Name: _		A		
1)	Which species represer	nts a chemical compound?		
	A) NH <sub>4</sub> +	B) Na	C) NaHCO <sub>3</sub>	D) N <sub>2</sub>
2)		identify pure substances?		
	A) a solution and a mix     B) a solution and a cor		<ul><li>C) an element and a n</li><li>D) an element and a c</li></ul>	
3)		represents one pure substance, c		ompound
	Willest particle diagram	epresents one pure substance, c	Tilly!	
	A)		c) C 0	
	• 0			
	В)		D) • 0	
	00			
4)	Given the simple repres	entations for atoms of two elemer	nts:	
		O = an atom o	of an element	
		= an atom of	of a different element	
	Which particle diagram ı	epresents molecules of only one	compound in the gaseous phase	e?
	~~ 8			
	A) (200 00 1		c)   000   0	
	8 8			
	00		8 B	
	в)		D)	
	8		9/ 0	
			o	
5)	Which substance can be	e decomposed by a chemical cha	nge?	
	A) Cu	B) Cr	C) Co	D) CO
6)		of be decomposed by a chemical	•	
	A) H <sub>2</sub> O	B) Ne	C) HF	D) N <sub>2</sub> O
7)	Which must be a mixture		C) solid	D) activities
٥١	A) gas	B) liquid	C) solid	D) solution
8)	A) water, sand, and sa	, sand, and salt is filtered, what pa It	asses inrough the filter paper?  C) water, only	
	B) water and salt, only		D) water and sand, on	ly

9)	Which mixture can be separated	I by using the equipment sh	own belov	w?		
			— Ring s	stand		
			lron ri	na		
			− Filter p	•		
				funnel		
			Glass	lunner		
			— Beake	er		
	A) NaCl(aq) and SiO <sub>2</sub> (s)		C)	CO <sub>2</sub> (aq) and C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> (a	iq)	
	B) NaCl(aq) and C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> (aq	)	D)	CO <sub>2</sub> (aq) and NaCl(aq)		
10)	Which process represents a che	emical change?				
	A) evaporation of water		C)	corrosion of copper		
	B) crystallization of sugar		D)	melting of ice		
11)	Which of the following changes i	s exothermic?				
	A) freezing of water     B) melting of iron		C) D)	sublimation of iodine vaporization of ethanol		
12)	As the temperature of a substan	ce decreases the average l	•			
''	A) remains the same	B) decreases	anelic ene		reases	
13)	Which grouping of the three pha		rder from	·		
	bromine molecules?		ruer ironi	ien to right for moreasing di	Starice	between
	A) gas, liquid, solid		C)	solid, liquid, gas		
	B) solid, gas, liquid		D)	liquid, solid, gas		
14)	Which 5.0-milliliter sample of NF				ter con	
	A) NH <sub>3</sub> (I)	B) NH <sub>3</sub> (aq)	C)	NH <sub>3</sub> (g)	D)	NH <sub>3</sub> (s)
15)	In which material are the particle	s arranged in a regular geo	metric pat	ttern?		
	A) CO <sub>2</sub> (g)			C <sub>12</sub> H <sub>22</sub> O <sub>11</sub> (s)		
	B) NaCl(aq)		D)	H <sub>2</sub> O(I)		
16)	What is the formula of nitrogen (I					
	A) NO <sub>2</sub>	B) N <sub>2</sub> O <sub>4</sub>	C)	NO	D)	N <sub>2</sub> O
17)	Which formula correctly represer	nts the composition of iron (	III) oxide?			
	A) Fe <sub>3</sub> O <sub>2</sub>	B) Fe <sub>3</sub> O	C)	Fe <sub>2</sub> O <sub>3</sub>	D)	FeO <sub>3</sub>
18)	What is the correct IUPAC name	for the compound NH <sub>4</sub> CI?		•		
	A) ammonium chlorate	, .,	C)	nitrogen chloride		
	B) nitrogen chlorate		D)	ammonium chloride		
19)	Which substance has a chemica	I formula with the same rati	o of meta	l ions to nonmetal ions as i	in pota	ssium sulfide?
	A) sodium oxide		C)	magnesium oxide		
	B) magnesium chloride		D)	sodium chloride		
20)	What is the correct formula for iro	•		- D		
	A) FePO <sub>4</sub>	B) Fe <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>	C)	FegPo	D)	FeP

21)	Which of the following is an em	pirical formula?			0071-1-14
	A) C <sub>2</sub> H <sub>4</sub>	B) C <sub>3</sub> H <sub>6</sub>	C)	P <sub>2</sub> O <sub>5</sub>	D) P <sub>4</sub> O <sub>6</sub>
22)	Which pair of formulas correctly  A) C <sub>2</sub> H <sub>2</sub> and CH  B) C <sub>3</sub> H <sub>4</sub> and CH <sub>2</sub>	y represents a molecular formul	C)	ts corresponding empirical for $C_5H_8$ and $C_2H_2$ $C_4H_6$ and CH	ormula?
23)	Given the reaction:				
	$Mg(s) + 2AgNO_3(aq) \rightarrow V_0$	g(NO <sub>3</sub> ) <sub>2</sub> (aq) + 2Ag(s)			
	Which type of reaction is repres  A) synthesis  B) decomposition	ented?	C) D)	single replacement double replacement	·
24)	Which equation represents a dependence of the Which equation represents a dependence of the Which equation $A = A + A + A + A + A + A + A + A + A + $	)		LiOH + HCI $\Box$ , LiCI + H <sub>2</sub> O CaCO <sub>3</sub> $\Box$ , CaO + CO <sub>2</sub>	
25)	Given the unbalanced equation	:			
	Al +CuSO <sub>4</sub> ->Al <sub>2</sub> (S	6O <sub>4</sub> ) <sub>3</sub> +Cu			
	When the equation is balanced A) 1	using the <i>smallest</i> whole-numb B) 2	er coe C)		nt of Al? D) 4
26)		ded by a hard negative shell	jes		
27)	The region that is the most prob A) an orbital B) an ion	bable location of an electron in a	n atom C) D)	n is the nucleus the excited state	
28)	Subatomic particles can usually A) an uncharged nucleus	y pass undeflected through an a	itom be	ecause the volume of an ator largely empty space	n is composed of
	B) protons		D)	neutrons	
29)	C) An atom has hardly any em		a nega gative c a posi	ative charge. harge. tive charge.	
30)	Which particles are found in the	e nucleus of an atom?	0)		
	A) protons and electrons     B) neutrons, only		C) D)	protons and neutrons electrons, only	
31)	Compared to a proton, an electron the same quantity of charge B) a greater quantity of charge C) the same quantity of charge D) a greater quantity of charge	e and the opposite sign e and the same sign e and the same sign			
32)	Which subatomic particle will be	• • • •	-		
	A) positron	B) neutron	C)	electron	D) proton

33)	Which subatomic particle has <i>n</i>	o charge?				
	A) alpha particle     B) neutron		C)	electron		
	B) neutron		D)	beta particle		
34)		ements is true? nt must have the same mass num ve different numbers of neutrons.				
		nt must have the same atomic nurve different numbers of isotopes.	nber	·		
35)	The atomic number of an atom	is <i>always</i> equal to the number of i	ts	•		
	A) protons plus electrons     B) neutrons, only		C) D)	protons, only protons plus neutrons		
36)	A neutral atom contains 12 neut	rons and 11 electrons. The numb	er of	protons in this atom is		
	A) 11 protons	B) 1 proton	C)	23 protons	D)	12 protons
37)	What is the total number of proto	ons in the nucleus of an atom of p	otas	sium-42?		
	A) 15	B) 42	C)	19	D)	39
38)	The atomic mass of an element	t is the weighted average of the m	asse	es of		
	A) all of its naturally occurring	isotopes		all of its radioactive isotopes	3	
	B) its two most abundant isoto	ppes	D)	its two least abundant isoto	pes	
39)	An atom of helium-4 differs from	an atom of lithium-7 in that the a	tom (	of helium-4 has		
	A) one more proton			two less protons		
	B) two less neutrons		D)	one more neutron		
40)	The nucleus of an atom of coba					
	<ul><li>A) 27 protons and 31 neutrons</li><li>B) 27 protons and 32 neutrons</li></ul>		C)	60 protons and 60 neutrons		
	b) 21 protons and 32 neutrons	)	D)	59 protons and 60 neutrons		
41)	What is the mass number of the	nuclear symbol ${}^{19}_{9}F$ ?				
	A) 28	B) 9	C)	10	D)	19
42)	All the isotopes of a given atom	have				
	A) different mass numbers an					
	<ul><li>B) the same mass number bu</li><li>C) different mass numbers bu</li></ul>					
	D) the same mass number an					
43)	Which two notations represents	atoms that are isotopes of the san	റെ ല	ement?		
	A) $^{121}_{50}$ Sn and $^{119}_{50}$ Sn	nome that are lockeped of the dan		19 O and 19 F		
	50 511 414 50 511		٥,	80 and 9 F		
	B) $^{39}_{17}$ C1 and $^{39}_{19}$ K		D١	$^{121}_{50} \mathrm{Sn} ^{and}  ^{121}_{50} \mathrm{Sn}$		
	17 01 1914		_,	50 511 50 511		
4.4\	NAThon - lithium - itam fama	(+ to a de a 1915)				
44)	When a lithium atom forms an L A) loses a proton	I' ion, the lithium atom	C)	lasas an alastran		
	B) gains an electron		D)	loses an electron gains a proton		
45)		an oxygen-18 atom contains <i>exac</i>	,	,		
¬0)	A) 10 protons, 8 neutrons, 8 el		uy C)	8 protons, 10 neutrons, 8 el	ectro	ns
	B) 8 protons, 8 neutrons, 10 el		,	8 protons, 10 neutrons, 10 e		
46)	How many electrons are contain	red in an Au3+ion?				
	A) 197	B) 82	C)	76	D)	79

47)	What is the total number of el	ectrons in the valence shell of an	atom of aluminum in the groun	nd state?
	A) 8	B) 2	C) 3	D) 10
48)	What is represented by the do Table?	ots in a Lewis electron-dot diagrar	n of an atom of an element in	Period 2 of the Periodic
	<ul><li>A) the number of valence ele</li><li>B) the total number of electrons</li></ul>		<ul><li>C) the number of protons</li><li>D) the number of neutron</li></ul>	
49)	Which Lewis electron-dot stru	cture is drawn correctly for the ato	om it represents?	
	A) <b>F</b>	B) :O:	C) Ne	D) :N
50)	Which Lewis electron-dot diag	gram represents a boron atom in	the ground state?	
	A) :B.	в) •В	c) <b>:</b> B	D) :B.
51)	An electron in an atom moves A) decreases	from the ground state to an excite  B) remains the s		e electron increases
52)	When the electrons of an excit	ted atom return to a lower energy	state, the energy emitted can i	result in the production of
	<ul><li>A) protons</li><li>B) isotopes</li></ul>		C) spectra D) alpha particles	
53)	What is the electron configura	tion of a sulfur atom in the ground	d state?	
	A) 2-8-6	B) 2-4	C) 2-6	D) 2-8-4
54)	Which ion has the same elect	ron configuration as an atom of H	le?	
	A) Na <sup>+</sup>	B) Ca <sup>2+</sup>	C) H-	D) O <sup>2</sup> -
55)	Which electron configuration r	epresents the electrons of an ato	m in an excited state?	
	A) 2-8-18-5	B) 2-8-1	C) 2-8-17-6	D) 2-8-6
56)	On the present Periodic Table	e of the Elements, the elements a	re arranged according to incre	asing
	A) atomic mass		C) atomic number	
	B) number of neutrons		D) number of oxidation s	tates
57)		electrons of the elements in Peri	od 2 found?	
	A) 1	B) 2	C) 3	D) 4
58)		nts atoms with valence electrons	in the same electron shell?	
	A) Sr, Sn, I	B) Ba, Br, Bi	C) Mn, Hg, Cu	D) O, S, Te
59)	Which element has chemical	properties that are most similar to	o the chemical properties of so	odium?
	A) Se	B) CI	C) Mg	D) K
60)	As each successive element i atomic radius	n Group 15 of the Periodic Table	is considered in order of incre	easing atomic number, the
	A) increases	B) remains the s	ame C)	decreases

\_\_61) The data table below shows elements Xx, Yy, and Zz from the same group on the Periodic Table.

Element	Atomic Mass (atomic mass unit)	Atomic Radius (pm)
Xx	69.7	141
Yy	114.8	?
Zz	204.4	171

VVIIC	it is the	most iikely	atomici	aulus	Orelement	1 y :

A)	127	pm

$\sim$	166	nm
C)	100	pm

D) 103 pm

62)	Compared	to the	radius	of a	chlorine	atom.	the	radius	of a	chloride	ion i	is

A) smaller because chlorine gains an electron

What is the most likely atomic radius of element VV

- C) larger because chlorine gains an electron
- B) smaller because chlorine loses an electron
- D) larger because chlorine loses an electron

\_\_\_\_63) As the atoms of the Group 17 elements in the ground state are considered from top to bottom, each successive element has

- A) the same number of valence electrons and identical chemical properties
- B) an increasing number of valence electrons and identical chemical properties
- C) the same number of valence electrons and similar chemical properties
- D) an increasing number of valence electrons and similar chemical properties

64)	Which element is classified a	as a noble gas	at STP?
	Willow Glottle Held Glassified	ao a nosio gas	aran.

- A) hydrogen
- B) nitrogen

C) neon

D) oxygen

\_\_\_\_ 65) An unknown element X can form a compound with the formula XBr3. In which group on the Periodic Table would element X be found?

A) 14

B) 1

C) 13

D) 2

## \_\_\_\_() The gram formula mass of NH<sub>4</sub>Cl is

- A) 53.5 g/mole
- B) 22.4 g/mole
- C) 95.5 g/mole
- D) 28.0 g/mole

The percent by mass of hydrogen in NH<sub>3</sub> is equal to

A) 
$$\frac{17}{3}$$
 x 100

B) 
$$\frac{17}{1}$$
 x 100

C) 
$$\frac{3}{17}$$
 x 100

D) 
$$\frac{1}{17}$$
 x 100

A hydrate is a compound that includes water molecules within its crystal structure. During an experiment to determine the percent by mass of water in a hydrated crystal, a student found the mass of the hydrated crystal to be 4.10 grams. After heating to constant mass, the mass was 3.70 grams. What is the percent by mass of water in this crystal?

A) 0.40%

B) 9.8%

C) 11%

D) 90.%

A hydrate is a compound with water molecules incorporated into its crystal structure. In an experiment to find the percent by mass of water in a hydrated compound, the following data were recorded:

Mass of crucible + hydrated crystals before heating	7.50 grams
Mass of crucible	6.90 grams
Mass of crucible + anhydrous crystals after heating	7.20 grams

What is the percent by mass of water in the hydrate?

D) 8.0%

B) 185 pm

\_\_\_\_70) What is the molecular formula of a compound that has a molecular mass of 54 and the empirical formula C<sub>2</sub>H<sub>3</sub>?

A) C<sub>8</sub>H<sub>12</sub>

B) C<sub>6</sub>H<sub>9</sub>

C) C<sub>4</sub>H<sub>6</sub>

D) C<sub>2</sub>H<sub>3</sub>

\_\_\_\_\_\_() Given the reaction:

$$N_2(g) + 3H_2(g) \longrightarrow 2NH_3(g)$$

What is the mole-to-mole ratio between nitrogen gas and hydrogen gas?

A) 2:3

B) 1:2

C) 1:3

D) 2:2

\_\_\_\_**7**2 Given the reaction:

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) 2 to 1

B) 7 to 2

C) 3 to 2

D) 1 to 1

\_\_\_\_\_73) A student intended to make a salt solution with a concentration of 10.0 grams of solute per liter of solution. When the student's solution was analyzed, it was found to contain 8.90 grams of solute per liter of solution. What was the percent error in the concentration of the solution?

A) 18.9%

B) 1.10%

C) 11.0%

D) 8.90%

\_\_\_\_7Υ) A student calculated the percent by mass of water in a hydrate as 14.2%. A hydrate is a compound that contains water as part of its crystal structure. If the accepted value is 14.7%, the student's percent error was

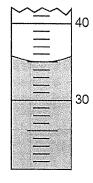
A)  $\frac{0.5}{14.7} \times 100$ 

B)  $\frac{0.5}{14.2}$  x 100

C)  $\frac{14.2}{14.7} \times 100$ 

D)  $\frac{14.7}{14.2}$  x 100

The diagram below represents a portion of a 100-milliliter graduated cylinder.



What is the reading of the meniscus?

A) 35.0 mL

B) 44.0 mL

C) 45.0 mL

D) 36.0 mL

A student wishes to investigate how the reaction rate changes with a change in concentration of HCI(aq).

Given the reaction:  $Zn(s) + HCI(aq) \rightarrow H_2(g) + ZnCI_2(aq)$ 

(a) Identify the independent variable in this investigation.

(b) Identify one other variable that might affect the rate and should be held constant during this investigation.