Name:	Class:	Date:	ID: A

Practice test 2013

Multiple Choice

Identify the choice that best completes the statement or answers the question.

Important constants

For Water

 $\Delta H_{\text{fus}} = 6.01 \text{ kJ/mol or } 334 \text{ J/g}$ $\Delta H_{\text{vap}} = 40.7 \text{ kJ/mol or } 2260 \text{ J/g}$ $c = 4.18 \text{ J/g}^{\circ}C \text{ or } 1.00 \text{ cal/g }^{\circ}C$

*There will be no retake for this last test.

Table of Common Molecules								
Name	Hydrogen	Chlorine	Ammonia	Methane				
Molecular Formula	H ₂	Cl ₂	NH ₃	CH ₄				

_

What type of bond do all of the molecules in the table above have in common?

a. polar

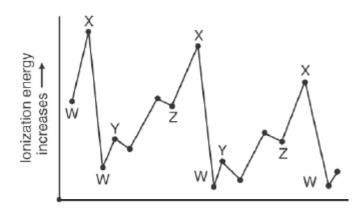
c. ionic

b. metallic

d. covalent

^{*}This is your last test.

^{*}You will have questions over past chapters and questions over specific topics from first semester like moles, naming, prediciting products, balancing and stoichiometry.



Atomic number increases →

The chart above shows the relationship between the first ionization energy and the increase in atomic number. The letter on the chart for the alkali family of elements is

- a. W
- b. X

- c. Y
- d. Z
- 3. What is the volume of 63.8 g of Carbon Dioxide at a pressure of 75.0 kPa and a temperature of 345 K?
 - a. 22.4 L

c. 8.23 L

b. 55.4 L

- d. 78.4 L
- 4. How much energy would be required to raise the temperature of 75.0 g of water from 25.0 °C to 75.0 °C?
 - a. 15.7 kJ

c. $1.25 \times 10^6 \,\mathrm{J}$

b. 334 kJ

- d. 4.85 kJ
- 5. What is the correct noble gas electron configuration for a Chloride ion?
 - a. $[Ar]3s^23p^5$

c. $[Ne]3s^23p^5$

b. $[Ar]3s^23p^6$

- d. $[Ne]3s^23p^6$
- 6. What is the correct order of the following bonds in terms of decreasing polarity?
 - a. As-Cl, P-Cl, N-Cl

c. P-Cl, N-Cl, As-Cl

b. As-Cl, N-Cl, P-Cl

- d. P-Cl, As-Cl, N-Cl
- 7. Why do atoms share electrons in covalent bonds?
 - a. Both atoms have a low ionization energy c. and want to lose electrons
- They both need to increase their atomic numbers.
- b. Both atoms have a high electronegativity d. and want to gain electrons.
- The electrons in each atom are always at the same energy level.
- 8. How many lone pairs of electrons are on the central atom of nitrogen trihydride?
 - a. .

c. 3

b. 2

- d. 4
- 9. Which of the following covalent bonds is the most polar?
 - a. C---C

c. C---Cl

b. C---Br

d. C---H

4.0			
 10.	Arrange the following elements: P ³⁻ , S ²⁻ , K ⁺ ,		
	a. Sc ³⁺ , Ca ²⁺ , K ⁺ , S ²⁻ , P ³⁻		P ³⁻ , S ²⁻ , K ⁺ , Ca ²⁺ , Sc ³⁺
	b. K ⁺ , Ca ²⁺ , Sc ³⁺ , S ²⁻ , P ³⁻		Sc ³⁺ , Ca ²⁺ , K ⁺ , P ³⁻ , S ²⁻
 11.	Which of the following elements has the smal		
	a. Cesium		Calcium
	b. Oxygen	d.	Chlorine
 12.		e amo	ounts of reactant and product at the end of the reaction?
	a. no reactant; all product		
	b. no product; all reactant		
	c. some product; some reactant	1	to connect by Astronovice A
10	d. The relationship between reactants and pr		
 13.	• •		
	a. $2SO_3 \rightarrow 2SO_2 + O_2$		$2SO_2 + O_2 \rightarrow 2SO_3$
	b. $SO_3 + O_2 \rightarrow SO_5$	d.	$SO_2 + 2SO_3 \rightarrow 3S + 4O_2$
 14.	In an endothermic reaction at equilibrium, wh	at is t	he effect of raising the temperature?
	a. The reaction makes more products.	c.	The reaction is unchanged.
	b. The reaction makes more reactants.	d.	The answer cannot be determined.
 15.	<u> </u>	t the	following reaction to the right?
	$4HCl(g) + O_2(g) \Longrightarrow 2Cl_2(g) + 2H_2O(g)$		
	a. addition of Cl ₂	c.	increase of pressure
	b. removal of O ₂	d.	decrease of pressure
16.	What is the effect of adding more water to the	follo	owing equilibrium reaction?
	$CO_2 + H_2O \longrightarrow H_2CO_3$		
	a. More H ₂ CO ₃ is produced.		
	b. CO ₂ concentration increases.		
	c. The equilibrium is pushed in the direction	n of re	eactants
	d. There is no effect.	1011	outunes.
17		∩ ⁸ th	0
 1/.	In an equilibrium reaction with a K_{eq} of 1×10^{-2}		
	a. reactants are favored		-
	b. reaction is spontaneous		reaction is exothermic
 18.	The $K_{\rm eq}$ of a reaction is 4×10^{-7} . At equilibrium	um, tł	ne
	a. reactants are favored		
	b. products are favored		
	c. reactants and products are present in equa		
	d. rate of the forward reaction is much great		an the rate of the reverse reaction
 19.	Which of the following is a property of an aci	d?	
	a. sour taste	c.	strong color
	b. nonelectrolyte	d.	unreactive
 20.	1 1		
	a. H ₂ PO ₃	c.	HPO_2
	b. H_3PO_4	d.	HPO_4

Name:	
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21.	Which of these is an Arrhenius base?		
 	a. LiOH	c.	$H_2PO_4^-$
	b. NH ₃	d.	CH ₃ COOH
22.	What is transferred between a conjugate acid-ba	ase r	J.
 	a. an electron	c.	a hydroxide ion
	b. a proton	d.	a hydronium ion
 23.	Which compound can act as both a Brønsted-Lo	owry	acid and a Brønsted-Lowry base?
	a. water	c.	sodium hydroxide
	b. ammonia	d.	hydrochloric acid
 24.	In the reaction $CO_3^2 + H_2O \rightleftharpoons HCO_3 + CO_3$)Η ⁻ ,	the carbonate ion is acting as a(n)
	a. Arrhenius base	c.	Brønsted-Lowry base
	b. Arrhenius acid	d.	Brønsted-Lowry acid
 25.	Which of the following reactions illustrates amp	phot	erism?
	a. $H_2O + H_2O \Longrightarrow H_3O^+ + OH^-$	c.	$HCl + H_2O \longrightarrow H_3O^+ + Cl^-$
	b. NaCl \longrightarrow Na ⁺ + OH ⁻	d.	$NaOH \longrightarrow Na^+ + OH^-$
 26.	What are the acids in the following equilibrium	reac	etion?
	$CN^- + H_2O \Longrightarrow HCN + OH^-$		
	a. CN ⁻ , H ₂ O	c.	CN ⁻ , OH ⁻
	b. H ₂ O, HCN	d.	$\rm H_2O, OH^-$
 27.	Which of the following represents a Brønsted-L	Lowr	ry conjugate acid-base pair?
	a. SO_3^{2-} and SO_2	c.	
	b. CO_3^{2-} and CO	d.	NH ₄ ⁺ and NH ₃
28.	What is the charge on the hydronium ion?		, ,
	a. 2-	c.	0
	b. 2-	d.	1+
 29.	The products of self-ionization of water are	_•	
	a. H_3O^+ and H_2O	c.	OH ⁺ and H ⁻
	b. OH ⁻ and OH ⁺	d.	OH ⁻ and H ⁺
 30.	In a neutral solution, the [H ⁺] is		
	a. $10^{-14}M$	c.	$1 \times 10^7 M$
	b. zero	d.	equal to [OH ⁻]
 31.	What is pH?		
	a. the negative logarithm of the hydrogen ion		
	b. the positive logarithm of the hydrogen ion		
	c. the negative logarithm of the hydroxide ion		
32.	d. the positive logarithm of the hydroxide ion Which of these solutions is the most basic?	COII	Centration
 J4.	a. $[H^+] = 1 \times 10^{-2} M$	c.	$[H^+] = 1 \times 10^{-11} M$
	b. $[OH^-] = 1 \times 10^{-4} M$	d.	$[OH^-] = 1 \times 10^{-13} M$
	[]	 •	[] - · · · · · · · · · · · · · · · ·

Name:	·			
	33.	Which of the following pairs consists of a. sulfuric acid, sodium hydroxide b. acetic acid, ammonia	a weak aci c. d.	-
_		esponse or more choices that best complete th	e statemen	nt or answer the question.
	34.	For the polymer, polyvinyl chloromator and control of the repeating subunit is a ch(Cl)CH ₂ . Ch(Cl)CHCH ₂ . b.		
	35.	Which substance is made up of monomers joined together in loa. salt b. protein		
	36.	Which element is capable of formextended chains of atoms through double, or triple bonds with itself a. C. b. O.	gh single,	ole, N H
	37.	Proteins are large macromolecuthousands of subunits. The struprotein depends on the sequence	cture of t	
	38.	b. monosaccharides Equal volumes of 1 molar hydromolar (HCl) and 1 molar sodium hydromolar (NaOH) are mixed. After mixin will be	d. ochloric a roxide ba	nucleosides acid se

strongly acidic

b. weakly acidic

a.

ID: A

c. nearly neutral

d. weakly basic

Name:			
Name:	 	 	

ID: A

Potassium hydroxide (KOH) is a strong base because it

39.

- a. easily releases hydroxide ions
- c. reacts to form salt crystals in water
- b. does not dissolve in water
- d. does not conduct and electric current

Of four different laboratory solutions, the solution with the *highest* acidity has a pH of

40.

a. 11

c. 5

b. 7

d. 3

Which of the following is an observable property of many acids?

___ 41.

- a. They become slippery when reacting with water
- b. They react with metals to release hydrogen gas
- c. They produce salts when mixed with other acids
- d. Thye beomce more acidic when mixed with a base

Which would be *most* appropriate for collecting data during a neutralization reaction?

42.

a. a pH probe

c. a thermometer

b. a statistics program

- d. a graphing program
- 43. An analysis of the equilibrium mixture in a 1-L flask gives the following results: $[HCl] = .30 \text{ mol}, [O_2] = .20 \text{ mol}, [H_2O] = 1.2 \text{ mol}, \text{ and } [Cl_2] = .60$

$$4HCl(g) \ + \ O_2(g) \ < ---> \ 2H_2O(g) \ + 2Cl_2(g) \ + 10kJ$$

- a. [Cl₂] [H₂O]/ [HCl] [O₂]
- c. $[O_2] [HCl]^4 [kJ]/ [H_2O]^2 [Cl_2]^2$
- b. $[Cl_2]^2 [H_2O]^2 / [HCl]^4 [O_2]$
- d. $[HC1] [O_2]/[Cl_2] [H_2O]$
- 44. An analysis of the equilibrium mixture in a 1-L flask gives the following results: [HC1] = .30 mol, $[O_2] = .20$ mol, $[H_2O] = 1.2$ mol, and $[Cl_2] = .60$

$$4HCl(g) + O_2(g) <---> 2H_2O(g) + 2Cl_2(g) + 10kJ$$

Calculate K_{eq}:

a. 0.51

c. 1.6

b. 2.2×10^2

d. 3.3×10^2

45. An analysis of the equilibrium mixture in a 1-L flask gives the following results: [HCl] = .30 $mol, [O_2] = .20$ $mol, [H_2O] = 1.2$ $mol, and [Cl_2] = .60$

$$4HCl(g) + O_2(g) <---> 2H_2O(g) + 2Cl_2(g) + 10kJ$$

Based on your answer for K_{eq} are the reactants or products favored?

a. reactants

c. Both a and B

b. products

46.

49.

d. heat

$$C_6H_6 + Br_2 \rightarrow C_6H_5Br + HBr$$

Which of the following changes will cause an increase in the rate of the above reaction?

- a. increasing the concentration of Br2
 - c. increasing the concentration of HBr
- b. decreasing the concentration of CH66 d. decreasing the temperature
- 47. When a reaction is at equilibrium and more reactant is added, which of the following changes is the immediate result?
 - a. The reverse reaction rate remains the c. same.
- c. The reverse reaction rate decreases.
 - b. The forward reaction rate increases.
- d. The forward reaction rate remains the same.
- 48. In which of the following reactions involving gases would the forward reaction be favored by an increase in pressure?

$$A + B \rightleftharpoons AB$$

$$2A + B \rightleftharpoons C + 2D$$

$$A + B \rightleftharpoons C + D$$

$$AC \rightleftharpoons A + C$$

$$4HCI_{(g)} + O_{2(g)} \rightleftarrows 2H_2O_{(l)} + 2CI_{2(g)} + 113 \text{ kJ}$$

Which action will drive the reaction to the right?

- a. heating the equilibrium mixture
- c. decreasing the oxygen concentration
- b. adding water to the system
- d. increasing the system's pressure

Name:

ID: A

$$NO_2(g) + CO(g) \rightleftharpoons NO(g) + CO_2(g)$$

The reaction shown above occurs inside a closed flask. What action will shift the reaction to the left?

50.

- a. pumping CO gas into the closed flask c. increasing the NO concentration in the flask
- b. raising the total pressure inside the flask
- d. venting some CO2 gas from the flask

$$NH_4CI(s) + heat \implies NH_3(g) + HCI(g)$$

What kind of change will shift the reaction above to the right to form more products?

51.

- a. a decrease in total pressure
- c. an increase in the pressure of NH3
- b. an increase in the concentration of HC1
- d. a decrease in temperature

52. Which direction best represents the effect of adding oxygen on the equilibrium position for the equation above.

$$4HCl(g) + O_2(g) < ---> 2H_2O(g) + 2Cl_2(g) + 10kJ$$

a. left

c. at equilibirum

b. right

d. a and b

$$2CO + O_2 \longrightarrow 2CO_2$$

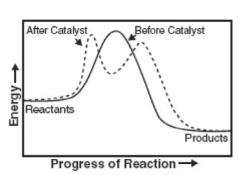
If the above reaction takes place inside a sealed reaction chamber, then which of these procedures will cause a decrease in the rate of reaction?

53.

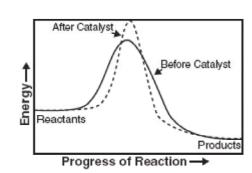
- a. raising the temperature of the reaction c. removing the CO2 as it is formed chamber
- b. increasing the volume inside the reaction chamber
- d. adding more CO to the reaction chamber

___ 54. Which reaction diagram shows the effect of using the appropriate catalyst in a chemical reaction?

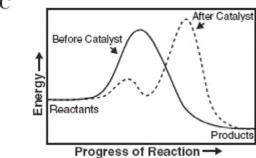
A



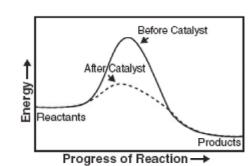
В



C



D



a. A

c. C

b. B

- d. D
- 55. The hydronium ion in the following reaction, HI + H₂O --> H₃O⁺ + I-, would be considered a:
 - a. acid

c. conjugate acid

b. base

d. conjugate base

____ 56. $C_3H_8 + 5O_2 < --> 3CO_2 + 4H_2O$

Which of these could be added to the above reaction to increase the rate of reaction over time?

a. C_3H_8 and O_2

c. O₂ and CO₂

b. H₂O and CO₂

- d. O₂ and H₂O
- 57. Given the reaction, ClO²⁻ + H₂O --> HClO²⁻ + OH-water is acting as:
 - a. an acidb. a base

- c. a conjugate base
- d. a conjugate acid

58.

pH Levels

[H ₃ 0+]	pН	Example
1 x 100	0	HCI (4%)
1 x 10 ⁻¹	1	Stomach acid
1 x 10 ⁻²	2	Lemon juice
1 x 10 ⁻³	3	Vinegar
1 x 10 ⁻⁴	4	Soda
1 x 10 ⁻⁵	5	Rainwater
1 x 10 ⁻⁸	6	Milk
1 x 10 ⁻⁷	7	Pure water
1 x 10 ⁻⁸	8	Egg whites
1 x 10 ⁻⁹	9	Baking soda
1 x 10 ⁻¹⁰	10	Ammonia
1 x 10 ⁻¹¹	11	
1 x 10 ⁻¹²	12	Drain cleaner
1 x 10 ⁻¹³	13	NaOH (4%)
1 x 10 ⁻¹⁴	14	

Which substance is the most acidic?

a. Baking soda

c. Milk

b. Drain cleaner

- d. Rainwater
- 59. Given the reaction $HSO_3^- + H_2O \longrightarrow SO_3^{2-} + H_3O^+$, sulfite is the:
 - a. acid

c. conjugat acid

b. base

- d. conjugate base
- 60. Using the electron dot structure, a phosphide ion would most look like _____.
 - a. : P:
- b. : Р:
- c. [**:**P]³⁻
- d. [**:P^{*}]**3

a. A

c. C

b. B

- d. D
- 61. Which of the following pairs of elements is most likely to form an ionic compound?
 - a. magnesium and fluorine
- c. nitrogen and sulfur

b. sodium and aluminum

d. oxygen and chlorine

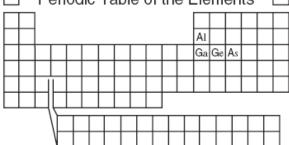
- 62. Choose the correct molecular shapter for ammonia, NH₃.
 - a. bent

c. trigonal planar

b. linear

d. trigonal pyramidal

☐ Periodic Table of the Elements



63.

Which of the following elements has the same Lewis dot structure as Silicon?

a. Germanium

c. Gallium

b. Aluminum

- d. Arsenic
- 64. Determine the shape of SCl₂:
 - a. bent

c. tetrahedral

b. linear

d. trigonal pyramidal

Practice test 2013 Answer Section

MULTIPLE CHOICE

	ANS: ANS: 1c		PTS:	1	STA:	2b		
3.	PTS: ANS: Stt. 4h		STA:	1c				
4.	PTS: ANS: St. 7d		STA:	4h				
	PTS:	1	STA:	7d				
5.	ANS:	D	PTS:	1				
6.	ANS:	A	PTS:	1				
	ANS:			1				
	ANS:			1				
	ANS:			1				
	ANS:		PTS:	1				
11.	ANS: St. 1c	В						
	St. IC							
	PTS:	1						
12.	ANS:	C	PTS:	1	DIF:	L1	REF:	p. 549 p. 550
	OBJ:	18.2.1	STA:	Ch.8.a				
13.	ANS:		PTS:	1	DIF:	L2	REF:	p. 549
		18.2.1		Ch.8.a				
14.	ANS:	A	PTS:	1	DIF:	L2	REF:	p. 554
15	OBJ: ANS:	18.2.2	STA: PTS:	Ch.9.a	DIE.	1.2	DEE.	n 551
13.	OBJ:			1 Ch.9.a	DIF:	L2	KEF.	p. 554
16.		A		1	DIF:	L2	REF:	p. 552 p. 553
10.		18.2.2		Ch.9.a	ZII.	22	TLLI .	p. 552 p. 555
17.	ANS:	C		1	DIF:	L1	REF:	p. 556
	OBJ:	18.2.3	STA:	Ch.9.c				
18.	ANS:			1	DIF:	L1	REF:	p. 556
	OBJ:	18.2.3	STA:	Ch.9.c				

19.	ANS:	A	PTS:	1	DIF:	L1	REF:	p. 587
	OBJ:	19.1.1	STA:	Ch.5.a				
20.	ANS:	В	PTS:	1	DIF:	L1	REF:	p. 588
	OBJ:	19.1.1						
21.	ANS:	A	PTS:	1	DIF:	L1	REF:	p. 589
	OBJ:	19.1.2	STA:	Ch.5.e				
22.	ANS:	В	PTS:	1	DIF:	L1	REF:	p. 591
	OBJ:	19.1.2	STA:	Ch.5.e				
23.	ANS:	A	PTS:	1	DIF:	L2	REF:	p. 591
	OBJ:	19.1.2	STA:	Ch.5.e				
24.	ANS:	C	PTS:	1	DIF:	L2	REF:	p. 590
	OBJ:	19.1.2	STA:	Ch.5.e				
25.	ANS:	A	PTS:	1	DIF:	L2	REF:	p. 592
	OBJ:	19.1.2	STA:	Ch.5.e				
26.	ANS:	В	PTS:	1	DIF:	L2	REF:	p. 591
	OBJ:	19.1.2	STA:	Ch.5.b				
27.	ANS:	D	PTS:	1	DIF:	L2	REF:	p. 591
	OBJ:	19.1.2	STA:	Ch.5.e				
28.	ANS:	D	PTS:	1	DIF:	L1	REF:	p. 594
	OBJ:	19.2.1	STA:	Ch.5.b				
29.	ANS:	D	PTS:	1	DIF:	L1	REF:	p. 594
	OBJ:	19.2.1	STA:	Ch.5.c				
30.	ANS:	D	PTS:	1	DIF:	L1	REF:	p. 595
	OBJ:	19.2.1	STA:	Ch.5.d				
31.	ANS:	A	PTS:	1	DIF:	L1	REF:	p. 596
	OBJ:	19.2.2	STA:	Ch.5.f				
32.	ANS:	C	PTS:	1	DIF:	L2	REF:	p. 597 p. 598
	OBJ:	19.2.2	STA:	Ch.5.d				
33.	ANS:	C	PTS:	1	DIF:	L3	REF:	p. 609
	OBJ:	19.3.2	STA:	Ch.5.c				

MULTIPLE RESPONSE

- 34. ANS: D 10a
 - PTS: 1
- 35. ANS: B 10b
 - PTS: 1

- 36. ANS: A 10b
 - PTS: 1
- 37. ANS: C 10c
 - PTS: 1
- 38. ANS: C 5a
 - PTS: 1
- 39. ANS: A 5c
 - PTS: 1
- 40. ANS: D 5d
 - PTS: 1
- 41. ANS: B 5a
 - PTS: 1
- 42. ANS: A 5a
 - PTS: 1
- 43. ANS: B 9b
 - PTS: 1
- 44. ANS: D 8b
 - PTS: 1
- 45. ANS: B 9b
 - PTS: 1
- 46. ANS: A 9a
 - PTS: 1

- 47. ANS: B 9a
 - PTS: 1
- 48. ANS: A 9a
 - PTS: 1
- 49. ANS: D 9b
 - PTS: 1
- 50. ANS: C 9a
 - PTS: 1
- 51. ANS: A 9a
 - PTS: 1
- 52. ANS: B 9a
 - PTS: 1
- 53. ANS: B 8a
 - PTS: 1
- 54. ANS: D 8c
 - PTS: 1
- 55. ANS: C 5b
 - PTS: 1
- 56. ANS: D 8a and 8b
 - PTS: 1
- 57. ANS: A 5b
 - PTS: 1

- 58. ANS: D 5a
- PTS: 1 59. ANS: D 8b
- PTS: 1 60. ANS: C 2e
- PTS: 1 61. ANS: A 2c
- PTS: 1 62. ANS: D 2f
- PTS: 1 63. ANS: A 2e
- PTS: 1 64. ANS: A 2f
 - PTS: 1