

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. The bonds in BaO are best described as
- A) covalent, because valence electrons are shared
  - B) covalent, because valence electrons are transferred
  - C) ionic, because valence electrons are shared
  - D) ionic, because valence electrons are transferred

3. 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
4. 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<sub>2</sub>
- C) C
- D) C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>

5. 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
6. A substance that has a melting point of 1074 K conducts electricity when dissolved in water, but does *not* conduct electricity in the solid phase. The substance is most likely
- A) an ionic solid
  - B) a network solid
  - C) a metallic solid
  - D) a molecular solid
7. Which statement correctly describes diamond and graphite, which are different forms of solid carbon?
- A) They differ in their molecular structure, only.
  - B) They differ in their properties, only.
  - C) They differ in their molecular structure and properties.
  - D) They do not differ in their molecular structure or properties.
8. Which characteristic is a property of molecular substances?
- A) good heat conductivity
  - B) good electrical conductivity
  - C) low melting point
  - D) high melting point
9. Which terms describe a substance that has a low melting point and poor electrical conductivity?
- A) covalent and metallic
  - B) covalent and molecular
  - C) ionic and molecular
  - D) ionic and metallic

10. A solid substance is an excellent conductor of electricity. The chemical bonds in this substance are most likely
- A) ionic, because the valence electrons are shared between atoms
  - B) ionic, because the valence electrons are mobile
  - C) metallic, because the valence electrons are stationary
  - D) metallic, because the valence electrons are mobile
11. Which property best accounts for the conductivity of metals?
- A) the relatively high first ionization energy
  - B) the malleability of most metals
  - C) the free electrons in the valence energy levels
  - D) the filled inner electron energy levels
12. Which type of bond is present in copper wire?
- A) covalent
  - B) ionic
  - C) electrovalent
  - D) metallic
13. Which substance contains particles held together by metallic bonds?
- A) Ni(s)
  - B) Ne(s)
  - C) N<sub>2</sub>(s)
  - D) I<sub>2</sub>(s)
14. The table below lists the melting points of various substances.

SUBSTANCE	PHASECHANGE (solid – liquid)	MELTINGPOINT (K)
chlorine	Cl <sub>2</sub> – Cl <sub>2</sub> (ℓ)	172
water	H <sub>2</sub> O(s) – H <sub>2</sub> O(ℓ)	273
sodiumchloride	NaCl(s) – NaCl(ℓ)	1073
copper	Cu(s) – Cu(ℓ)	1356

Based on this table, which type of substance has the highest melting point?

- A) nonpolar covalent
- B) polar covalent
- C) ionic
- D) metallic

15. At STP, which substance has metallic bonding?

- A) ammonium chloride
- B) barium oxide
- C) iodine
- D) silver

16. 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

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17. Which statement best describes the substance that results when electrons are transferred from a metal to a nonmetal?

- A) It contains ionic bonds and has a low melting point.
- B) It contains ionic bonds and has a high melting point.
- C) It contains covalent bonds and has a low melting point.
- D) It contains covalent bonds and has a high melting point.

18. Which formula is described correctly?

- A)  $\text{BaCl}_2$  is covalent and molecular.
- B)  $\text{H}_2\text{O}_2$  is covalent and empirical.
- C)  $\text{H}_2\text{O}$  is ionic and molecular.
- D)  $\text{NaCl}$  is ionic and empirical.

19. Hydrogen forms a negative ion when it combines with sodium to form  $\text{NaH}$ . This is primarily because hydrogen

- A) loses an electron to sodium
- B) has a greater attraction for electrons than sodium has
- C) is a larger atom than sodium
- D) has a smaller ionization energy than sodium

20. As sodium reacts with fluorine to form the compound  $\text{NaF}$ , each sodium atom will

- A) gain 1 electron
  - B) gain 2 electrons
  - C) lose 1 electron
  - D) lose 2 electrons
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