Biology 150: 1st in-class examination **Name**_____
February 7, 2014

Indicate the lab you are registered in:

Monday, 1-2:50 _____ ; Tuesday, 10-11:50 _____; Tuesday, 1-2:50 _____ ; Tuesday, 3-4:50 _____

Answer the questions in the space provided and you may also use the back of the page to complete your response. There are 33 questions worth a total of 50 points (plus three bonus questions). The point value of individual questions appears in parentheses.

1. Like other living animals, you eat stuff. This is an example of what characteristic of all living things? (1)

2. A bacterium in your intestines, when suddenly surrounded by the milk you just drank, begins to express (or "turns on") the genes to produce the enzymes necessary to metabolize milk. This is an example of which other characteristic of all living things? (1)

3. There are two basic types of science. The report last month of the existence of a previously unknown species of river dolphin found living in the Araguaia River of Brazil is an example of which type? (1)

4. To which type of science does the scientific method apply? (1)

5. In order, what are the steps of the scientific method? (1)

6. Consumption of *Helicobacter pylori* by Barry Marshall to see if he might develop gastritis was an example of what step of the scientific method? (1)

7. Where do the Monarch Butterflies (*Danaus plexippus*) of the Midwestern US spend the winter? (1)

8. In science, what is the difference between an hypothesis and a theory? (1)

9. Charles Darwin saw in nature three processes that explained the evolutionary change. Name (or describe) all three. (3)

10. Give one example of artificial selection. (1)

11. In humans, as in other organisms, O, C, and H are the most abundant elements. What is the fourth most abundant? (1)

12. ^{12}C, ^{13}C, and ^{14}C are three different _____ of Carbon. Which is radioactive? How many neutrons does it contain and what does it radioactively decay into? (3)

13. The atomic number of oxygen is 8. Therefore, each Oxygen atom has _____ electrons and it forms _____ covalent bonds. (2)

14. What is the valence of C? (1)

15. For each of the following bonds indicate if they are (1) non-polar covalent, (2) ionic, or (3) polar covalent.(1)

    O-H _____, Na-Cl _____, N-H _____, C-H _____, C-C _____

16. Molecules that are ionic or that are rich in polar covalent bonds tend to dissolve easily in water and are therefore said to be _____. (1)

17. The tendency of water to rise up surfaces composed of molecules rich in polar covalent bonds is referred to as _____. (1)

18. A certain compound has a central carbon bonded to an amino group, a carboxyl group, a phosphate, and an hydroxyl group. Draw its complete structure showing all atoms and bonds and beside that molecule draw its enantiomer. (5)

19. Name one hexose aldose. (1)

20. Name one disaccharide and name its constituent monosaccharaides. (2)

21. Larger biological polymers are generally assembled by reactions called a between smaller subunits in which a water molecule is released? (1)

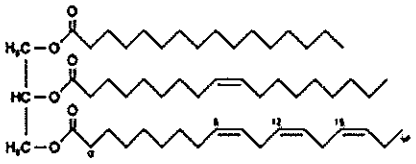
22. How do amylose and cellulose differ? (2)

23. Glucose, amylose, or sucrose which is a reducing sugar? (1)

24. The exoskeleton of arthropods as well as the cell walls of some fungi are composed primarily of what polysaccharide? (1)

25. Triglycerides are formed by ester bonds between three _____ and a three carbon _____ . (2)

26. Saturated or unsaturated? (1)

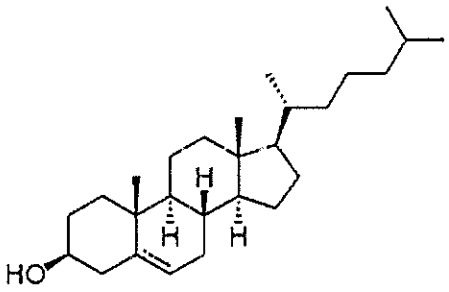


27. Describe the differences between triglycerides and waxes. (1)

28. Describe the difference between triglycerides and phospholipids. (2)

29. What structure do phospholipids form when mixed with water? (1)

30. What class of lipid is this molecule? (1)



31. Draw the structure of an amino acid. (1)

32. Proteins are polymers of _____, of which 20 different ones occur in proteins. Of these _____ have non-polar variable groups (or side chains), while _____ have polar, _____ have acidic, and _____ have basic variable groups. (5)

33. To what does the primary structure of a protein refer? (1)

Bonus questions:

(1) Who wrote "An essay on the principle of population" in 1797? (1)

(2) Who authored the book "Principles of Geology" in 1837? (1)

(3) Each glucose contains how many of each C, H, and O atoms? (2)