I. Multiple choice and True or False

1. Circle all of the following drugs that are stimulants? (3 points)

a) alcohol b) caffeine c) THC d) amphetamines

2. To which receptor site does nicotine bind? (2 points)

a) norepinephrine b) GABA c) serotonin d) acetyl choline

3. Which of the following drugs is a hallucinogen (psychedelic)? (2 points)

a) alcohol b) cocaine c) LSD d) morphine

4. Circle all of the following that are methods of treating a bacterial infection.(3 points)

a) Alter the DNA sequence of chromosomes in the nucleus.
b) Bind the two strands of DNA, preventing them from replicating.
c) Attack enzymes responsible for forming strong cell walls.
d) Inhibit formation of folic acid, which regulates growth and reproduction.

5. Circle all of the following that are examples of virus infections. (3 points)

a) common cold b) small pox c) strep throat d) measles

6. The main neurotransmitter found in maintenance neurons is: (2 points)

a) norepinephrine b) acetyl choline c) GABA d) dopamine

7. Depressants, such as alcohol, function by effecting which of the following neurotransmitter site? (2 points)

a) dopamine b) norepinephrine c) GABA d) serotonin

8. Circle all of the following food items that are permitted in a vegan diet. (3 points)

a) bacon b) almonds c) beans d) milk

9. Circle all of the following that are fat soluble vitamins. (3 points)

a) vitamin B b) vitamin C c) vitamin D d) vitamin E

10. Which vitamin is necessary for bone maintenance and development. (2 points)

a) vitamin A b) vitamin B c) vitamin C d) vitamin D

11. Which of the following food items contains the most calories? (2 points)

a) 1g butter b) 1g mountain dew c) 1g pasta d) 1g steak

12. Which food category is not essential? (2 points)

a) lipids b) vitamins c) carbohydrates d) proteins

13. Circle all characteristics that describe a polymer formed by a 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.

14. One drug enhancing the effect of another drug is called a(n) _____ effect. (2 points)

a) placebo b) psychological c) synergistic d) analgesic

15. Which functional group is most often associated with very unpleasant smells, such as dead fish or road kill? (2 points)

a) esters b) amines c) aromatics d) ethers

16. Foods that contain this functional group are likely to taste sour and have a pungent smell. (2 points)

a) esters b) amines c) carboxylic acids d) alcohols

17. Which of the following gases results from burning coal and is a significant contributor to acid rain? (2 points)

a) SO_2 b) CH_4 c) CO_2 d) HCl

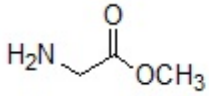
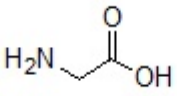
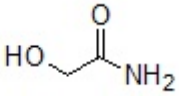
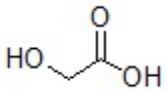
18. Circle all of the following examples of a homogeneous mixture. (3 points)

a) salt water b) sugar c) concrete d) milk

19. Circle all of the following that are potential outcomes of global warming. (3 points)

a) An increased occurrence of skin cancer.
b) An increase in the number of severe storms.
c) An increase in insect and pest populations.
d) Inhabitants along coastal cities displaced.

20. Which of the following is a basic building block (monomer unit) for peptides and proteins? (2 points)

a) 
b) 
c) 
d) 

21. Which of the following is a chalcogen? (2 points)

a) Mg b) S c) Li d) Cl e) Fe

22. Which sequence correctly ranks the following regions in the electromagnetic spectrum in order of increasing energy? (3 points)

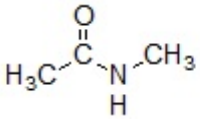
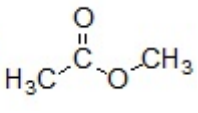
ultraviolet (**1**) infrared (**2**) visible (**3**)

a) 1<2<3 b) 2<3-1 c) 3<1<2 d) 3<2<1 e) 2<1<3 f) 1<3<2

23. Circle all of the compounds below that have a molecular dipole moment greater than zero. (3 points)

a) CH_2Cl_2 b) C_2Cl_4 c) CH_2O d) CO_2

24. Consider each of the following to be pure substances. Circle all chemicals that can form hydrogen bonds. (3 points)

a) CH_3CH_2OH b)  c) CH_3OCH_3 d) 

25. (Circle the correct answer) The cathode is the site where (oxidation / reduction) occurs. (2 points)

26. Frost that forms on your windshield in the winter is an example of which of the following processes? (2 points)

a) sublimation b) deposition c) condensation d) freezing

27. Which of the following is an example of a scientific hypothesis? (3 points)

a) Money is the root of all evil.
b) Organic vegetables contain more nutrients than nonorganic vegetables.
c) Apple taste better than oranges.
d) Laughter is the key to a long life.

28. Circle all of the following that are greenhouse gases. (3 points)

a) H_2O b) CH_4 c) N_2 d) CO_2

II. Fill in the blank / Short answer

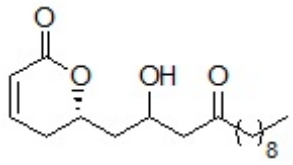
1. An endogonic reaction is a reaction where the reactants are _____ than the products. (2 points)

2. How does the lock and key model relate to biological activity? (3 points)

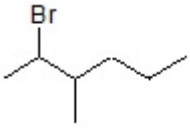
3. Name 3 harmful side effects that result from the use of stimulants. (6 points)

4. Name two specific methods used in the discovery of new drugs. (6 points)

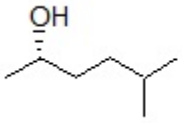
5. The following compound was isolated from aphids and was found to possess cytotoxic activity against leukemia cells (*J. Nat. Prod.* **2014**, 2459). Circle and name each functional groups contained in this structure. (8 points)

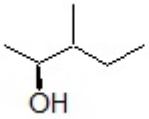


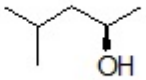
6. Provide a name for each of the following compounds. (5 points)



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







8. Using line-angle structures, draw 3 isomers having the molecular formula of C_4H_8O. (8 points)

9. Harmful_____ are filtered out by the ozone layer located in the stratosphere. (2 points)

10. _____ is a measure of how much matter an object contains and is the same on the earth or on the moon. (3 points)

11. Is evaporation an endothermic or exothermic process? (2 points)

12. Provide the molecular formula of aluminum chloride. (3 points)

13. A _____ is a voltaic cell where both the anode and cathode are in the same container. (2 points)

14. A(n) _____ is a substance made of only one type of atom. (3 points)

15. Answer questions a - c regarding $^{32}P^{2+}$. (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? _____

16. _____ is the source of the sun's energy output. (3 points)

17. A(n) _____bond is one in which atoms bond by sharing electrons. (3 points)

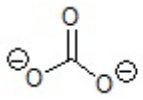
18. What is the molecular geometry of an atom surrounded by 3 groups of electrons? (3 points)

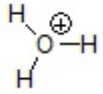
19. Pure water has a maximum density at _____^{o}C. (2 points)

20. _____ forces are forces of attraction between molecules of different type. (3 points)

21. How does a catalyst speed up a reaction? (3 points)

22. Name the following two polyatomic ions. (4 points)





23. Complete the following acid base reaction by drawing structures for the products. (6 points)

H_3O^+ + CH_3NH_2 → +

24. (Circle the correct answer) A solution with a pH of 5 is considered (acidic, basic or neutral). (2 points)

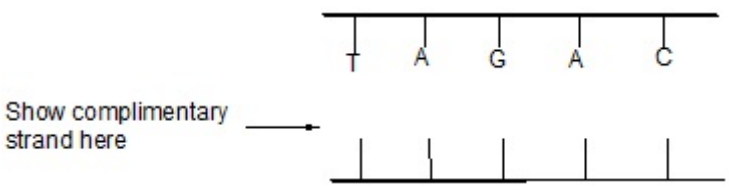
25. Provide the 2 half reactions for the redox reaction shown below. (8 points)

2 Na + Cl_2 → 2 NaCl

26. Which compound in the reaction above (question 25) is being reduced.? (2 points)

27. _____ is a redox reaction between a metal and oxygen. (2 points)

28. Shown below is a strand of DNA. Provide the matching strand by indicating the necessary sequence of base pairs. A = Adenine, C = Cytosine, G = Guanine, T = Thiamine. (8 points)



III. Calculations:

1. How many liters of water will be displaced when a solid 25g aluminum ball is completely submerged in a bucket of water? Show all of your work for full credit. (Density of aluminum is 2.70g/mL, 6 points)

2. Given that 234-Uranium undergoes nuclear decay with the loss of an alpha particle, provide a nuclear equation for this reaction. (4 points)

$$^{234}_{92}U \rightarrow \quad + \quad$$

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

$$C_3H_6O + O_2 \rightarrow H_2O + CO_2$$

4. For the equation below, use unit conversions to show how many grams of water can be produced from 3.5 grams of oxygen, assuming an excess amount of hydrogen. Show all of your work for full credit. (6 points)

$$2\ H_2 + O_2 \rightarrow 2\ H_2O$$

IV. Extra Credit:

1. If 3.0 grams of glucose, $C_6H_{12}O_6$, dissolves in 25mL of water, what is the molarity of this solution. Show all of your work for full credit. (5 points)

You received _____ points out of 200 points possible.