POTENTIAL ESSAYS SEMESTER ONE AP BIO

AP Biology Potential Essays, Unit 1

1. Water is essential to living systems.
    a. Explain polar covalent bonding in a water molecule.
    b. Explain a hydrogen bond and then explain how polar covalency leads to the hydrogen bonding between adjacent water molecules.
    c. Explain three of the unique properties of water that are the result of hydrogen bonding.

2. Discuss the biological importance and molecular structure of each of the following organic compounds in relations to cellular structure and function in plants and/or animals.
    a. Carbohydrates
    b. Proteins
    c. Lipids
    d. Nucleic Acids

3. Describe the model of the cell membrane of a eukaryotic cell and discuss different ways in which substances move across the membrane. In your discussion be sure to indicate whether your examples are passive or active transport.

4. A laboratory assistant prepared solutions of 0.7M, 0.5M, 0.3M, and 0.1M sucrose, but forgot to label them. After realizing the error, he took of to Mexico and then his assistant randomly labeled the flasks containing these four unknown solutions as flask A, flask B, flask C, and flask D. Design an experiment, based on the principles of diffusion and osmosis. That the assistant could use to determine which of the flasks contains each of the four unknown solutions. Include in your answer:

    a. A description of how you would set up and perform the experiment
    b. The results you would expect from your experiment.
    c. An explanation of those results based on the principle involved.

    Be sure to clearly state the principles addressed in your discussion.

Macromolecules Notes Guide: General Biology A

You are responsible not only for the material in this guide but the diagrams and pictures on the notes. The notes can be found on Mr. Walkers website: www.walkersclass.com.

This set of notes covers Unit 1: Objective 2: Classify the different types of macromolecules in the body

What is organic?

-_____ Molecule: A molecule made up a large carbon-based structure that is found in or produced by living organs (e.g. carbohydrates, lipids)

What are some examples of organic compounds?

-Macromolecule: A large molecule (polymer) composed of many smaller organic molecules called monomers. There are four types of biological macromolecules: proteins, carbohydrates, lipids, and amino acids.
---Monomer: A molecule that can chemically react with other like molecules to form a larger molecule called a polymer.
---Polymer: A large molecule composed of smaller units, called monomers, linked together by chemical bonds (e.g. proteins are polymers of amino acids).

Why study Carbon?
All of life is built on carbon.
A molecule associated with life containing carbon.

Cells made of:
~72% _____
~25% carbon compounds
carbohydrates
lipids
proteins
nucleic acids
~3% salts
Na, Cl, K...

Carbohydrates - Monosaccharides

The least complicated of all the macromolecules
Function: Provide cells with _____.
Example: monosaccharides (glucose), disaccharides (sucrose), polysaccharides (starches/cellulose).
Structure: The chemical formula for all monosaccharides is: CxH2xOx

The three most common are glucose, galactose, fructose. Each has the same chemical formula ($C_6H_{12}O_6$).

Carbs- Disaccharides: Example: Maltose ($C_{12}H_{22}O_{11}$)
-Other disaccharides are sucrose and lactose. Each has the same formula $C_{12}H_{22}O_{11}$

Carbs-Polysaccharides and Polymers
---The most complex carbohydrates which are made up of long _____ of monosaccharides (glucose-like units).

Starch, cellulose, and glycogen are examples. They differ because of how the subunits are bonded together.

How to break down a polymer

Digestion

---use H2O to breakdown polymers

---reverse of dehydration synthesis

---cleave off one monomer at a time

---H2O is split into H+ and OH– Called Hydrolysis

---H+ & OH– attach to ends

----requires _____

----releases energy

How to build a polymer

---Synthesis

---joins monomers by "taking" H2O out- Called Dehydration Synthesis

---one monomer donates OH–

---other monomer donates H+

----together these form H2O

----requires _____ & enzymes

Lipids

Function: Lipids are used to insulate cells, provide selectively permeable membranes, send messages, and provide energy for cells.

Examples: A group of organic compounds that include _____, oils, waxes, and related substances.

Structure: Made of Carbon, hydrogen, and oxygen. There is no definite ratio of hydrogen to oxygen atoms like in carbohydrates. Simple lipids are the most common and are made up of three fatty acid molecules (CnH2nCOOH) and one glycerol molecule (C3H8O3). They are held together with chemical bonds

Proteins

Function: They can be very large and complex. They play a wide variety of roles in the cell. Roles include transport of materials, providing structural support, aid in chemical reactions, support cells to carry out cell processes.

Examples: Hormones, enzymes, antibodies, Hemoglobin, Na K pump, or pigments.

Structure: Made of _____ bonded together. They are made off carbon, hydrogen, oxygen, and nitrogen; some contain sulfur. They are bonded by dehydration synthesis. Bonds between amino acids are called peptide bonds. Meat, beans, eggs, nuts, and milk contain a lot of proteins.

Enzymes- A type of protein

Enzymes act as _____ in living cells. A catalyst increases the rate of a chemical reaction, allowing it to proceed rapidly when it would otherwise occur very slowly.

Enzymes lower the activation energy needed for a reaction to occur. Each enzyme has an optimum range of temperature and pH at which is operates most efficiently.

Without enzymes in our cells, reactions would take too long and cells would die.

Nucleic Acids

Examples: DNA and RNA.

Function: Provide the code for the body to build proteins and are the genetic material which is passed down to offspring.

---RNA (three types)
---mRNA-Carries DNA code to ribosomes
---rRNA-Assembles proteins
---tRNA-Transfers amino acids to ribosomes
Structure: Consist of _____ (Sugar, Phosphate Group, and Nitrogenous base).

Chemistry Terms

-pH scale: A system of measurement ranging from one to fourteen that indicates the relative concentration of hydrogen ions in a solution. A pH of one indicates a strong acid while a pH of fourteen indicates a strong base, and pH of seven is neutral.
-Product: The substance that results from a chemical reaction.
-Reaction rate: The _____ at which a chemical reaction occurs, measured as the amount of reactant converted to product in a set period of time.

Macromolecules Summary

-Lipids: Large biomolecules that are made of mostly carbon and hydrogen with small amount of oxygen. Fats, oils, waxes, and steroids are all lipids.
-Nucleic Acids: A complex biomolecule that stores cellular information in the form of a code. They are polymers made of smaller subunits called nucleotides. A nucleotide consists of a sugar deoxyribose, a phosphate group, and a nitrogenous base.
-Proteins: A large complex polymer composed of carbon, hydrogen, oxygen, nitrogen, and sometimes sulfur. They provide structure for tissues and organs and carry out cell metabolism.
-Enzyme: A _____ that functions as a biological catalyst and accelerates the rate of a biochemical reaction by reducing the required activation energy of the reaction while remaining unchanged by the reaction.
-Catalyst: A substance that accelerates the rate of a chemical reaction by decreasing the activation energy of the reaction without being changed by the reaction (enzymes).

Carbohydrates

-Carbohydrates: A biomolecule composed of carbon, hydrogen, and oxygen with a ratio of about two hydrogen atoms and one oxygen atom for every carbon atom. They are types of _____.
---Monosaccharide: A monomer of a carbohydrate molecule, of known as a simple sugar like glucose or fructose, or ribose. $C_6H_{12}O_6$
---Disaccharides: Two-sugar carbohydrate. Sucrose (table sugar) is a combination between glucose and fructose
---Polysaccharides: Composed of many monosaccharide's subunits. Starch, glycogen, and cellulose are examples of polysaccharides. They serve as storage of energy for our cells.

Draw the basic structure of a lipid:

Draw the basic structure of a nucleic acid:

Draw the basic structure of a carbohydrate:

Draw the basic structure of a protein:

Chemistry of Life Notes Guide:

Concept: Matter consists of Chemical elements in pure form and in combinations called compounds.

Matter is composed of Elements

_____ is anything that takes up space and has mass. Matter is made up of elements.
*Matter can exist as a solid, liquid, or gas.

An _____ is the basic unit of matter. It cannot be broken down further to a different substance with different properties. 92 naturally occurring.

The smallest complete unit of an element and therefore matter is called the _____.

_____ = the atomic number
Neutrons = the atomic number minus the number of protons
Electrons* weigh 1/1800 as much as a proton or neutron.

Everything is made of matter. Matter is made of atoms. Atoms of the various elements differ in number of subatomic particles.

Elements of Life:

Life requires about 25 chemical elements. Four elements make up 96% of living matter.

Carbon, hydrogen, _____, and nitrogen make up 96% of living matter. Most of the remaining 4% consists of calcium, phosphorus, potassium, and sulfur.

Trace elements are those required by an organism in minute quantities. Examples: Iron and Iodine

Compounds vs Molecules:

A compound is a substance consisting of _____ or more elements in a fixed ratio. A compound has characteristics different from those of its elements.

Molecules are formed when two or more elements are _____ together.

Concept: An element's properties depend on the structure of its atoms

Properties of the Atom:

An _____ is the smallest unit of matter that still retains the properties of an element.

Neutrons (no electrical charge)
Protons (positive charge)
Electrons (negative charge)

All atoms of an element have the same number of protons but may differ in number of neutrons.

Isotopes are two atoms of an element that differ in number of neutrons. Radioactive isotopes decay spontaneously, giving off particles and energy.

An element's **mass number** is the sum of protons plus neutrons in the nucleus.
Atomic mass, the atom's total mass, can be approximated by the mass number.

Concept: The formation and function of molecules depend on chemical bonding between atoms.

Energy transfer to make bonds:

_____is the capacity to cause change.
Potential energy is the energy that matter has because of its location or structure. The electrons of an atom differ in their amounts of potential energy. An electron's state of potential energy is called its energy level, or electron shell.

Bonding properties

Effect of **Electrons** determine chemical behavior of an atom. It depends on the number of electrons in an atom's outermost shell (_____ **Shell**).

Periodic Table: Elements in the same _____ have the same number of _____.

Elements in the same columns have the same valence (meaning the same number of _____ in their outermost shell).

Chemical Reactivity:

Atoms tend to 1) complete a partially filled valence shell or 2) empty a partially filled valence shell. This tendency drives chemical reactions and creates _____.

Types of Bonds

Weak Bonds: Hydrogen Bonds (attraction between + and -)
Ionic Bonds (attraction between a + charged element and an – charged element)

Strong Bonds: _____ Bonds

Covalent Bonds: A covalent bond is the sharing of a pair of valence electrons by two atoms. In a covalent bond, the shared electrons count as part of each atom's valence shell.

---Nonpolar covalent bonds share electrons equally. Example O=O, H-H
---Polar covalent bonds have an unequal sharing of electrons between atoms. This creates a molecule which has an area which is more positive or negative than the other parts. Example: Water H20.

Draw how covalent bonds share electrons:

Multiple Covalent Bonds:

2 atoms can share >1 pair of electrons
double bonds: 2 pairs of electrons
triple bonds: 3 pairs of electrons
Very _____ bonds

Nonpolar covalent bonds
- Pair of electrons shared _____ by 2 atoms
  - example: hydrocarbons = C_xH_x
    - methane (CH_4)

Polar covalent bonds:
- Pair of electrons shared _____equally by 2 atoms
  - example: water = H_2O
    - oxygen has stronger "attraction" for the electrons than hydrogen
    - oxygen has higher electronegativity
    - water is a polar molecule
      - + vs – poles
      - leads to many interesting properties of water…

Ionic Bonds: Two atoms attract valence electrons so unequally that the more electronegative atom _____ the electron away from the less electronegative atom.

Draw how ionic bonds work:

Hydrogen Bonds: The polarity of water creates molecular attractions
- _____ between positive H in one H_2O molecule to negative O in another H_2O
- also can occur wherever an -OH exists in a larger molecule
- Weak bond

These weak bonds form between partial positively charged hydrogen atoms of one molecule and the strongly electronegative oxygen or nitrogen of another molecule.

Draw how hydrogen bonds work:

Van Der Waal interactions are very weak connections which result from an asymmetrical distribution of electrons within a molecule.

Concept: Chemical reactions make and break chemical bonds

Chemical reactions are the making and breaking of chemical bonds.

In order for a chemical reaction to take place, the reacting molecules (or atoms) must first collide and then have sufficient energy (_____ energy) to trigger the formation of new bonds.

Ions such as Na that take on a positive charge are called _____, and are composed of more protons than electrons. Ions with a negative charge are called _____, and are composed of more electrons than protons.

The starting molecules of a chemical reaction are called _____.
The final molecules of a chemical reaction are called _____.

$6CO_2 + 6H_20$ +Energy ------→ $C_6H_{12}O_6 + 6O_2$
-------Reactants------ -----Products--------

The number of molecules is represented by the prefix or coefficient. $6CO_2$. There are 6 molecules of CO_2. There may be 6 Carbon atoms and 12 Oxygen atoms. There are only 6 Molecules. (Molecules are atoms held together with chemical bonds).

Chemical Reactions Cont:
Endergonic Reaction: A reaction that requires input of energy to occur. A+B + energy → C
Exergonic Reaction: A reaction that gives off energy as a product. A +B--> Energy + C

Although many reactions can occur spontaneously, the presence of a catalyst accelerates the rate of the reaction because it lowers the activation energy required for the reaction to take place.

A _____ accelerates the rate of the reaction but does not undergo a chemical change itself. Since the catalyst is not changed by the reaction, it can be used over and over again.

Chemical reactions that occur in biological systems are referred to as metabolism. These include the breakdown of substances (catabolism), the formation of new products synthesis or _____), or the transferring of every form one substance to another.

Name _____ Date _____ Period _____

Extraordinary properties of Water ppt Questions

1. What is the formula for a molecule of water?

2. Which atom in water attracts more negative electrons?

3. Water is a _____ molecule because it has an equal number of _____ and _____.
4. What is water's net charge?

5. Water is called a _____ molecule because the oxygen end "acts" _____ charged and the hydrogen end "acts" _____ charged.

6. One hydrogen bond is _____, but many hydrogen bonds are _____.
7. How do hydrogen bonds form?

PROPERTIES OF WATER

8. At sea level, water boils at _____ and freezes at _____.
9. What happens to the boiling point of water at higher elevations where the atmospheric pressure is less?

10. Where will it take longer for an egg to boil ---- in Death Valley or Mt. Everest?
11. Name 5 more properties of water that are important to life.
    a.
    b.
    c.
    d.
    e.
12. What is cohesion?

13. Cohesion produces _____ _____ when one water molecule attracts other _____ molecules.
14. What is surface tension a measure of?
15. How does the film produced by surface tension help organisms?

16. What is adhesion?

17. How does adhesion DIFFER from cohesion?

18. Adhesion produces _____ _____ as water is attracted to and pulled into a tube.
19. What process in plants is due to capillary action (one word)?

20. Plants absorb water through their _____ and use _____ action or _____ to move water upward against gravity to the leaves.
21. Name 2 other things observed in nature that are the result of adhesion.
    a.

    b.

22. Define specific heat.

23. Water _____ a change in temperature and can absorb or release _____ amounts of energy with very little temperature change.
24. What is heat of vaporization?

25. In order to evaporate, water must break its _____ bonds.
26. When water evaporates from a surface, it removes a lot of _____.
27. What is water's heat of vaporization?

28. In order for a gram of water at 100°C to change into steam at that same temperature, it must _____ _____ calories of energy. Therefore, which would contain more energy at 100°C, steam or boiling water?
29. How does water warm the Earth?

30. Why does ice float in water?

31. Frozen water forms _____ holding the molecules at fixed distances from each other.
32. Which is denser ---- ice or water?
33. Define homeostasis.

34. List 5 ways that water helps maintain homeostasis.

a.

b.

c.

d.

e.

SOLUTIONS & SUSPENSIONS

35. Solutions and suspensions are two types of _____ that both contain _____.
36. The _____ is the substance being dissolved and the _____ is what the substance is dissolved in.
37. What acts as a "universal solvent" because it dissolves so many substances?
38. How does a suspension form?

39. What keeps particles suspended?

ACIDS, BASES, & pH

40. Write the equation for the dissociation (separation) of water and label the hydrogen & hydroxide ions?

41. What does the pH scale actually measure?

42. The pH scale ranges from _____ with a pH of _____ being neutral.
43. Where are acids found on the pH scale?

44. Where are the bases found on the pH scale?

45. Each pH unit represents a factor of _____ change in concentration.
46. How much stronger is a substance with a pH of 3 than a pH of 6. Show how you got your answer.

47. Acids produce a lot of _____ ions, while bases contain lots of _____ ions.
48. What is a buffer?

49. Buffers are produced by the body to _____ acids and bases to maintain homeostasis.
50. What pH do you think is best for most parts of the body --- cells, blood, etc?

Macromolecules Practice: _____/

1. What are the definitions for a monomer and polymer?

Monomer= _____

Polymer= _____

2. Complete the chart below. Remember MONO means one and POLY means many.

Macromolecules	Food Example	Monomer	Polymer
Carbohydrates			
Lipids			
Proteins			
Nucleic Acids			

3. Classify each as a carbohydrate (C), protein (P), lipid (L) or nucleic acid (N).

____Starch ____Cholesterol ____Steroid ____Glycogen ____Nucleotide ____RNA

____Glucose ____Unsaturated fatty acid ____Phospholipid ____Polysaccharide ____Enzyme

____DNA ____Cellulose ____Monosaccharide ____Amino acid

4. Identify the specific molecule from each description. (Carbohydrate, Lipid, Protein, Nucleic Acid)

a. _____ provides long-term energy storage

b._____ provides immediate energy

c._____ builds and repairs body tissues

d._____ stores and transfers important information

5. Circle the answer: Are lipids polar or non-polar? Polar Non-polar

6. What two functions do nucleic acids have?

7. Draw and label the 3 parts of a nucleotide.

8. A person suffering from hypertension (high blood pressure) caused by clogged arteries, most likely consumed too many _____fats.

9. Olive oil is considered a healthy lipid called _____fat.

10. Which food molecule (monosaccharide, polysaccharide, lipid, protein) would you eat if.....

a. ...you needed a quick boost of energy _____

b. ...you wanted to grow strong nails _____

c. ... you wanted to grow healthy hair _____

d. ...you have a race tomorrow afternoon _____

e. ...you are getting ready for hibernation _____

f. ...you wanted to get bigger muscles _____

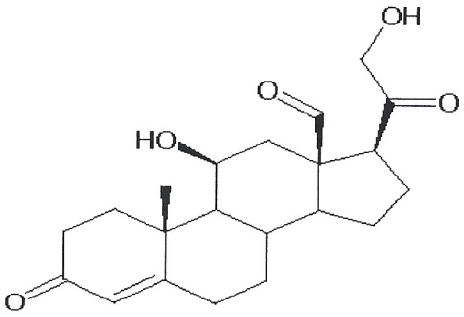
g ...your next meal will be in a week _____

11. Draw what a carbohydrate and lipid would look like.....

Name_____ Date_____ Period_____ [redacted]

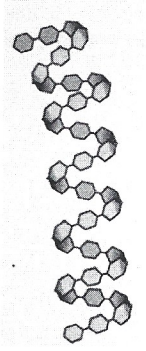
MACROMOLECULES PRACTICE TEST MULTIPLE CHOICE

1. The molecule below is a



a. carbohydrate
b. lipid
c. steroid
d. A and C
e. B and C

2. The molecule below is a polymer of glucose monomers. The molecule below is



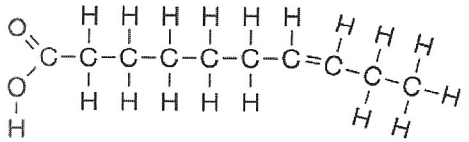
a. Cellulose
b. Starch
c. Maltose
d. Glycogen
e. Chitin

3. You are walking down the "tough streets" of New Jersey, and suddenly you feel the need to run away from someone who is accosting you! Your **muscles** keep a form of **energy stored** just for these emergencies. What ***macromolecule*** **stores energy** in the **muscles**?

a. Glucose
b. Galactose
c. Starch
d. Glycogen
e. Chitin

4. _____ gives rigidity to the cell membrane.
   a. A triglyceride
   b. A Phospholipid
   c. Wax
   d. Cholesterol
   e. Cellulose

5. The molecule below is...



   a. a saturated fatty acid
   b. a saturated triglyceride
   c. an unsaturated fatty acid
   d. an unsaturated triglyceride
   e. an unsaturated wax

6. Table sugar is
   a. Galactose
   b. Glucose
   c. Fructose
   d. Lactose
   e. Sucrose

7. A disaccharide is formed when two monosaccharides are joined together by
   a. a synthesis reaction
   b. a hydrolytic reaction
   c. a hydrolysis reaction
   d. A and B
   e. B and C

8. The main source of energy for cells is
   a. Sucrose
   b. Glucose
   c. Fructose
   d. Galactose
   e. Maltose

9. Mr. Jolly has just been to his doctor to discuss the results of his recent physical. His doctor told him that his **blood "bad" triglycerides and cholesterol are too high** and that he is beginning to **develop heart disease**. Since he has not completely developed heart disease, there is still time for Mr. Jolly to change his diet and lifestyle so that he does not develop heart disease. Given his new health news, what would be the best dinner for Mr. Jolly to eat tonight?
   a. Steak, potatoes, veggies, water and chocolate cake
   b. A cheeseburger, French fries, and chocolate ice cream sundae
   c. Pizza and donuts
   d. Whole wheat pasta tossed in olive oil with veggies and tofu
   e. Whole wheat pasta in a butter cream sauce with veggies and tofu

10. Mr. Jolly had put himself at risk for heart disease due to his previous eating habits. Which of the following most likely describes the eating habits that led to Mr. Jolly's high risk of heart disease?
   a. A diet with many saturated triglycerides and animal derived foods.
   b. A diet with many unsaturated triglycerides and plant derived foods.
   c. A diet with many complex carbs and plant derived foods.
   d. A diet with many simple carbs and plant derived foods.

11. Potatoes have a large amount of
   a. Cellulose
   b. Glycogen
   c. Triglyceride
   d. Wax
   e. Starch

12. Lard is **pig fat**. People often use it is making pastries because its **solid** form at room temperature makes it ideal for flaky pastries and pie crusts. Lard is a(n)...
   a. Unsaturated triglyceride
   b. Saturated triglyceride
   c. Wax
   d. Unsaturated fatty acid
   e. Steroid

13. During photosynthesis, plants capture sunlight energy to make glucose. Then they are able to **store** that glucose energy as what macromolecule?
   a. Starch
   b. Cellulose
   c. Chitin
   d. Sucrose
   e. Glycogen

14. Which food below, when consumed in excess over time, would be most likely to cause heart disease?

a. Oatmeal
b. Peanut butter
c. Butter
d. Sugar cane
e. Celery

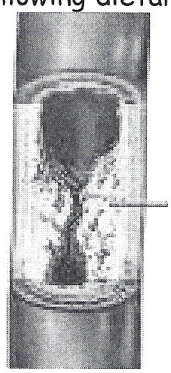
15. A plant living in a dry area will likely have a substance that helps to minimize water loss from the leaves. What is that substance?

a. Wax
b. Triglyceride
c. Lipid
d. Cuticle
e. A, C, and D

16. If you have consistent issues with bowel constipation, which of the following should you increase in your diet?

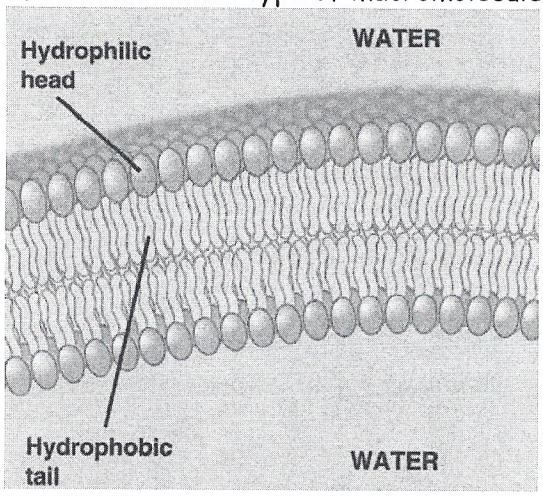
a. Cellulose
b. Chitin
c. Phospholipid
d. Starch
e. Glycogen

17. The image below shows a build-up of plaque on the inside of an artery wall. Which of the following dietary macromolecules is most likely the cause of this type of plaque build-up?



a. Unsaturated phospholipid
b. Saturated phospholipid
c. Saturated triglyceride
d. Unsaturated triglyceride
e. Ear Wax

18. The macromolecules depicted in the image below make up a wall that surrounds the outside of all cells. What type of macromolecule is pictured below?

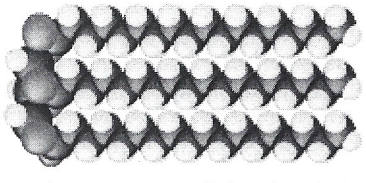


a. Triglycerides
b. Waxes
c. Steroids
d. Phospholipids
e. Starches

19. Which of the following is for **LONG TERM energy storage** in both plants and animals?

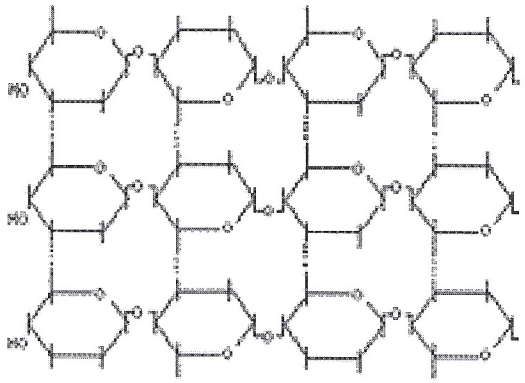
a. Glycogen
b. Starch
c. Trigycerides
d. Cellulose
e. Chitin

20. The molecule below is a(n) _____ and is most likely to be _____ at room temperature.



a. Unsaturated fat/ solid
b. Saturated fat/ solid
c. Unsaturated fat/ liquid
d. Saturated fat/ liquid
e. Ear wax/ solid

21. The macromolecule below, which consists of **chains of glucose stacked on top of one another**, is called...



a. Dietary fiber
b. Chitin
c. Cellulose
d. A and B
e. A and C

22. A **LIPID** molecule that **transmits messages** around an organism's body is most likely...
a. A triglyceride
b. A wax
c. A steroid
d. A phospholipid
e. A cuticle

23. The information macromolecule that STORES information about how to run the cell is called...
a. Chitin
b. Cellulose
c. DNA
d. RNA
e. Nucleus

24. Proteins are made up of chains of
a. Monosaccharides
b. Nucleotides
c. Amino acids
d. Fatty acids
e. Steroids

25. How many different amino acids are there?
a. 1
b. 10
c. 20
d. hundreds
e. millions

26. A change in pH is able to cause protein denaturation because
a. The amino group is sensitive to OH-
b. The molecules start moving so rapidly that they come apart
c. Sasha said so and all the world believes him.
d. It causes the areas that were hydrophobic to become hydrophilic
e. The primary structure changes when the [H+] changes

27. Amino acids are linked together via what type of bond?
a. Hydrogen bond
b. Polar bond
c. Peptide bond
d. Synthetic bond
e. Hydrolytic bond

28. What type of reaction links monomers together to form polymers?
a. Hydrolysis
b. Synthesis
c. Digestion
d. Exothermic
e. Exergonic

29. Which of the following is NOT an organic compound?
a. $C_6H_{12}O_6$
b. H_2O
c. CH_4
d. $C_2H_4O_2$
e. All of the above are organic compounds

30. Which of the following represents the correct ranking of terms from smallest to largest?

a. Macromolecule →polymer→monomer→ carbon atom
b. Polymer→monomer→macromolecule → carbon atom
c. Carbon atom → macromolecule → polymer→monomer
d. Monomer →carbon atom → macromolecule → polymer
e. Carbon atom → monomer → polymer → macromolecule

Use the information below to answer the following multiple choice questions.

You are a scientist at a prestigious university. You are studying the effects of various temperatures on the function of a particular fictitious cellular protein, "toxeliminator." The function of the protein in the cell is to break apart and eliminate toxins that invade the cell.

The following chart depicts your experimental set-up.

Test Tube	Test Tube temperatures °C	Contents of the test tube
A	Normal cell temp (35°)	2 ml toxin 2 ml toxeliminator protein
B	55 °	2 ml toxin 2 ml toxeliminator protein
C	75 °	2 ml toxin 2 ml toxeliminator protein
D	95 °	2 ml toxin 2 ml toxeliminator protein

For your data, you measure the amount of toxin still left in each test tube 10 minutes after you have mixed the test tube ingredients. You have written down your results, but you have been a sloppy scientist! You mixed up the tubes and now you don't know which measurement goes with which tube!! The following is your data.

Amount of toxin left in the tube (mL)
0.1
1.3
1.8
2.0

31. Which piece of data most likely corresponds to tube D?

a. 0.1
b. 1.3
c. 1.8
d. 2.0
e. None of the data would correspond with tube D

32. Which piece of data most likely corresponds with tube A?

a. 0.1
b. 1.3
c. 1.8
d. 2.0
e. None of the data would correspond with tube A