

1. What type of bond is present in graphite?
A) ionic B) polar covalent
C) network D) metallic
2. Diamond and graphite both have bonds which are predominantly
A) ionic B) metallic
C) covalent D) network
3. Which properties are characteristic of metals?
A) low thermal conductivity and low electrical conductivity
B) low thermal conductivity and high electrical conductivity
C) high thermal conductivity and low electrical conductivity
D) high thermal conductivity and high electrical conductivity
4. A factor distinguishing a metallic bond from either an ionic or a covalent bond is the mobility of
A) nuclei B) protons
C) electrons D) neutrons
5. Which is characterized by being insoluble in most solvents and good conductors in the solid state?
A) nonpolar covalent molecules
B) ionic salts
C) polar covalent molecules
D) metals
6. Which is held together by the attraction between cations and mobile electrons?
A) metals
B) ionic salts
C) polar covalent molecules
D) nonpolar covalent molecules
7. The conductivity, ductility, luster, and malleability of metals is explained by
A) mobile electrons
B) equally shared electron pairs
C) unequally shared electron pairs
D) high reactivity
8. The species which form positive ions and mobile electrons are
A) ionic solids
B) metallic solids
C) non polar molecular solids
D) polar molecular solids
9. A substance that consists of positive ions bonded together by electrons which move freely from ion to ion is
A) Au B) Kr C) NaCl D) C
10. Copper is a good conductor of electricity because it contains free-moving
A) electrons B) ions
C) nuclei D) protons
11. The bond that involves positive particles in a "sea" of mobile electrons are
A) ionic bonds B) metallic bonds
C) covalent bonds D) hydrogen bonds
12. Consider the usual charge found on these ions of a series of elements.
 V^{3+} , W^{2+} , X^+ , Y^- , Z^{2-}
Which of the elements are metals?
A) V and W B) V, W and X
C) X and Y D) Y and Z
13. Which property of metallic elements is best explained by the free movement of their valence electrons?
A) atomic mass
B) atomic number
C) position in the periodic table
D) electrical conductivity
14. Metals tend to
A) share electrons B) gain electrons
C) form positive ions D) form negative ions
15. Metals are best described as being
A) shiny, light, and soft.
B) soft, powdery, and light.
C) flexible, powdery, and dense.
D) hard, shiny, and dense.

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16. Metals are better conductors of both heat and electricity than nonmetals because metals
- A) contain more electrons.
 - B) have higher melting points.
 - C) have mobile valence electrons.
 - D) have higher ionization energies.
17. Which type of bonding represents positive ions immersed in a sea of mobile electrons?
- A) ionic
 - B) metallic
 - C) polar covalent
 - D) nonpolar covalent
18. Which is characteristic of all metallic solids?
- A) They are very brittle
 - B) They conduct electricity
 - C) They have low melting points
 - D) They have high vapor pressures
19. The bond which holds atoms of copper together is the
- A) ionic bond
 - B) metallic bond
 - C) polar covalent bond
 - D) nonpolar covalent bond
20. Which type of bonding is present in solid aluminum?
- A) Ionic
 - B) Polar covalent
 - C) Molecular covalent
 - D) Metallic
21. Which element consists of positive ions immersed in a "sea" of mobile electrons?
- A) sulfur
 - B) nitrogen
 - C) calcium
 - D) chlorine
 - E) silicon
22. Which property best accounts for the conductivity of metals?
- A) the nuclear change
 - B) the free electrons in the valence energy levels
 - C) the filled inner electron energy levels
 - D) the mobility of the nuclei
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