Name _____KEY_____

PRE AP FALL FINAL STUDY GUIDE

1. Biomolecule Review: Fill out the table below to review the 4 biomolecules

4 Biomolecules	"Building Block" subunits/MONOMERS	Function
Protein	Amino Acids	Cell Building Material, muscle to move bones, speed up reactions, fight germs, clot blood, lower blood sugar, carry oxygen, etc
Nucleic Acid	Nucleotide	Blueprint for life
Carbohydrate	Monosaccharide	Quick energy to cells
Lipid	1 Glycerol and 3 Fatty Acids	Long-term energy storage, Insulation, cell-to-cell communication

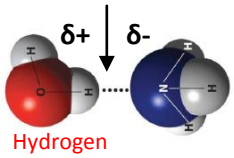
2. Write the biochemical reaction pattern for the following 2 common cellular reactions using the 3 terms provided (BIG molecule, BB, H_2O)

CONDENSATION: BB + BB → BIG Molecule + H_2O

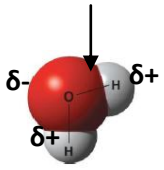
HYDROLYSIS: BIG Molecule + H_2O → BB + BB

3. Match the chemical bond that is seen in the diagram(s) below.

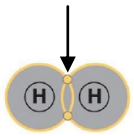
Chemical Bond Choices:
Ionic Nonpolar Covalent Polar Covalent Hydrogen



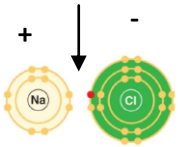
Hydrogen



Poplar Covalent



Nonpolar Covalent



Ionic

4. Match the following carbohydrates to the appropriate place in the table below:

Carbohydrate Molecules:
starch glycogen sucrose glucose cellulose fructose lactose chitin

Monosaccharides	Disaccharides	Polysaccharides
Glucose	Sucrose	Starch
Fructose	Lactose	Glycogen
		Cellulose
		chitin

5. Which of the following lists contains ONLY proteins?
   a. hemoglobin, cholesterol, antibodies, muscles
   b. muscle, insulin, glycogen, hemoglobin
   c. antibodies, muscles, insulin, collagen
   d. collagen, insulin, hemoglobin, glycerol

6. Which of the following lists does NOT contain a polysaccharide?
   a. glucose, starch, chitin
   b. sucrose, glucose, collagen
   c. glycogen, cellulose, glucose
   d. insulin, sucrose, cellulose

7. A Fluorine atom has an atomic number of 9… Is this atom stable or reactive …. Explain WHY?

It is reactive because the outer energy level (ring) has 7 electrons and this is NOT full (with 8)

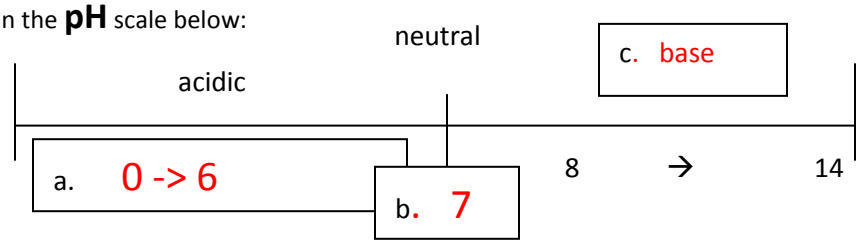
8. A Carbon atom has an atomic number of 6….How many covalent bonds could it form?

It has 4 unpaired electrons on the outside that could form up to 4 covalent bonds

9. Explain why solid ice floats in liquid water?

Due to hydrogen bonding, solid ice molecules wiggle and have more spaces between them (less dense) than liquid water which is packed in tighter as it moves and attracts by hydrogen bonds (more dense)

10. Fill in the **pH** scale below:



11. What is the importance of **ATP** molecules in living organisms? Show where the energy is stored with a diagram?

Store energy for all cell functions like a "1$ bill" **A – P – P – P** **energy is here**

12. ***Using the figure to the right, properly identify the:***

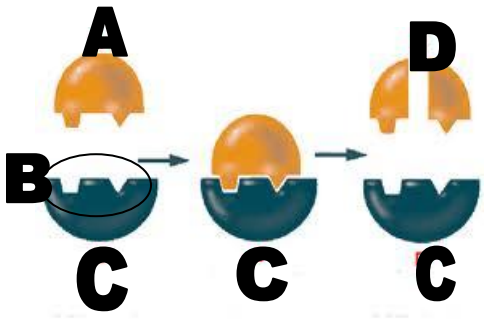
Enzyme **C**

Reactant **A**

Product **D**

Enzyme's active site: **B**

Substrate: **A**



13. What is the importance of **enzymes** inside living organisms?

They speed up the chemical reactions that are crucial for life to exist and they allow these reactions to happen at body temperature

14. What is activation energy?

The energy needed to jumpstart a chemical reaction

15. An enzyme is usually a _protein___ (biomolecule) that _____speeds___ up chemical reactions by lowering the __activation___ energy?

16. What does it mean when we say that an enzyme has been **denatured?**

Their shape has been altered so that they no longer fit the substrate and thus they cease to function

17. Are enzymes reusable? Explain an example of this idea you observed in class

Yes … they are used over and over in a cell. An example was the class demo with a catalase enzyme in a piece of liver that continued to work (create bubbles) even when it was placed in a new test tube of hydrogen peroxide

18. List **2** ways to increase enzyme speed in a typical human cell:

↑ heat to a point, ↑ substrate concentration, change the pH, shrink the cell size

19. List **2** possible reasons why no bubbles may form after hydrogen peroxide is put on a cut?

The catalase enzymes may have previously been denatured or the H_20_2 may have already broken down into water and O_2 bubbles

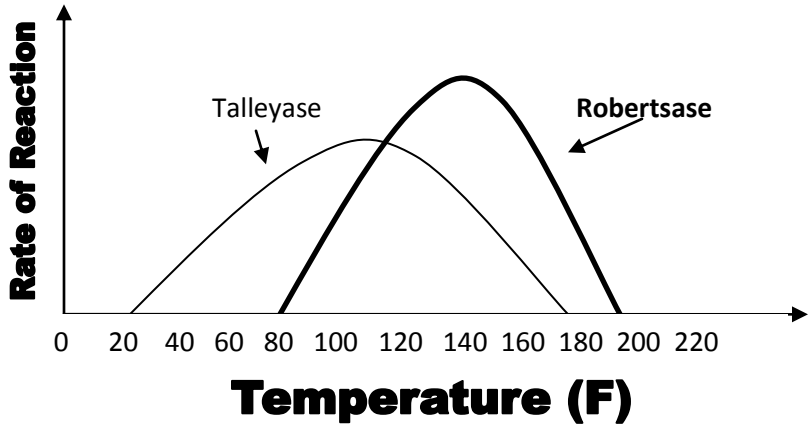
20. List **5** factors that can **SLOW** or **STOP** enzyme function.

Factor	Explain an example of this we saw/talked about in class
extreme heat	**Boiled yeast and liver**
chill	**iced yeast enzymes**
salt	**salted yeast enzymes**
pH change	**teacher demo with yeast enzymes n acid & base**
increase # enzymes in cell	**toothpickase lab discussion**

Analogy Comparisons:

21. monomer : polymer :: monosaccharide : __**polysaccharide**__
22. protein : amino acid :: DNA : ____**nucleotide**___
23. ___**share**___ electrons : covalent :: trade electrons : ionic bond
24. OSE : carbohydrate :: ____**ASE**___ : enzyme
25. key : lock :: __**substrate**___ : enzyme active site
26. proton : positive :: ____**neutron**__ : neutral
27. starch : plants :: __**glycogen**___ : animals
28. water : polar :: lipid : __**nonpolar**___
29. weak acid : pH 6 :: weak base : _**pH 8**____
30. lipid: nonpolar :: ____**water**_ : polar

Study the graph below and answer the following questions.



31. Provide an acceptable TITLE for this graph: **The Effect of Temparature on Reaction Rate of 2 Enzymes**

32. At what temperature does **Talleyase** work best? **110**

33. At what temperature does **Robertsase** work best? **145**

34. Which enzyme functions over the longest range of temperatures: **Talleyase**

35. Which enzyme achieves the highest rate of chemical reaction: **Robertsase**

36. Circle the temperature at which both enzymes work the best: 80 100 **120** 140 160 200

37. Circle the temperature at which NEITHER enzyme would work: 80 100 120 140 160 **200**

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38. Write the correct chemical equation for:

a) Photosynthesis: $CO_2 + H_2O \rightarrow C_6H_{12}O_6\ (sugar) + 0_2$

b) Respiration: $C_6H_{12}O_6\ (sugar) + 0_2 \rightarrow CO_2 + H_2O$

39. Circle (above) the **Reactants** for photosynthesis and the **Products** for Respiration …. How do they compare? same

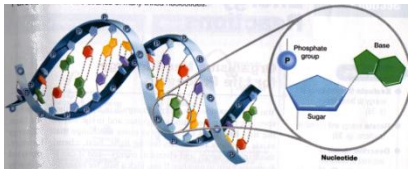
40. Which reaction above is Exergonic (Photosynthesis or Respiration) …. Explain WHY?
Energy stored in sugar is released OUT

41. Which reaction above is Endergonic (Photosynthesis or Respiration) …. Explain WHY?
Energy is absorbed IN and stored in sugar

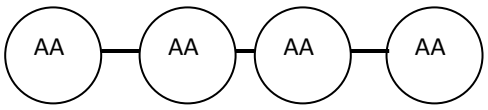
42. List 2 ways to cause plants to INCREASE their rate of photosynthesis:

Give them more $CO_2 + H_2O$ and give them more sunlight

IDENTIFY each biomolecule below: (carbohydrate, lipid, protein, nucleic acid, ATP, water)

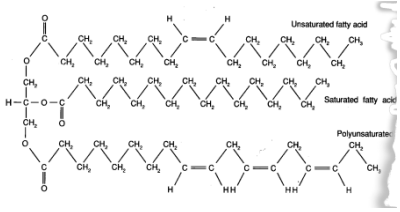
43. 

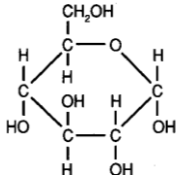
Nucleic Acid

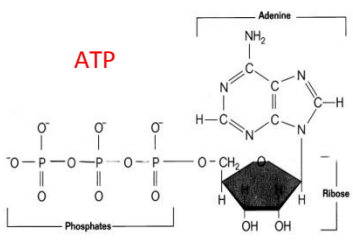
44. 

protein

45. 
carbohydrate

46. LIpid


47. carbohydrate


48 ATP


CELL REVIEW: Identify the cell parts whose FUNCTIONS are described below:

49.__mitochondria_____ "power plant" of the cell where aerobic respiration produces ATPs of energy from sugars

50._____SER_____ network of narrow round tubes that detoxify poisons including drugs and alcohol, and produce lipids

51._____nucleus_____ the command center or "brain" of the cell where all cellular activities are coordinated

52._____Golgi Body_____ "packages" the cell materials for transport within or out of the cell like the Post Office, UPS,

53.____Cell Membrane_____ the "gate keeper" that encloses the cell contents and regulates which materials get in or out

54.____Vesicle_____ membrane-bound package that encloses proteins or food for transport throughout the cell

55.___Chromatin_____ stringy noodles of genetic material in the nucleus that carry the directions for making proteins

56._____Lysosome____ membrane-bound sac with digestive enzymes to break down cellular or foreign materials,

57._____RER_____ network of flattened, ribosome covered tubes that transport and "accessorize' proteins

58.____cytoskeleton_____ a microtubule and microfilament frame which gives a cell support and provides for organelle movement

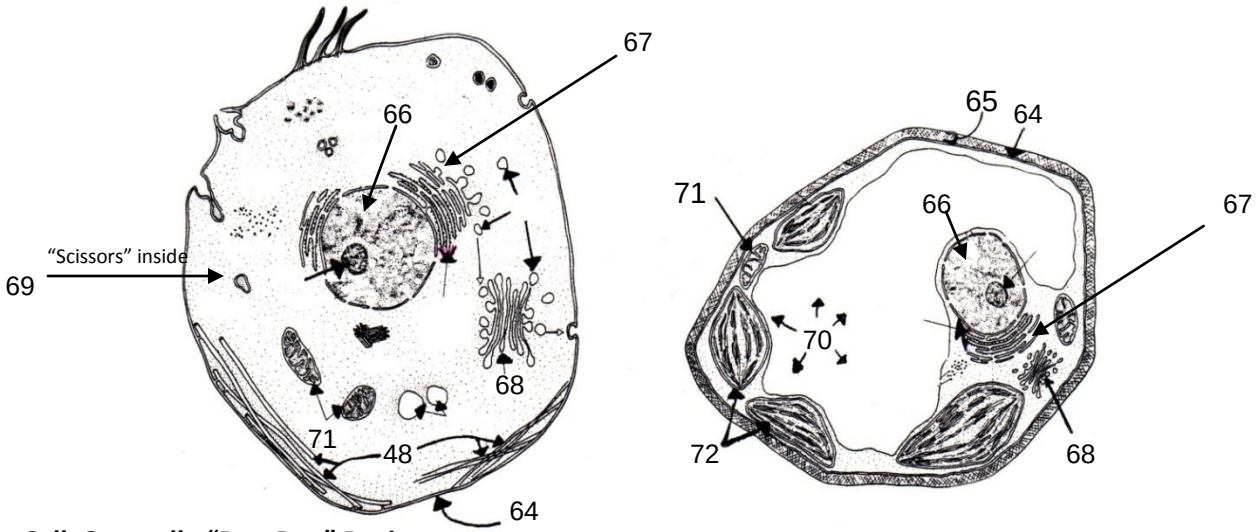
59._____cell wall____ a thick, cellulose cell covering which gives shape, strength, and support to plant cells

60.____ribosome_____ site of protein production, the most numerous organelle in any cell

61.____vacuole_____ membrane-bound sacs that stores water, minerals, wastes

62.____centriole_____ L -shaped microtubule bundles that assist cell division by producing a spindle

63.____chloroplast_____ membrane-bound sac that contains green pigments for photosynthesis in plants



73. Cell Organelle "Boo-Boo" Review: Predict what problems a cell would have if the cell organelle identified in the diagram is broken.

#	Cell symptoms or problems if the organelle is BROKEN
64	Trouble communicating with other cells and shipping wases OUT and needed materials IN
67	Trouble producing lipids for vesicles and inability to detoxify poisons in the cell
68	Trouble shipping food and proteins to the correct "addresses" in other cells
70	Plants wilt from lack of water pressure and wastes poison other cell parts
71	Trouble producing ATP from glucose via cell respiration
72	Trouble making glucose in plants

74. Differentiate between **prokaryotic** and **eukaryotic** cells using the table below:

Cell Type	Definition	Examples
Prokaryotic	Simple cells with NO nucleus or membrane-wrapped organelles	bacteria
Eukaryotic	Complex cells with a nucleus and many membrane-wrapped organelles	Animal, plant, fungi, protist cells