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Nan	ne:				
1)	Which molecule contains a triple covalent bond?				
	A) H <sub>2</sub> C) O <sub>2</sub>				
	B) Cl <sub>2</sub> D) N <sub>2</sub>				
2)	The <i>strongest</i> forces of attraction occur between molecules of				
	A) HF C) HBr				
	B) HCl D) HI				
3)	Which of the following atoms has the <i>greatest</i> tendency to attract electrons?				
	A) bromine C) beryllium				
	B) boron D) barium				
4)	Which of these formulas contains the <i>most</i> polar bond?				
	A) $H^{\ddagger}_{I}CI$ C) $H^{\ddagger}_{I}I$				
	B) H <sup>‡</sup> <sup>‡</sup> Br D) H <sup>‡</sup> <sup>‡</sup> F				
5)	Which subatomic particle has <i>no</i> charge?				
	A) beta particleC) alpha particleB) neutronD) electron				
6)	Which intermolecular force of attraction accounts for the relatively high boiling point of water?				
	A) metallic bonding C) ionic bonding				
	B) covalent bonding D) hydrogen bonding				
7)	In Period 3, from left to right in order, each successive element will				
	A) decrease in electronegativity				
	<ul><li>B) increase in number of protons</li><li>C) decrease in atomic mass</li></ul>				
	<ul><li>D) increase in metallic character</li></ul>				
8)	Which pair of characteristics describes the molecule illustrated below?				
	H− <b>Ω</b> \$				
	\ Н				
	A) asymmetrical and nonpolar				
	<ul><li>B) symmetrical and polar</li><li>C) symmetrical and nonpolar</li></ul>				
	<ul><li>D) asymmetrical and polar</li></ul>				
9)	The number of neutrons in the nucleus of an atom can be determined by				
	A) adding the atomic number to the mass number				
	B) subtracting the atomic number from the mass number				
	C) adding the mass number to the atomic mass				
10)	D) subtracting the mass number from the atomic number				
10)	Which molecule contains a nonpolar covalent bond?				

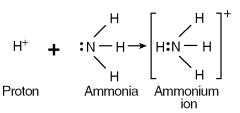
- A) CO C) H<sub>2</sub>O
- B) I<sub>2</sub> D) NH3

11) Given the reaction:

 $2C_{2}H_{6} + 7O_{2} \ddagger \uparrow 4CO_{2} + 6H_{2}O_{2}$ 

What is the ratio of moles of CO<sub>2</sub> produced to moles of C<sub>2</sub>H<sub>6</sub> consumed?

- A) 3 to 2 C) 1 to 1 B) 2 to 1 D) 7 to 2
- 12) Given the reaction:



Which type of bond is formed between the proton (H<sup>+</sup>) and the ammonia molecule?

- A) nonpolar covalent
- B) coordinate covalent
- C) network
- D) ionic
- 13) What is the formula of nitrogen (II) oxide?
  - A) N<sub>2</sub>O C)  $NO_2$ B) N<sub>2</sub>O<sub>4</sub> D) NO
- 14) Which type of bond is formed between the carbon and oxygen atoms in a CO<sub>2</sub> molecule?
  - A) nonpolar covalent C) ionic
  - B) electrovalent D) polar covalent
- The atomic number of an atom is always equal to the 15) number of its
  - A) protons plus neutrons
  - B) neutrons, only
  - C) protons plus electrons
  - D) protons, only

Which element is classified as a noble gas at STP? 16)

- C) hydrogen A) nitrogen
- B) neon D) oxygen
- Which formula represents a polar molecule? 17)
  - A) HBr C) NaBr
  - B) KBr D) LiBr
- 18) What is the total number of electrons in a Cu<sup>+</sup>ion?
  - A) 30 C) 28 B) 29
    - D) 36

19)	In which system do molecule-ion attractions exist?		
	A) NaCl(aq)		C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> (aq)
	B) C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> (s)	D)	NaCl(s)
20)	The gram formula mass of NH4	Cl is	
	A) 53.5 g/mole	C)	22.4 g/mole
	B) 28.0 g/mole	D)	95.5 g/mole
21)	Metallic bonding occurs betwee	en ato	oms of
	A) copper	C)	sulfur
	B) carbon	D)	fluorine
22)	Which formula represents an io	nic co	ompound?
	A) H <sub>2</sub> O	C)	NH <sub>3</sub>
	B) CH4	D)	KCl
23)	The region that is the most prob in an atom is	able	location of an electron
	A) an orbital	C)	the excited state
	B) an ion	D)	the nucleus
24)	Which structural formula repres	sents	a nonpolar molecule?
	A) H-Cl	C)	H—N—H   H
	B) H—H	D)	H—0   H
25)	Which type of chemical bond is	form	ed between two atoms

- 25) Which type of chemical bond is formed between two atoms of bromine?
  - A) metallic C) covalent
  - B) hydrogen D) ionic
- 26) Given the unbalanced equation:

 $\_Al + \_CuSO_4 \bullet, \_Al_2(SO_4)_3 + \_Cu$ 

When the equation is balanced using the *smallest* wholenumber coefficients, what is the coefficient of Al?

A) 1 B) 2 C) 3 D) 4

27) Based on the *Properties of Selected Elements* chemistry reference table, which of the following atoms requires the *least* energy for the removal of the most loosely bound electron?

A)	Sn	C)	Be
B)	Br	D)	Sr

28) Given the reaction:

 $6CO_2 + 6H_2O \bullet, C_6H_{12}O_6 + 6O_2$ 

What is the total number of moles of water needed to make 2.5 moles of  $C_6H_{12}O_6$ ?

	A)	2.5	C)	15
	B)	12	D)	6.0
29)	Wh	ich substance contains a pola	ar co	valent bond?
	A)	Cl <sub>2</sub>	C)	H <sub>2</sub>
	B)	HCl	D)	KCl
30)	Wh	ich of the following is an emp	irical	formula?
	A)	P2O5		C <sub>3</sub> H <sub>6</sub>
	B)	C <sub>2</sub> H <sub>4</sub>	D)	P <sub>4</sub> O <sub>6</sub>
31)	The	e percent by mass of hydroger	n in 1	NH <sub>3</sub> is equal to
	A)	$\frac{1}{17}$ x 100	C)	$\frac{3}{17}$ x 100

- B)  $\frac{17}{1} \times 100$  D)  $\frac{17}{3} \times 100$
- 32) The table below shows the normal boiling point of four compounds.

Compound	Normal Boiling Point (°C)
HF(L)	19.4
CH <sub>3</sub> Cl( <i>L</i> )	-24.2
CH <sub>3</sub> F( <i>l</i> )	-78.6
HCI(L)	-83.7

Which compound has the strongest intermolecular forces?

A)	CH <sub>3</sub> Cl(1)	C)	HCl(l)

B) HF(l) D)  $CH_3F(l)$ 

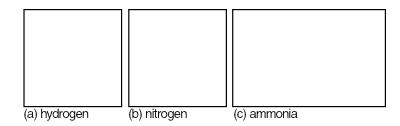
33) Which list of elements is arranged in order of increasing atomic radii?

A)	Sc, Ti, V, Cr	C)	Sr, Ca, Mg, Be
B)	F, Cl, Br, I	D)	Li, Be, B, C

34) Which of the following solids has the *highest* melting point?

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

- 35) In the boxes below, draw a correct Lewis electron-dot structure for:
  - (a) an atom of hydrogen
  - (b) an atom of nitrogen
  - (c) a molecule of ammonia (NH<sub>3</sub>)



36) A chemist performs the same tests on two homogeneous white crystalline solids, *A* and *B*. The results are shown in the table below.

	Solid A	Solid B
Melting Point	High, 801°C	Low, decomposes at 186°C
Solubility in H <sub>2</sub> O (grams per 100.0 g H <sub>2</sub> O at 0°C)	35.7	3.2
Electrical Conductivity (in aqueous solution)	Good Conductor	Nonconductor

The results of these tests suggest that

- A) solid A contains only ionic bonds and solid B contains only covalent bonds
- B) solid A contains only covalent bonds and solid B contains only ionic bonds
- C) both solids contain only covalent bonds
- D) both solids contain only ionic bonds