_3O_2(s)$ is stirred into water and dissolves, the electrical conductivity of the solution

A) decreases B) increases
C) remains the same