

Chem 106 Midterm Study Questions - Chapters 1-7

Name: _____

Review Mon 10/17/11

Due 10/24/11 (Midterm exam)

This is a homework assignment. Please show your work for full credit. If you do work on separate paper, attach the work to these.

Useful information to be provided on exam:**Mass**

1 lb = 453.6 g *

1 kg = 2.205 lb *

Length

1 in = 2.54 cm

1 m = 1.094 yd *

1 mi = 1.609 km *

Volume

1 L = 1.0567 qt*

1 ft³ = 28.32 L *

1. Define the following terms:
 - a. science
 - b. chemistry
2. Write 8,364 in standard scientific notation.
 - A) 8364
 - B) 8.364×10^{-3}
 - C) 836.4×10^1
 - D) 8.364×1000
 - E) 8.364×10^3
3. The number 0.005822 expressed in scientific notation is
 - A) 5.82×10^3
 - B) 5.822×10^3
 - C) 5.82×10^{-3}
 - D) 5.822×10^{-3}
 - E) 5822×10^{-6}
4. 1.2 kilograms contain this many grams.
 - A) 1.2×10^3
 - B) 1.2×10^2
 - C) 1.2×10^1
 - D) 1.2×10^{-2}
 - E) 1.2×10^{-3}

5. Convert: $3.6 \text{ mm} = \underline{\hspace{2cm}}$ km.
- A) $3.6 \times 10^{-6} \text{ km}$
 - B) $3.6 \times 10^{-3} \text{ km}$
 - C) $3.6 \times 10^3 \text{ km}$
 - D) $3.6 \times 10^6 \text{ km}$
 - E) $3.6 \times 10^2 \text{ km}$
6. Convert 216.0 m to decimeters.
- A) $2.160 \times 10^4 \text{ dm}$
 - B) 21.60 dm
 - C) 2.160 dm
 - D) $2.160 \times 10^3 \text{ dm}$
 - E) none of these
7. 2.2 milliseconds is equal to how many seconds?
- A) $2.2 \times 10^3 \text{ s}$
 - B) $2.2 \times 10^2 \text{ s}$
 - C) $2.2 \times 10^{-3} \text{ s}$
 - D) $2.2 \times 10^{-2} \text{ s}$
 - E) 0.22 s
8. Using the rules of significant figures, calculate the following:
 $6.167 + 70 =$
- A) 76
 - B) 80
 - C) 76.167
 - D) 77
 - E) 76.17
9. The number 2.00152 rounded to four significant figures is
- A) 2.002
 - B) 2.001
 - C) 2.000
 - D) 2.152
 - E) none of these

10. How many significant figures are in the number 1000.0?
A) 1
B) 2
C) 3
D) 4
E) 5
11. A student finds that the weight of an empty beaker is 12.024 g. She places a solid in the beaker to give a combined mass of 12.108 g. To how many significant figures is the mass of the solid known?
A) 1
B) 2
C) 3
D) 4
E) 5
12. The product of $0.1400 \times 6.02 \times 10^{23}$ will have how many significant figures?
A) 2
B) 3
C) 23
D) 10^{23}
E) 7
13. Convert: $638.4 \text{ K} = \underline{\hspace{2cm}} \text{ } ^\circ\text{C}$.
A) 911.4°C
B) 365.4°C
C) 1181.1°C
D) 386.7°C
E) 354.7°C
14. Convert: $-34.9^\circ\text{F} = \underline{\hspace{2cm}} \text{ } ^\circ\text{C}$.
A) -37.2°C
B) -1.6°C
C) -120.4°C
D) -5.2°C
E) 238.1°C

15. An object is 143.0 inches in height. Express this height in centimeters.
- A) 56.30 cm
 - B) 0.01776 cm
 - C) 11.92 cm
 - D) 363.2 cm
 - E) 145.5 cm
16. 314.2°F is equivalent to
- A) 192.3°C
 - B) 156.8°C
 - C) 508.0°C
 - D) 623.2°C
 - E) 174.6°C
17. What is the mass in pounds of a human who weighs 98.40 kg?
- A) 217.0 lb
 - B) 44.63 lb
 - C) 197.0 lb
 - D) 100.61 lb
 - E) none of these
18. The density of gold is 19.3 g/mL. What is the volume of a gold nugget that weighs 95.2 g?
- A) 1.84×10^3 mL
 - B) 4.93 mL
 - C) 0.203 mL
 - D) 75.9 mL
 - E) none of these
19. A graduated cylinder contains 20.0 mL of water. An irregularly shaped object is placed in the cylinder, and the water level rises to the 31.2-mL mark. If the object has a mass of 96.3 g, what is its density?
- A) 8.60 g/mL
 - B) 0.116 g/mL
 - C) 3.09 g/mL
 - D) 4.81 g/mL
 - E) none of these

20. Which of the following is a chemical change?
- A) Water condenses on a mirror.
 - B) A damp towel dries.
 - C) Peanuts are crushed.
 - D) A "tin" can rusts.
 - E) At least two of the above (a-d) exhibit a chemical change.
21. If iodine melts at 114°C and boils at 184°C , what is its physical state at 120°C ?
22. Which of the following is an element?
- A) air
 - B) water
 - C) salt
 - D) helium
 - E) sugar
23. Which is an example of a homogeneous mixture?
- A) vodka
 - B) oily water
 - C) soil (dust)
 - D) sodium chloride
 - E) aluminum
24. True or False? The normal boiling point of water is 100°C , which is a physical property of the substance water.
- A) True
 - B) False
25. True or False? Metal rusting is an example of a chemical change.
- A) True
 - B) False

26. Which statement below is **incorrect**?
- A) Dalton's statement "All atoms of a given element are identical" is no longer accepted because of the existence of isotopes and ions.
 - B) O₃ (ozone) is considered a molecule but is not considered an element.
 - C) The number in the measurement "12 apples" has an infinite number of significant figures.
 - D) Rutherford's discovery revealed the atom is mostly made up of empty space.
 - E) At least two of the above statements (a-d) are **incorrect**.
27. The total number of atoms indicated by the formula Ca₃(PO₄)₃ is
- A) 6
 - B) 10
 - C) 16
 - D) 18
 - E) 7
28. Which atomic particle determines the chemical behavior of an atom?
- A) proton
 - B) electron
 - C) neutron
 - D) nucleus
 - E) none of these
29. Which particle has the smallest mass?
- A) neutron
 - B) proton
 - C) electron
 - D) helium nucleus
30. An atom with 15 protons and 16 neutrons is an atom of
- A) P
 - B) Ga
 - C) S
 - D) Pd
 - E) Rh

31. A certain isotope X^+ contains 54 electrons and 78 neutrons. What is the mass number for this element?
- A) 133
 - B) 132
 - C) 131
 - D) 55
 - E) 53
32. The number of protons in the nucleus of an atom is called its
- A) mass number
 - B) valence
 - C) isotope number
 - D) atomic number
 - E) none of these
33. Which pair have approximately the same mass?
- A) a hydrogen, ${}^1_1\text{H}$, and a deuterium, ${}^2_1\text{H}$, atom
 - B) a neutron and an electron
 - C) a proton and a neutron
 - D) an electron and a proton
34. Which of the following elements is an alkaline earth metal?
- A) Ca
 - B) Cu
 - C) Fe
 - D) Na
 - E) Sc
35. Which of the following elements is most similar to chlorine?
- A) H
 - B) He
 - C) Na
 - D) Hg
 - E) Br
36. How many protons, electrons, and neutrons does the isotope ${}^{57}_{26}\text{Fe}^{3+}$ have?

37. The binary compound PCl_3 is called
- A) phosphorus chloride
 - B) triphosphorus chloride
 - C) monophosphorus trichloride
 - D) phosphorus trichloride
 - E) none of these
38. The name for Sn^{2+} is
- A) strontium(II) ion
 - B) tin(II) ion
 - C) strontium ion
 - D) sulfur(II) ion
 - E) selenium ion
39. The correct name for H_2CO_3 is
- A) carbonate acid
 - B) hydrocarbonic acid
 - C) carbonous acid
 - D) carbonic acid
 - E) hydrocarbonous acid
40. The name for $\text{Al}(\text{OH})_3$ is
- A) aluminum(III) hydroxide
 - B) aluminum trihydroxide
 - C) aluminum hydroxide
 - D) monaluminum trihydroxide
 - E) aluminum(I) hydroxide
41. The name for NO_3^- is _____.
42. Which of the following is an **incorrect** name for an acid?
- A) hydrocarbonate acid
 - B) hydrocyanic acid
 - C) acetic acid
 - D) phosphoric acid
 - E) sulfurous acid

43. The name for NaHCO_3 is
- A) sodium hydrogen carbonate (sodium bicarbonate)
 - B) sodium carbonate
 - C) sodium(I) hydrogen carbonate
 - D) sodium(I) bicarbonate
 - E) none of these
44. The name for $\text{HBrO}(aq)$ is
- A) hydrogen bromous acid
 - B) bromous acid
 - C) bromic acid
 - D) hypobromous acid
 - E) perbromic acid
45. The name for $(\text{NH}_4)_2\text{CO}_3$ is _____.
46. The name for CO is _____.
47. The name for $\text{C}_2\text{H}_3\text{O}_2^-$ is _____.
48. The name for MnO_2 is _____.
49. The name for the compound $\text{Na}_2\text{Cr}_2\text{O}_7$ is _____.
50. The name for $(\text{NH}_4)_2\text{SO}_4$ is _____.
51. The name for N_2S_3 is _____.
52. The name for CuCl_2 is _____.
53. The name for SiO_2 is _____.
54. The name for $\text{Zn}(\text{OH})_2$ is _____.

55. The name for Ag_2CO_3 is _____.
56. Write the correct formula for sodium nitrite.
57. Write the correct formula for dinitrogen pentoxide.
58. Give the formula for barium phosphate.
59. Give the formula for calcium hydrogen carbonate.
60. Give the formula for hydrosulfuric acid.
61. Give the formula for lithium sulfate.
62. Give the formula for barium hydroxide.
63. Give the formula for hypochlorous acid.
64. Give the formula for hydroiodic acid.
65. Give the formula for hydrogen peroxide.
66. Give the formula for chromium(III) iodide.
67. Give the formula for mercury(II) sulfide.
68. Give the formula for silicon tetrafluoride.
69. Give the formula for carbon monoxide.

70. Write the correct formula for iron(III) sulfide.

71. When the following equation is balanced using the smallest possible integers, what is the number in front of the substance in bold type?



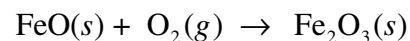
- A) 5
- B) 4
- C) 3
- D) 2
- E) 1

72. When the following equation is balanced using the smallest possible integers, what is the number in front of the substance in bold type?



- A) 10
- B) 6
- C) 4
- D) 2
- E) 1

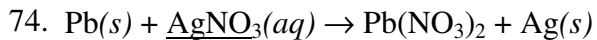
73. Balance the following equation in standard form and determine the sum of the coefficients. Remember that any reagent with NO coefficient actually has a coefficient of "1."



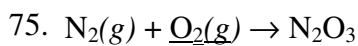
- A) 3
- B) 4
- C) 6
- D) 7
- E) 14

Use the following to answer questions 74-75:

When the following equations are balanced using the smallest possible integers, what is the number in front of the underlined substance in each case?



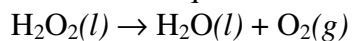
- A) 1
- B) 2
- C) 4
- D) 5
- E) 6



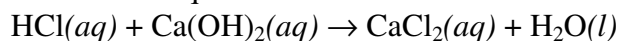
- A) 1
- B) 2
- C) 3
- D) 4
- E) 6

76. Write and balance the equation showing the reaction between calcium metal and water to form aqueous calcium hydroxide and hydrogen gas.

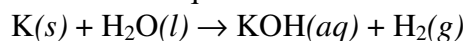
77. Balance the equation



78. Balance the equation



79. Balance the equation



80. How many of the following are oxidation-reduction reactions?

I. reaction of a metal with a nonmetal

II. synthesis

III. combustion

IV. precipitation

V. decomposition

- A) 1
- B) 2
- C) 3
- D) 4
- E) 5

81. The reaction $\text{HCl}(aq) + \text{KOH}(aq) \rightarrow \text{H}_2\text{O}(l) + \text{KCl}(aq)$ is a(n) _____ reaction.

- A) precipitation
- B) acid-base
- C) oxidation-reduction
- D) single-replacement
- E) none of these

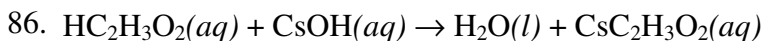
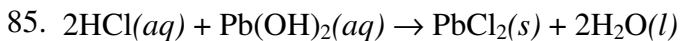
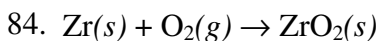
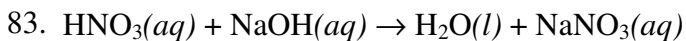
82. A reaction that involves a transfer of electrons is called a(n) _____ reaction.

- A) precipitation
- B) acid-base
- C) oxidation-reduction
- D) double-replacement
- E) none of these

Use the following to answer questions 83-86:

Use the following choices to classify each reaction given below (more than one choice may apply).

- a. oxidation-reduction
- b. acid-base
- c. precipitation



Use the following to answer questions 87-89:

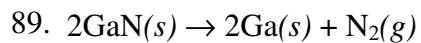
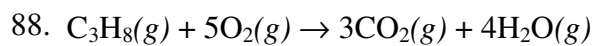
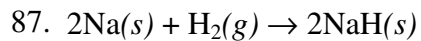
Use the following choices to classify each balanced equation given below (more than one choice may apply).

a. oxidation-reduction

b. combustion

c. synthesis

d. decomposition



Answer Key

- a. Acquisition of knowledge of the natural universe through the use of the Scientific Method.
b. The science that deals with matter and the changes it undergoes.
- E
- D
- A
- A
- D
- C
- B
- A
- E
- B
- B
- B
- A
- D
- B
- A
- B
- A
- D
- liquid
- D
- A
- A
- A
- B
- D
- B
- C
- A
- A
- D
- C
- A
- E
- The isotope contains 26 protons, 23 electrons, and 31 neutrons.
- D
- B
- D
- C
- nitrate ion
- A
- A
- D
- ammonium carbonate
- carbon monoxide
- acetate ion
- manganese(IV) oxide
- sodium dichromate
- ammonium sulfate
- dinitrogen trisulfide
- copper(II) chloride
- silicon dioxide
- zinc hydroxide
- silver carbonate
- NaNO_2
- N_2O_5
- $\text{Ba}_3(\text{PO}_4)_2$
- $\text{Ca}(\text{HCO}_3)_2$
- H_2S
- Li_2SO_4
- $\text{Ba}(\text{OH})_2$
- HClO
- $\text{HI}(aq)$
- H_2O_2
- CrI_3
- HgS
- SiF_4
- CO
- Fe_2S_3
- B
- E
- D
- B
- C
- $\text{Ca}(s) + 2\text{H}_2\text{O}(l) \rightarrow \text{Ca}(\text{OH})_2(aq) + \text{H}_2(g)$
- $2\text{H}_2\text{O}_2(l) \rightarrow 2\text{H}_2\text{O}(l) + \text{O}_2(g)$
- $2\text{HCl}(aq) + \text{Ca}(\text{OH})_2(aq) \rightarrow \text{CaCl}_2(aq) + 2\text{H}_2\text{O}(l)$
- $2\text{K}(s) + 2\text{H}_2\text{O}(l) \rightarrow 2\text{KOH}(aq) + \text{H}_2(g)$
- D
- B

- 82. C
- 83. b
- 84. a
- 85. b; c
- 86. b
- 87. a; c
- 88. a; b
- 89. a; d