Chem25, Spring 2008, Foothill College, FinalExam
Name_____

Please read all the questions VERY carefully before answering. No outside paper is allowed.
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) What happens to the equilibrium position of an endothermic reaction when you add heat? 1) _____
A) halves
B) shifts to the left
C) does nothing
D) shifts to the right
E) doubles

2) For the reaction $2N_2O(g) \rightleftharpoons O_2(g) + 2N_2(g)$, what happens to the equilibrium position if the pressure decreases? 2) _____
A) shifts to the left
B) shifts to the right
C) halves
D) doubles
E) does nothing

3) What is the molarity of a solution prepared by dissolving 54.3 g of $Ca(NO_3)_2$ into 355 mL of water? 3) _____
A) 0.932 *M*
B) 1.99 *M*
C) 0.331 *M*
D) 0.117 *M*
E) none of the above

4) What types of forces exist between I_2 molecules? 4) _____
A) ion-dipole forces
B) dispersion forces
C) dipole-dipole forces
D) hydrogen bonding
E) none of the above

5) Which molecule below has hydrogen bonding? 5) _____
A) HF
B) CH_3OH
C) NH_3
D) H_2O
E) all of the above

6) Which noble gas has the highest boiling point? 6) _____
A) Kr B) He C) Xe D) Ne E) Ar

7) How many grams of $C_4H_{10}O$ can be melted by 2.00×10^3 J? 7) _____

Given ΔH_{fus}=7.27 kJ/mol

A) 3.64
B) 14.5
C) 20.4
D) 74.1
E) none of the above

8) The vapor pressure of water at 20.0°C is 17.5 mm Hg. If the pressure of a gas collected over water was measured to be 453.0 mm Hg. What is the pressure of the pure gas? 8) _____

A) 0.0230 atm
B) 0.573 atm
C) 0.596 atm
D) 0.619 atm
E) none of the above

9) A 3.76 g sample of a noble gas is stored in a 2.00 L vessel at 874 torr and 25°C, what is the noble gas? 9) _____

A) He
B) Ne
C) Ar
D) Kr
E) not enough information

10) What is the final volume of a balloon that was initially 500.0 mL at 25°C and was then heated to 50°C ? 10) _____

A) 1.00 L
B) 542 mL
C) 461 mL
D) 193 mL
E) none of the above

11) 8.5 g sample of NH_3 on oxidation produces 4.5 g of NO. Calculate the percent yield. 11) _____

Reaction: $4\ NH_3 + 5\ O_2 \rightarrow 4\ NO + 6\ H_2O$

A) 15 %
B) 70%
C) 30%
D) 60%
E) none of the above

12) How many moles of aluminum oxide are produced according to the reaction below given that you start with 10.0 g of Al and 19.0 grams of O_2? 12) _____

Reaction: $4Al + 3O_2 \rightarrow 2Al_2O_3$

A) 0.396
B) 0.741
C) 0.185
D) 5.00
E) not enough information

13) What are the coefficients for the following reaction when it is properly balanced? 13) _____

___nitrogen monoxide + ___carbon monoxide → ___nitrogen +___carbon dioxide

A) 2, 2, 1, 2
B) 2, 1, 1, 2
C) 2, 2, 2, 1
D) 1, 1, 2, 2
E) none of the above

14) Identify the double displacement reactions among the following: 14) _____

1. $KCl(aq) + AgNO_3(aq) \rightarrow AgCl(s) + KNO_3(aq)$
2. $Na_2SO_4(aq) + BaCl_2(aq) \rightarrow BaSO4(s) + 2NaCl(aq)$
3. $H_2SO_4(aq) + 2NaOH(aq) \rightarrow Na_2SO_4(aq) + 2H_2O(l)$

A) 1 and 3 only
B) 1 and 2 only
C) 2 and 3 only
D) All of 1, 2, and 3
E) None of 1, 2, and 3

15) What is the value of n when the empirical formula is C_3H_5 and the molecular mass is 205.4 g/mol. 15) _____

A) 10
B) 5
C) 140
D) 0.02
E) none of the above

16) If a sample of carbon dioxide contains 3.8 moles of oxygen atoms, how many moles of carbon dioxide are in the sample? 16) _____

A) 1.9
B) 3.8
C) 11.4
D) 7.6
E) none of the above

17) What is the mass of 1.56×10^{21} atoms of magnesium in grams? 17) _____

A) 0.0630
B) 1.07×10^{-4}
C) 4.72×10^{-5}
D) 0.142
E) none of the above

18) How many atoms are in 1.50 moles of fluorine gas? 18) _____

A) 18.98
B) 9.03×10^{23}
C) 6.022×10^{23}
D) 1.81×10^{24}
E) none of the above

19) Which of the following compounds have the smallest formula mass? 19) _____

A) SiO_2 B) SO_2 C) H_2O D) CO_2 E) NO_2

20) What is the correct formula for ammonium hydrogen sulfate? 20) _____

A) $NH_4)_2SO_4$
B) NH_4HSO_4
C) $(NH_4)_2HSO_4$
D) Am_2HSO_4
E) none of the above

21) What is the name of the compound whose formula is Na_2O? 21) _____

A) Sodium oxide
B) Sodium monoxide
C) Disodium oxide
D) Disodium monoxide
E) none of the above

22) Chlorine has two stable isotopes, Cl-35 and Cl-37. If their exact masses are 34.9689 amu and 36.9695 amu, respectively, what is the natural abundance of Cl-35? (The atomic mass of chlorine is 35.45 amu) 22) _____

A) 37.00% B) 24.05% C) 35.00% D) 75.95% E) 50.00%

23) An atom that has the same number of neutrons as $^{138}_{56}Ba$ is 23) _____

A) $^{138}_{55}Cs$
B) $^{136}_{54}Am$
C) $^{136}_{56}Ba$
D) $^{137}_{57}La$
E) none of the above

24) How many protons and electrons are present in O^{2-}? 24) _____

A) 10 protons and 8 electrons.
B) 8 protons and 10 electrons.
C) 16 protons and 8 electrons.
D) 8 protons and 8 electrons.
E) none of the above

25) Xe is a member of which family? 25) _____

A) noble gases
B) halogens
C) alkali metals
D) alkaline earth metals
E) none of the above

26) Nonmetals are located where on the periodic table? 26) _____

A) left side
B) zig-zag diagonal line
C) right side
D) middle
E) none of the above

27) In order for a solution to be acidic 27) _____

A) $[H_3O^+] = [OH^-]$
B) pH = pOH
C) $[H_3O^+] > [OH^-]$
D) $[H_3O^+] < [OH^-]$
E) none of the above

28) A solution at 25°C has a hydrogen ion concentration of 2.6×10^{-5} M. Which of the following is TRUE? 28) _____

A) $[H_3O^+] = \frac{[OH^-]}{K_W}$
B) $[H_3O^+] > [OH^-]$
C) $[H_3O^+] = [OH^-]$
D) $[H_3O^+] < [OH^-]$
E) none of the above

29) What is the $[H^+]$ in a solution that has a pH of 3.35? 29) _____

A) 4.5×10^{-4} M
B) 2.2×10^{3} M
C) $1 \times 10^{3.35}$ M
D) 3.35×10^{-14} M
E) none of the above

30) What is the concentration of the hydroxide ion given that the concentration of the hydronium ion is 1.5×10^{-5} M? 30) _____

A) 1.5×10^{9} M
B) 6.7×10^{-10} M
C) 1.0×10^{-14} M
D) 1.0×10^{-19} M
E) none of the above

31) Determine the answer to the following equation with correct number of significant figures: 31) _____
$(4.123 \times 0.12) + 24.2 =$ _____
A) 24.695
B) 24.7
C) 24.70
D) 25
E) none of the above

32) How many cm^3 are there in 1.25 ft^3? 32) _____
A) 3.54×10^4
B) 38.1
C) 5.49×10^3
D) 246
E) none of the above

33) Given the density of Au is 19.3 g/cm^3, determine the mass of gold in an ingot with the dimensions of 10.0 in x 4.00 in x 3.00 in. 33) _____
A) 102
B) 0.161
C) 3.80×10^4
D) 2.32×10^3
E) none of the above

34) Which of the following items is a pure substance? 34) _____
A) air
B) brass
C) ice
D) seawater
E) none of the above

35) Physical properties are: 35) _____
A) those that cause atoms and molecules to change.
B) those that a substance displays without changing its composition.
C) identical for all solid matter.
D) those that a substance displays only through changing its composition.
E) none of the above

36) When methane is burned with oxygen the products are carbon dioxide and water. If you produce 36 grams of water and 44 grams of carbon dioxide from 16 grams of methane, how many grams of oxygen were needed for the reaction? 36) _____
A) 32
B) 96
C) 80
D) 64
E) none of the above

37) The boiling point of water is 37) _____

(1) 212°F (2) 0°C (3) 373 K

A) 1 and 3 only
B) 1 and 2 only
C) 2 and 3 only
D) all of 1, 2, and 3
E) none of 1, 2, and 3

38) A 15.0 gram lead ball at 25.0°C was heated with 40.5 joules of heat. Given the specific heat of lead is 0.128 J/g•°C, what is the final temperature of the lead? 38) _____

A) 46.1°C
B) 0.844°C
C) 77.8°C
D) 21.1°C
E) none of the above

TRUE/FALSE. Choose "A" for a true answer and "B" for wrong answer.

39) The name of KNO_3 is potassium nitratide. 39) _____

40) Carbon dioxide is an example of a molecular compound. 40) _____

41) The charges on electrons and neutrons cancel each other to give neutral atoms. 41) _____

42) The pH of 0.001 M HCl is 3.0. 42) _____

43) A neutral solution does not contain any H^+ or OH^-. 43) _____

44) A strong acid is one that completely dissociates into ions in solution. 44) _____

45) Exact numbers have an unlimited number of significant figures. 45) _____

46) When the number 65.59 is rounded to contain 2 significant figures, it becomes 66.0. 46) _____

47) Solids have indefinite shape and volume 47) _____

48) Air is a pure substance. 48) _____

49) One mole of chlorine gas has a mass of 35.45 grams. 49) _____

50) Water is 11.2% hydrogen by mass. 50) _____

Answer Key
Testname: FH_CHEM25_SP08_FINALEXAM

1) D
2) B
3) A
4) B
5) E
6) C
7) C
8) B
9) C
10) B
11) C
12) C
13) A
14) C
15) B
16) A
17) A
18) D
19) C
20) B
21) A
22) D
23) B
24) B
25) A
26) C
27) C
28) B
29) A
30) B
31) B
32) A
33) C
34) C
35) B
36) D
37) A
38) A
39) FALSE
40) TRUE
41) FALSE
42) TRUE
43) FALSE
44) TRUE
45) TRUE
46) FALSE
47) FALSE
48) FALSE

49) FALSE
50) TRUE