midterm1, 2009

Record your name on the top of this exam and on the scantron form. Record the test ID letter in the top right box of the scantron form. Record all of your answers on the scantron form. Turn in both your exam and answer sheet at the end of the period. You have 50 minutes. GOOD LUCK !

- 1. Identify the ions in CaHPO₄.
 - a. Ca^{2+} and HPO_4^{2-}
 - b. Ca^{3+} and HPO_4^{3-}
 - c. Ca^+ and HPO_4^-
 - d. CaH^{3+} and PO_4^{3-}
- 2. What is the name for the element with symbol Mg?
 - Maryland a.
 - b. Magnesium
 - c. Molybdenum
 - d. Manganese

3. What is the mass number of a nickel atom (Ni) with 31 neutrons?

- a. 58
- 31 b.
- c. 59
- d. 3
- 4. Which of the following compounds is a weak base?
 - KOH a.
 - b. LiCl
 - c. NH₃
 - d. HNO₃

5. A precipitate will form when aqueous $Pb(NO_3)_2$ is added to an aqueous solution of _____.

- a. CaBr₂
- b. NaCH₃CO₂
- c. NaNO₃
- d. $Ca(ClO_4)_2$
- 6. Which of the following elements is the most electronegative?
 - lithium a.
 - b. boron
 - c. oxygen
 - calcium d.
- 7. Which one of the following is most likely to be a homogeneous mixture?
 - mortar (a mixture of calcium carbonate and sand) a.
 - the air trapped inside an inflated balloon b.
 - c. blood
 - ground beef d.

- 8. The atomic number of phosphorous is _____.
 - a. 9
 - b. 15
 - c. 19
 - d. 46
- 9. Which of the following statements is/are correct?
 - 1. Water soluble ionic compounds, such as NaCl, are strong electrolytes.
 - 2. Some molecular compounds, such as HCl, are strong electrolytes.
 - 3. Some molecular compounds, such as acetic acid, are weak electrolytes.
 - a. 1, 2, and 3
 - b. 1 and 2
 - c. 1 only
 - d. 3 only

10. Which of the following observations is/are examples of chemical change?

- 1. Sodium chloride melts at 801 °C.
- 2. The density of water decreases when it changes from a liquid to a solid.
- 3. The combustion of propane gas yields carbon dioxide and water.
- a. 1 only
- b. 2 only
- c. 3 only
- d. 1 and 2
- 11. According to the kinetic-molecular theory of matter, particles in a solid
 - a. vibrate back and forth about an average position.
 - b. move slower as the temperature increases.
 - c. are packed closely together, but are not confined to specific positions.
 - d. fly about randomly, colliding with themselves and the walls of their container.
- 12. What halogen is in the second period?
 - a. N
 - b. O
 - c. F
 - d. Ne

13. When ethanol undergoes complete combustion, the products are carbon dioxide and water.

 $\underline{C_2H_5OH(\ell)} + \underline{O_2(g)} \rightarrow \underline{CO_2(g)} + \underline{H_2O(g)}$

What are the respective coefficients when the equation is balanced with the smallest whole numbers?

- a. 1, 1, 1, 1
- b. 1, 2, 1, 3
- c. 1, 3, 2, 3
- d. 2, 3, 4, 6

Name:

- 14. You have 7.57 g of each of the following elements: Si, S, Se, Sr, and Sn. Which sample contains the largest number of atoms?
 - a. Si
 - b. S
 - c. Sr
 - d. Se
- 15. An electronic balance is used to determine that a sample has a mass of 5.8234 g. If the balance's precision is ± 0.1 mg, what is the correct number of significant figures for this measurement?
 - a. 2
 - b. 3
 - c. 4
 - d. 5
- 16. You can identify a metal by carefully determining its density. A 33.39 g sample of an unknown metal is 1.50 cm long, 2.50 cm wide, and 1.00 cm thick. What is a possible identity of the element?
 - a. aluminum, 2.70 g/cm^3
 - b. chromium, 7.20 g/cm^3
 - c. iron, 7.87 g/cm^3
 - d. nickel, 8.90 g/cm³
- 17. Write a balanced net ionic equation for the reaction of aqueous solutions of baking soda (NaHCO₃) and acetic acid (CH₃CO₂H).
 - a. $HCO_3^{-}(aq) + H^+(aq) \rightarrow H_2O(\ell) + CO_2(g)$
 - b. $HCO_3^{-}(aq) + CH_3CO_2H(aq) \rightarrow CH_3CO_2^{-}(aq) + H_2O(\ell) + CO_2(g)$
 - c. $HCO_3^{-}(aq) + H^+(aq) \rightarrow H_2CO_3(aq)$
 - d. NaHCO₃(aq) + H⁺(aq) \rightarrow H₂CO₃(s) + Na⁺(aq)
- 18. Two isotopes of a given element will have the same number of _____, but a different number of _____ in their nucleus.
 - a. protons, electrons
 - b. electrons, protons
 - c. protons, neutrons
 - d. electrons, neutrons
- 19. Which method is correct for determining the gallons of gasoline required to fill an automobile's 64 liter tank? (1.000 liter = 1.057 quarts, 4 quarts = 1 gallon)

a. 64 liters
$$\left(\frac{1 \text{ liter}}{1.057 \text{ quarts}}\right) \left(\frac{1 \text{ gallon}}{4 \text{ quarts}}\right) =$$

b. 64 liters $\left(\frac{1.057 \text{ quarts}}{1 \text{ liter}}\right) \left(\frac{4 \text{ quarts}}{1 \text{ gallon}}\right) =$
c. 64 liters $\left(\frac{1 \text{ liter}}{1.057 \text{ quarts}}\right) \left(\frac{4 \text{ quarts}}{1 \text{ gallon}}\right) =$
d. 64 liters $\left(\frac{1.057 \text{ quarts}}{1 \text{ liter}}\right) \left(\frac{1 \text{ gallon}}{4 \text{ quarts}}\right) =$

- 20. Which of the following is the greatest length?
 - a. $5.0 \times 10^{-1} \text{ mm}$
 - b. $5.0 \times 10^1 \,\mu m$
 - c. $5.0 \times 10^8 \text{ pm}$
 - d. $5.0 \times 10^{6} \text{ nm}$
- 21. An element consists of two isotopes. The abundance of one isotope is 60.1% and its atomic mass is 68.9256 u. The atomic mass of the second isotope is 70.9247 u. What is the average atomic mass of the element?
 - a. 69.7 u
 - b. 69.9 u
 - c. 70.1 u
 - d. 84.1 u
- 22. When 24.3 g of magnesium is burned in air, what quantity of magnesium oxide is formed?
 - a. 28.3 g
 - b. 42.3 g
 - c. 40.3 g
 - d. 56.3 g

23. Which of the following compounds will produce an acidic solution when dissolved in water?

- a. CaO
- b. Na₂SO₄
- c. Fe_2O_3
- d. SO₂
- 24. Nitrogen and oxygen form an extensive series of oxides with the general formula N_xO_y . What is the empirical formula for an oxide that contains 36.85% by mass nitrogen?
 - a. N₂O
 - b. NO
 - c. NO₂
 - $d. \quad N_2O_3$
- 25. What is the molar mass of potassium nitrate?
 - a. 39.10 g/mol
 - b. 53.11 g/mol
 - c. 85.11 g/mol
 - d. 101.1 g/mol
- 26. The boiling point of liquid helium is -269 °C. What is this temperature in kelvin?
 - a. 0.985 K
 - b. 1.01 K
 - c. 4 K
 - d. 29 K

midterm1, 2009 Answer Section

MULTIPLE CHOICE

1.	ANS:	А	PTS:	1	TOP:	2.7 Ionic Compounds: Formulas, Names, and Properties
2.	ANS:	В	PTS:	1	TOP:	1.3 Elements and Atoms
3.	ANS:	С	PTS:	1	TOP:	2.2 Atomic Number and Atomic Mass
4.	ANS:	С	PTS:	1	TOP:	3.7 Acids and Bases
5.	ANS:	А	PTS:	1	TOP:	3.6 Precipitation Reactions
6.	ANS:	С	PTS:	1	TOP:	1.4 Compounds and Molecules
7.	ANS:	В	PTS:	1	TOP:	1.2 Classifying Matter
8.	ANS:	В	PTS:	1	TOP:	2.2 Atomic Number and Atomic Mass
9.	ANS:	А	PTS:	1	TOP:	3.5 Ions and Molecules in Aqueous Solutions
10.	ANS:	С	PTS:	1	TOP:	1.6 Physical and Chemical Change
11.	ANS:	А	PTS:	1	TOP:	1.2 Classifying Matter
12.	ANS:	С	PTS:	1	TOP:	2.5 The Periodic Table
13.	ANS:	С	PTS:	1	TOP:	3.2 Balancing Chemical Equations
14.	ANS:	А	PTS:	1	TOP:	2.9 Atoms, Molecules, and the Mole
15.	ANS:	D	PTS:	1	TOP:	Review.3 Mathematics in Chemistry
16.	ANS:	D	PTS:	1	TOP:	1.5 Physical Properties
17.	ANS:	В	PTS:	1	TOP:	3.8 Gas-Forming Reactions
18.	ANS:	С	PTS:	1	TOP:	2.3 Isotopes
19.	ANS:	D	PTS:	1	TOP:	Review.3 Mathematics in Chemistry
20.	ANS:	D	PTS:	1	TOP:	Review.1 Units of Measurement
21.	ANS:	А	PTS:	1	TOP:	2.4 Atom Mass
22.	ANS:	С	PTS:	1		
23.	ANS:	D	PTS:	1	TOP:	3.7 Acids and Bases
24.	ANS:	D	PTS:	1	TOP:	2.10 Describing Compound Formulas
25.	ANS:	D	PTS:	1	TOP:	2.9 Atoms, Molecules, and the Mole
26.	ANS:	С	PTS:	1	TOP:	Review.1 Units of Measurement