Sample Mid Term Exam

This is very similar to the layout of the actual quiz. There will not be any more than 75 questions

1. Which of the following is reflective of the phrase "the whole is greater than the sum of its parts"?
    a. The cell theory
    b. Emergent properties
    c. Homeostasis
    d. Reductionism
    e. Evolution

2. One of the key distinctions between prokaryotic and eukaryotic cells is the presence_____ cell, which is lacking in _____ cells.
    a. A nucleus in eukaryotic…prokaryotic
    b. Nucleus in prokaryotic… eukaryotic
    c. DNA in prokaryotic… eukaryotic
    d. DNA in eukaryotic… prokaryotic
    e. A cytoplasmic organelle in prokaryotic… eukaryotic

3. Which four elements make up approximately 96% of living matter?
    a. One of the atoms sharing electrons is much more electronegative than the other atom.
    b. The two atoms sharing electrons are equally electronegative
    c. The two atoms sharing electrons are of the dame elements
    d. It is between two atoms that are both very strong electron acceptors
    e. The two atoms sharing electrons are different elements

4. A covalent chemical bond is one in which
    a. Electron are removed from one atom and transferred to another atom so that the two atoms become oppositely charged.
    b. Protons or neutrons are shared by two atoms so as to satisfy the requirement of both
    c. Outer-shell electrons are shared by two atoms so as satisfactorily fill the outer electron shells of both
    d. Outer-shell electrons of one atom are transferred to the inner electron shells of another.
    e. The inner-shell electrons of one atom are transferred to the outer shell of another atom.

5. The ionic bond of sodium chloride is formed when
    a. Chlorine gains an electron form sodium
    b. Sodium and chlorine share an electron pair
    c. Sodium and chlorine both lose electrons from their outer valence shells
    d. Sodium gains an electron from chlorine
    e. Chlorine gains a proton from sodium

6. Which of the following is not considered to be a weak molecular interaction
    a. Covalent bond
    b. Vanderwaals interaction
    c. Ionic bond in the presence of water
    d. Hydrogen bond
    e. Both a and b are correct.

7. Which of the following best describes chemical equilibrium?
    a. Reactions continue with no effect on the concentration of reactants and products.
    b. Concentrations of products are high
    c. Reactions have stopped

d. Reactions stop only when all reactants have been converted to products
e. There are equal concentrations of reactants and products.

8. The partial negative charge of a water molecule is attracted to the partial positive charge of another water molecule. What is this attraction called?
    a. a covalent bond
    b. a hydrogen bond
    c. an ionic bond
    d. a hydrophilic bond
    e. a hydrophobic bond

9. Water is transported in plant tissues against gravity due to which of the following properties?
    a. Cohesion
    b. Adhesion
    c. Hydrogen bonding
    d. Only a and
    e. A, b, c

10. Which bonds must be broken for water to vaporize?
    a. Ionic bonds
    b. Nonpolar covalent bonds
    c. Polar covalent bonds
    d. Hydrogen bonds
    e. Both c and d are correct

11. Why does ice float in liquid water?
    a. The liquid water molecules have more energy and can push the ice
    b. The ionic bonds between molecules in ice prevent the ice from sinking.
    c. Ice always has air bubbles that keep it afloat
    d. Hydrogen bonds keep the molecules of ice farther apart than in liquid water.
    e. The crystalline lattice of ice causes it to be denser than liquid water.

12. Hydrophobic substance like vegetable oil is
    a. Non-ionic or nonpolar substance that repel water.
    b. Non-ionic or nonpolar substances that have an affinity for water.
    c. Ionic or polar substances that repel water.
    d. Ionic or polar substances that have affinity for water.
    e. Ionic substances that readily dissolve in water

13. Which of the following solutions has the greatest concentration of hydrogen ions?
    a. gastric juice at pH2
    b. vinegar at pH3
    c. tomato juice at pH4
    d. black coffee at pH5
    e. household bleach at pH12

14. Which property of the carbon atom gives it compatibility with a greater number of different elements than any other type of atom?
    a. Carbon has six to eight neutrons
    b. Carbon has a valence of 4
    c. Carbon forms ionic bonds

d. Only a and c are correct
e. A, b and c are correct

15. Which of the following best summarizes the relationship between dehydration reactions and hydrolysis?
    a. Dehydration reactions assemble polymers, and hydrolysis breaks them down
    b. Hydrolysis occurs during the day, and dehydration breaks them down
    c. Dehydration reaction can occur only after hydrolysis
    d. Hydrolysis creates monomers, and dehydration reactions destroy them
    e. Dehydration reactions occur in plant s and hydrolysis happens in animals

16. Carbohydrates normally function in animals as
    a. The functional units of lipids
    b. Enzymes in the regulation of metabolic processes
    c. A component if triglycerides
    d. Energy-storage molecules
    e. Sites of protein synthesis

17. a change in a protein three-dimensional shape or conformation due to disruption of hydration bonds disulfide bridges, and ionic bonds is termed
    a. Hydrolysis
    b. Stabilization
    c. Destabilization
    d. Renaturation
    e. Denaturation

18. Dehydration reactions are used in forming which of the following compounds
    a. Triglycerides
    b. Polysaccharides
    c. Proteins
    d. Only a and c are correct
    e. A, b, and c are correct

19. All of the following molecules are carbohydrates except
    a. Lactose
    b. Cellulose
    c. Hemoglobin
    d. Glycogen
    e. Starch

20. Which of the following statements best summarizes structural differences between DNA and RNA
    a. rna is a protein, whereas dna is nucleic acid
    b. DNA is not a polymer, but RNA is
    c. DNA contains a different sugar from RNA
    d. RNA is a double helix, but DNA is not
    e. DNA has different purine bases from RNA

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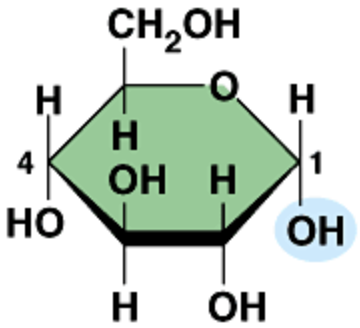
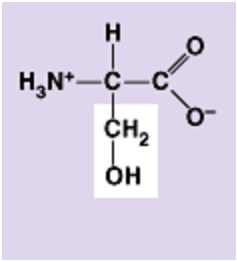


21. If 100 molecules of the general type shown above are covalently joined together in sequence, the single molecule that would result would be
    a. Polysaccharide
    b. Disaccharide
    c. Protein
    d. Nucleic acid
    e. Fatty acid



22. If two thousand molecules of the general type shown above are covalently joined together in sequence, the single molecule that would result would be
    a. Polysaccharide
    b. Disaccharide
    c. Protein
    d. Nucleic acid

23. Which of the following is the first law of thermodynamics?
    a. Energy cannot be created or destroyed.
    b. The entropy of the universe is decreasing.
    c. The entropy of the universe is constant.
    d. Kinetic energy is stored energy that results from the specific arrangement of matter.
    e. Energy cannot be transferred or transformed.

24. Metabolism is best described as
    a. Synthesis of macromolecules.
    b. Breakdown macromolecules.
    c. Control of enzyme activity.
    d. A and B
    e. A B and C

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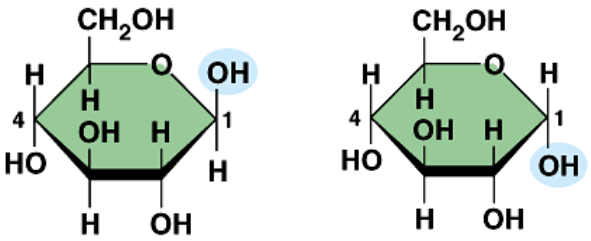
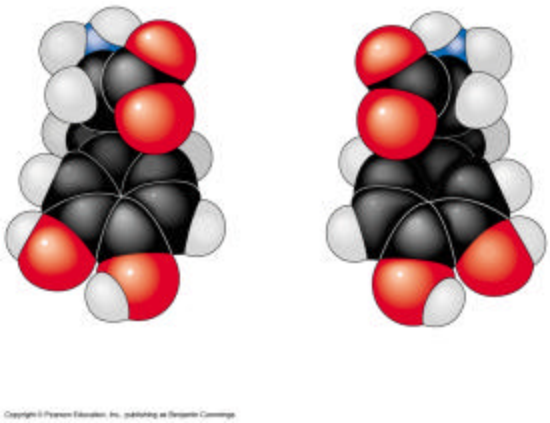


25. What type of isomer are the molecules above?
    a. Stereo
    b. Enantiomer
    c. Geometric
    d. Nonisotopic
    e. Structural



26. What type of isomer are these molecules above?
    a. Stereo
    b. Enantiomer
    c. Geometric
    d. Nonisotopic
    e. Structural

27. Of the following, the structure of ATP is most closely related to
    a. An anabolic steroid
    b. A double helix
    c. RNA nucleotides.
    d. An amino acid with three phosphate groups attached.
    e. Phospholipids.

28. Which of the following would decrease the entropy within a system?
    a. Dehydration reactions
    b. Hydrolysis
    c. Respiration
    d. Digestion
    e. Catabolism

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29. Which of the following is true for exergonic reactions?
    a. The products have more free energy than the reactants.
    b. The products have less free energy than the reactants.
    c. Reactants will always be completely converted to products.
    d. A net input of energy from the surrounding is required for the reactions to proceed.
    e. The reactions upgrade the free energy in the products at the expense of energy from the surroundings.

30. Molecules capable of interacting must first overcome a thermodynamic barrier known as the reactions
    a. Entropy.
    b. Activation energy
    c. Endothermic level.
    d. Heat content.
    e. Free-energy content.

31. How does an enzyme catalyze a reaction?
    a. By supplying the energy to speed up a reaction
    b. By lowering the energy of activation of a reaction
    c. By lowering the delta G of a reaction
    d. Starch cannot be hydrolyzed in the presence of so much water
    e. By increasing the amount of free energy of a reaction

32. According to the fluid mosaic model of cell membranes, which of the following is a true statement about membrane phospholipids?
    a. They can move laterally along the plane of the membrane.
    b. They frequently flip-flop from one side of the membrane to the other.
    c. They occur in an uninterrupted bilayer, with membrane proteins restricted to the surface of the membrane.
    d. They are free to depart from the membrane and dissolve in the surrounding solution.
    e. They have hydrophilic tails in the interior of the membrane.

33. The presence of cholesterol in the plasma membranes of some animals
    a. makes the membrane less flexible, so it can sustain greater pressure from within the cell.
    b. makes the animal more susceptible to circulatory disorders.
    c. enables the membrane to stay fluid more easily when cell temperature drops.
    d. enables the animal to remove hydrogen atoms from saturated phospholipids.
    e. enables the animal to add hydrogen atoms to unsaturated phospholipids.

34. What is one of the ways that the membranes of winter wheat are able to remain fluid when it is extremely cold?
    a. by increasing the percentage of unsaturated phospholipids in the membrane
    b. by increasing the percentage of cholesterol molecules in the membrane
    c. by decreasing the number of hydrophobic proteins in the membrane
    d. A and B
    e. A, B, and C

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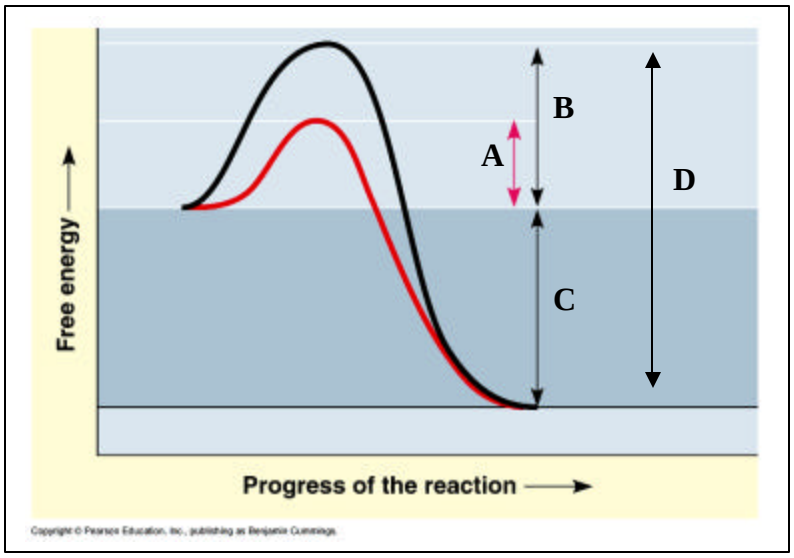
Use the following graph to answer the questions which follow. (Black line is the normal reaction; red line is the same reaction with an enzyme)



35. Which of the following best describes this reaction?
    a. Endergonic
    b. Exergonic
    c. Anabolic
    d. Allosteric
    e. Nonspontaneous

36. Which of the following represents the delta G of the reaction?
    a. A
    b. B
    c. C
    d. D

37. Which of the following represents the activation energy with out an enzyme?
    a. A
    b. B
    c. C
    d. D

38. Organelles that contain DNA include
    a. Nucleus
    b. Mitochondria
    c. Chloroplasts
    d. Only B and C are correct
    e. A, B, and C are correct.

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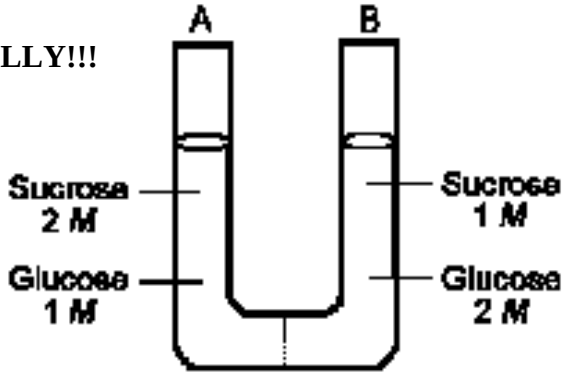
Use the diagram of the U-tube setup below to answer the questions that follow. The solutions in the two arms of this U-tube are separated by a membrane that is permeable to water and glucose but not to sucrose. Side A is half filled with a solution of 2 M sucrose and 1 M glucose. Side B is half filled with 1 M sucrose and 2 M glucose. Initially the liquid levels on both sides are equal. "M" is a measure of how concentrated the solution is.

CAUTION: READ CAREFULLY!!!



39. Initially, in terms of concentration, the solution in side A with respect to that in side B is
    a. saturated.
    b. hypertonic.
    c. hypotonic.
    d. plasmolyzed.
    e. isotonic.

40. After the system reaches equilibrium, what changes are observed?
    a. The water level is unchanged.
    b. The water level is higher in side A than in side B.
    c. The concentration of sucrose and glucose are equal on both sides.
    d. The concentration of glucose is higher in side A than in side B.
    e. The water level is higher in side B than in side A.

41. Ions diffuse across membranes down their
    a. chemical gradients.
    b. concentration gradients.
    c. electrical gradients.
    d. electrochemical gradients.
    e. Both A and B are correct.

42. What are the three types of signals cells use to communicate?
    a. Telekinetical, mechanical, and electromagnetic
    b. Chemical, electromagnetic, and pulsar
    c. Chemical, mechanical, and electromagnetic
    d. Electrical , chemical, and temporal

43. Organelles that contain DNA include
    a. nucleus.
    b. mitochondria.
    c. chloroplasts.
    d. Only B and C are correct.
    e. A, B, and C are correct.

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The questions below refer to the following terms. Each term may be used once, more than once, or not at all.

a) telophase
b) anaphase
c) prometaphase
d) metaphase
e) prophase

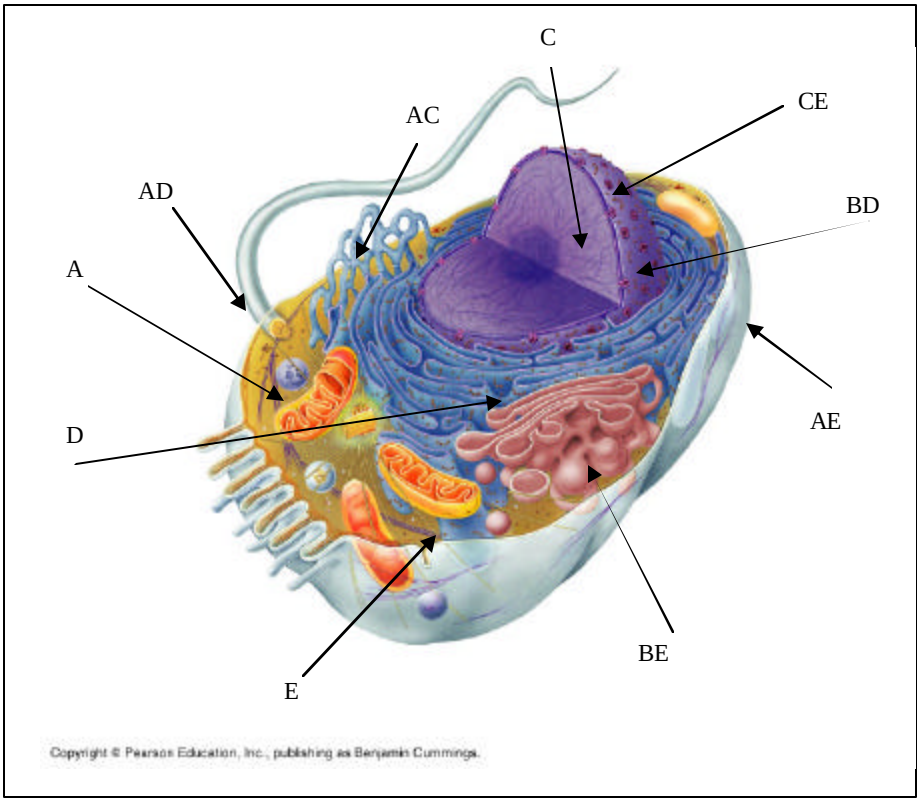
44. Chromosomes become very clear as nuclear membrane is completely broken down.

45. Centrioles begin to move apart in animal cells.

46. Centromeres uncouple, sister chromatids are separated, and the two new chromosomes move to opposite poles of the cell.

For the following Cell parts, find their matching letters from the pictures. Bubble in the letter(s) on your answer sheet.

47. Nucleus
48. Mitochondria
49. Flagella
50. Cell Wall
51. Golgi Apparatus
52. Smooth ER
53. Cell Membrane
54. Rough ER
55. Nuclear envelope



56. The oxygen consumed during cellular respiration is directly involved in
    a. glycolysis.
    b. accepting electrons at the end of the electron transport chain.
    c. the citric acid cycle.
    d. the oxidation of pyruvate to acetyl CoA.
    e. the phosphorylation of ADP.

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57. In addition to ATP, what are the end products of glycolysis?
    a. CO_2 and H_2O
    b. CO_2 and NADH
    c. H_2O and ethyl alcohol
    d. CO_2 and ethyl alcohol
    e. NADH and pyruvate

58. Which of these is the overall process of respiration?
    a. organic compounds + water→ carbon dioxide + oxygen + energy
    b. carbon dioxide + water + energy→ organic compounds + oxygen
    c. oxygen + organic compounds→ water + carbon dioxide + energy
    d. organic compounds + water+ oxygen→ carbon dioxide + energy

59. Muscle cells in oxygen deprivation convert pyruvate to_____.
    a. lactate
    b. alcohol
    c. ATP
    d. NADPH
    e. CO_2

60. Organisms that metabolize organic molecules produced by other organisms
    a. are autotrophs
    b. are heterotrophs
    c. are decomposers
    d. are B and C.
    e. are A, B, and C