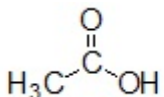


**I. Multiple choice and True or False**

- Circle all of the following examples of a homogeneous mixture. (3 points)  
a) table salt      b) brass      c) root beer      d) pecan pie
- Which of the following is a halogen? (2 points)  
a) O      b) H      c) Li      d) Br      e) Cu
- The greatest contributor to background radiation is \_\_\_\_\_. (2 points)  
a) human tissue      b) cosmic radiation      c) radon gas      d) rocks
- Which sequence correctly ranks the following regions in the electromagnetic spectrum in order of increasing energy? (3 points)  
ultraviolet (1)      infrared (2)      gamma (3)  
a) 1-2-3      b) 2-3-1      c) 3-1-2      d) 3-2-1      e) 2-1-3      f) 1-3-2
- The amount of energy required to remove an electron from an atom is called \_\_\_\_\_. (2 points)  
a) electronegativity      b) electron affinity      c) retention energy      d) ionization energy
- Circle all of the compounds below that have a molecular dipole moment greater than zero. (3 points)  
a)  $\text{CCl}_2\text{F}_2$       b)  $\text{C}_2\text{Cl}_4$       c)  $\text{CH}_2\text{O}$       d)  $\text{CH}_4$
- Circle all of the pure substances listed below that can form hydrogen bonds. (3 points)  
a)  $\text{CH}_2\text{Cl}_2$       b)       c)  $\text{CH}_3\text{CH}_2\text{CH}_3$       d)  $\text{CH}_3\text{NH}_2$

8. Indicate the correct units for molarity. (2 points)
- a) g solute / mL solvent      c) moles solute / L solution  
b) g solute / g solution      d) moles solute / g solution
9. (Circle the correct answers) The anode has a ( + / - ) charge and is the site of ( oxidation / reduction ). (4 points)
10. Which of the following is **not** a fossil fuel? (3 points)
- a) methane hydrate    b) biomass    c) natural gas    d) petroleum
11. Which of the following is the major renewable energy resource used in the United States? (3 points)
- a) hydroelectric      b) OTEC      c) wind      d) hydrothermal
12. Circle all of the following drugs that function by directly mimicking a natural neurotransmitter? (3 points)
- a) alcohol      b) caffeine      c) diazepam      d) amphetamines
13. Which drug functions mainly by blocking re-uptake of a natural neurotransmitter. (2 points)
- a) LSD      b) cocaine      c) heroin      d) nicotine
14. Which of the following drugs is a hallucinogen? (2 points)
- a) LSD      b) cocaine      c) heroin      d) morphine
15. Which drug functions by binding to endorphin receptor sites in the brain? (2 points)
- a) LSD      b) cocaine      c) heroin      d) THC
16. Circle all of the ways cancer can be treated with the use of drugs. (3 points)
- a) Drugs that alter the DNA found in the cancer cell nucleus.  
b) Drugs that bind the two strands of DNA, preventing them from replicating.  
c) Drugs that attack enzymes responsible for forming strong cell walls.  
d) Drugs that inhibit the formation of folic acid.

17. ( True or False ) Penicillin is an antibiotic that functions by disabling an enzyme responsible for constructing strong bacterial cell walls. (2 points)
18. ( True or False ) It is easier to treat viral infections than bacterial infections since viruses are biologically less complex than bacteria. (2 points)
19. The main neurotransmitter found in maintenance neurons is: (2 points)
- a) norepinephrine    b) acetyl choline    c) GABA    d) dopamine
20. Which neurotransmitter would most likely suppress coordination? (2 points)
- a) dopamine    b) norepinephrine    c) GABA    d) serotonin
21. How does an anesthetic function in reducing pain? (2 points)
- a) Inhibits the production of prostaglandins, which relay the pain signal.  
b) Binds to endorphin receptor sites in the brain, altering perception of pain.  
c) Reduces inflammation.  
d) Intercepts nerve impulses traveling to the brain.
22. One drug enhancing the effect of another drug is called a(n) \_\_\_\_\_ effect. (2 points)
- a) placebo    b) psychological    c) synergistic    d) analgesic
23. Circle all characteristics that describe a polymer formed by the condensation mechanism. (3 points)
- a) It is made up of 2 or more different monomers.  
b) The polymer grows in just one direction.  
c) As the polymer forms, water is produced as a by-product.  
d) Carbon-carbon double bonds are converted to carbon-carbon single bonds.
24. Which of the following functional groups is sometimes called peptide bonds because it forms the linkages between amino acids to form proteins? (2 points)
- a) esters    b) amines    c) amides    d) alcohols
25. Which functional group is most often associated with pleasant aromas? (2 points)
- a) esters    b) amines    c) aromatics    d) ethers

26. Foods that contain this functional group are likely to taste sour. (2 points)
- a) esters                      b) amines                      c) carboxylic acids                      d) alcohols
27. Which of the following polymers has a resin code of 1? (2 points)
- a) LDPE                      b) PS                      c) PVC                      d) PETE
28. Circle all of the following polymers that are formed by an addition mechanism. (3 points)
- a) LDPE                      b) PS                      c) PVC                      d) PETE
29. Which sequence correctly list the following pollutants in order in which they peak in a typical day? (3 points)
- Ozone (1)      Nitrogen Monoxide (2)      Nitrogen Dioxide (3)
- a) 1-2-3      b) 2-3-1      c) 3-1-2      d) 3-2-1      e) 2-1-3      f) 1-3-2
30. Freons were once used for air conditioning, refrigerants, and blowing agents, but have now been largely banned because they diminish the ozone layer. Which of the following is an example of a freon? (2 points)
- a)  $\text{CHCl}_3$                       b)  $\text{CH}_2\text{FCCl}_3$                       c)  $\text{CCl}_2\text{F}_2$                       d)  $\text{CH}_3\text{CF}_3$
31. Which of the following is not a significant contributor to  $\text{SO}_2$  emissions? (2 points)
- a) steel industry      b) cars      c) traditional power plant      d) volcanoes
32. Circle all reasons why global warming provokes such political controversy. (3 points)
- a) There is not a definite link between the warming climate and man's contributions.
- b) Uncertainties regarding the earth's ability to compensate for the warming trend.
- c) The proposed outcomes of global warming are insignificant.
- d) Remedial actions would initially prove costly to our economy and way of life.

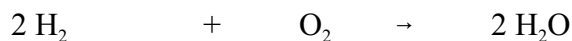
**II. Calculations:**

1. How many liters of water will be displaced when a 15g gold ball is completely submerged in a bucket of water? (Density of gold is 19.3 g/mL, 4 points)

2. Correctly balance the equation shown below. (4 points)



3. For the equation below, use unit conversions to show how many moles of water can be produced from 7 grams of oxygen, assuming an excess amount of hydrogen? (4 points)

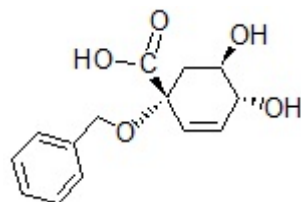
**III. Fill in the blank / Short answer**

1. The \_\_\_\_\_ is the closest layer of the atmosphere to the earth. (2 points)
2. Draw all 3 isomers having the molecular formula  $\text{C}_4\text{H}_8$ . (6 points)

3. Ozone and \_\_\_\_\_ found in the stratosphere both protect the earth from harmful ultraviolet rays. (2 points)
4. Name two changes brought about by the Clean Air Act and its amendments that have led to a reduction in air pollution. (4 points)
5. Gases capable of absorbing infrared radiation are called \_\_\_\_\_ gases. (2 points)
6. \_\_\_\_\_ is anything that has mass and volume. (3 points)
7. A(n) \_\_\_\_\_ is a step in the scientific method where a testable assumption or educated guess is formulated. (3 points)
8. \_\_\_\_\_ is the conversion of a gas to a liquid. (3 points)
9. Provide the molecular formula of aluminum oxide. (3 points)
10. A(n) \_\_\_\_\_ is a substance made of only one type of atom. (3 points)
11. Answer questions a - c regarding  $^{13}\text{C}^{2+}$ . (6 points)
  - a) How many protons does this isotope have? \_\_\_\_\_
  - b) How many neutrons does this isotope have? \_\_\_\_\_
  - c) How many valence electrons does this isotope have? \_\_\_\_\_
12. \_\_\_\_\_ is the splitting of an atomic nucleus into nearly equal fragments. (3 points)
13. Who coined the term radioactivity? \_\_\_\_\_ (2 points)

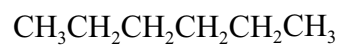
14. A(n) \_\_\_\_\_ bond is one in which atoms bond by sharing electrons. (3 points)
15. The molecular shape of carbon in methane is \_\_\_\_\_. (3 points)
16. If air is considered a homogeneous solution, then \_\_\_\_\_ would be the solvent. (2 points)
17. Pure water has a maximum density at \_\_\_\_\_ °C. (2 points)
18. \_\_\_\_\_ forces are forces of attraction between molecules of the same type. (3 points)
19. A \_\_\_\_\_ is any substance that lowers the activation energy of a reaction without being consumed. (3 points)
20. Draw a structure for the hydronium ion. (2 points)
21. In the following equation, circle and label the acid and the conjugate acid. (4 points)
- $$\text{H}_3\text{O}^+ + \text{NH}_3 \rightarrow \text{H}_2\text{O} + \text{NH}_4^+$$
22. (Circle the correct answer) A solution with a pH of 10 is considered ( acidic, basic or neutral). (2 points)
23. Circle the species that is being reduced in the reaction below. (3 points)
- $$2 \text{Na} + \text{Cl}_2 \rightarrow 2 \text{NaCl}$$
24. How many electrons are transferred in the redox reaction shown above? \_\_\_\_\_ (2 points)
25. In most types of power plants, water is converted to steam, which then turns a \_\_\_\_\_ causing electrons to flow through a wire. (2 points)

26. Name two renewable energy resources that do not require the use of water. Be specific! (4 points)
27. \_\_\_\_\_ is a redox reaction between a nonmetal and oxygen that generally produces heat. (3 points)
28. Conventional nuclear reactors contain \_\_\_\_\_ made of cadmium or boron to maintain control of the nuclear reaction. (3 points)
29. \_\_\_\_\_ is the use of drugs to treat diseases. (2 points)
30. Name 3 harmful side effects that result from the use of stimulants. (6 points)
31. \_\_\_\_\_ acts as a stimulant by suppressing maintenance neurons. (2 points)
32. \_\_\_\_\_ are specialized cells that transmit electric impulses. (2 points)
33. Name two specific methods used in the discovery of new drugs. (4 points)
34. Circle and identify all of the functional groups contained in the following molecule, recently reported in *J. of Medicinal Chem.* **2004**, 5735. (6 points)

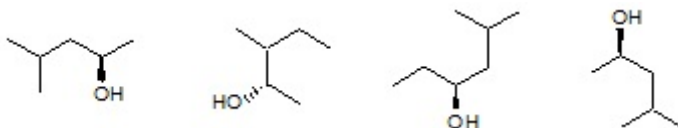




35. Provide a name for the following hydrocarbon. (2 points)

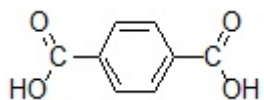


36. Circle the two structures below that represent the same compound. (3 points)



#### IV. Extra Credit:

1. Show **two repeating units** of the polymer that would result from the monomers shown below. (5 points)



You received \_\_\_\_\_ points out of 200 points possible. To check your overall grade see <http://courses.weber.edu/>.