

Name: _____

KEY

Class: _____

Date: _____

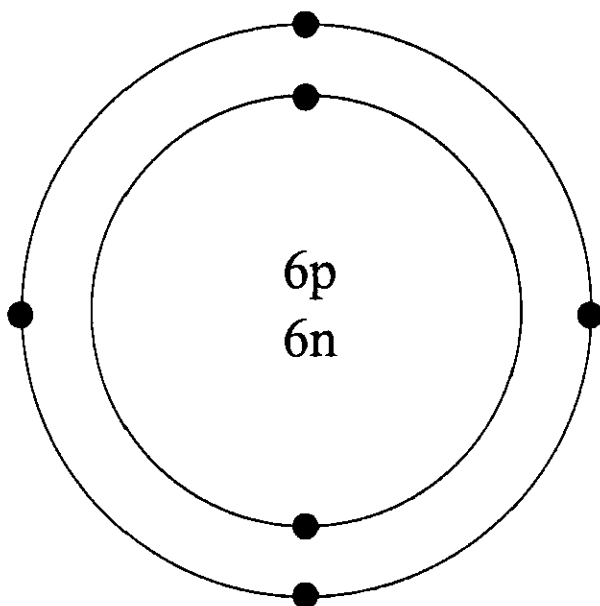
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MCC Spring 2010 Test 1

Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

- _____ 1. Biology is
- a historical science that does not involve current research.
 - the study of animals and plants.
 - a list of facts about wildlife.
 - a science that includes the molecular basis of life.
- _____ 2. A kilometer is to length what a kilogram is to
- mass.
 - temperature.
 - time.
 - area.
- _____ 3. A scientific hypothesis is
- a proven fact accepted by the majority of scientists.
 - an educated guess that is based on data but is not testable.
 - scientific data that are observed by more than one person.
 - an explanation that can be tested through experiments or observation.
- _____ 4. Elements are made of
- only one kind of atom.
 - two or more kinds of atoms.
 - two or more compounds.
 - only one kind of molecule.
- _____ 5. Over 96% of all living matter is made of six elements—oxygen, carbon, sulfur,
- iron, nitrogen, and platinum.
 - hydrogen, nitrogen, and phosphorus.
 - nitrogen, iron, and potassium.
 - sodium, nitrogen, and hydrogen.
- _____ 6. A description for the formula H_2O is two
- molecules of hydrogen and one atom of oxygen.
 - molecules of oxygen and one molecule of hydrogen.
 - atoms of hydrogen and one atom of oxygen.
 - atoms of oxygen and one atom of hydrogen.

**Figure 01.01**

- _____ 7. The black dots in the Figure 01.01 diagram represent
- atoms.
 - molecules.
 - electrons.
 - chemical bonds.
- _____ 8. If there were eight neutrons in the nucleus of the Figure 01.01 diagram, how would it be related to the original?
- It would be a molecule.
 - Its charge would increase.
 - It would be an isotopic form.
 - Its charge would decrease.
- _____ 9. If one of the black dots in the Figure 01.01 diagram was lost during a reaction, the charge of the atom would
- remain the same.
 - be positive.
 - be negative.
 - be neutral.
- _____ 10. An atom consists of subatomic particles, including
- protons, electrons, and ions.
 - an electron cloud and a nucleus.
 - neutrons, electrons, and protons.
 - protons and an electron shell.
- _____ 11. The hydrogen atoms in a water molecule have a slightly positive charge. The oxygen atom has a slightly negative charge. Hydrogen bonding occurs in water when the
- hydrogen of one water molecule is attracted to the oxygen of another water molecule.
 - two hydrogens of one water molecule are attracted to each other.
 - hydrogens of one water molecule are attracted to the hydrogens of another water molecule.
 - the hydrogen and oxygen atoms in the same molecule are attracted to each other.

- _____ 12. If an atom or a molecule gains or loses an electron, it becomes a(n)
 a. different element. c. isotope.
 b. nonfunctional molecule. d. ion.
- _____ 13. In a covalent bond, two atoms share electrons. This type of bonding
 a. allows atoms to always share electrons equally.
 b. helps to fill electron shells.
 c. is easily broken.
 d. occurs only between different elements.
- _____ 14. An ionic bond is formed as the result of
 a. the actual sharing of electrons. c. the transfer of electrons.
 b. a release of energy. d. a combination of fats and proteins.
- _____ 15. The building blocks for carbohydrates are
 a. simple sugars. c. metabolism.
 b. glycerol and fatty acids. d. nucleotides.
- _____ 16. Glycerol and fatty acids are building blocks for
 a. proteins. c. nucleic acids.
 b. lipids. d. carbohydrates.

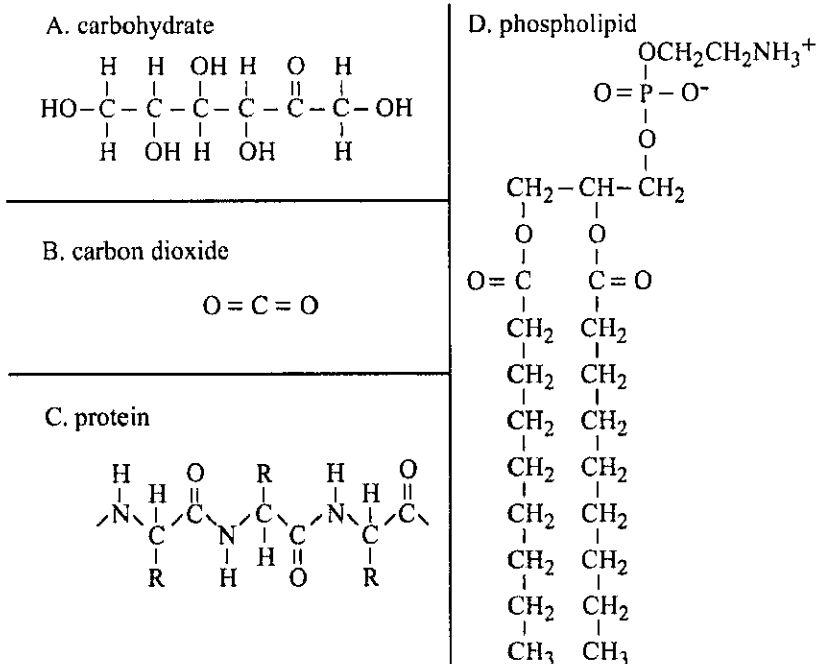


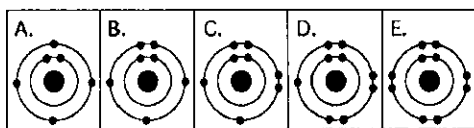
Figure 01.02

- _____ 17. Refer to Figure 01.02. The primary use of this type of macromolecule is as a source of energy.
 a. Carbohydrate c. Protein
 b. Carbon Dioxide d. Phospholipid

- _____ 18. Refer to Figure 01.02. This macromolecule is the primary component in cellular membranes.
- a. Carbohydrate
 - b. Carbon Dioxide
 - c. Protein
 - d. Phospholipid
- _____ 19. Refer to Figure 01.02. The functions of this macromolecule include structural contributions, communication, and defense against disease.
- a. Carbohydrate
 - b. Carbon Dioxide
 - c. Protein
 - d. Phospholipid
- _____ 20. When two amino acids are bonded chemically,
- a. energy is released.
 - b. water is released.
 - c. water is added.
 - d. carbon dioxide is added.
- _____ 21. Amino acids are the building blocks of
- a. DNA.
 - b. isotopes.
 - c. proteins.
 - d. viruses.
- _____ 22. The amino-acid sequence of proteins is determined by
- a. secondary structure.
 - b. nucleic acids.
 - c. nitrogen content.
 - d. peptide bonds.
- _____ 23. The four nucleotides in a DNA molecule differ from one another only in the
- a. kind of nitrogen bases they contain.
 - b. basic atomic structure of their sugars.
 - c. attachment of the phosphates to the sugar.
 - d. position of the bases in the molecule.
- _____ 24. When a nitrogen base becomes bonded to a sugar (ribose or deoxyribose) that is bonded to a phosphate, the resulting molecule is called a(n)
- a. nucleotide.
 - b. amino acid.
 - c. bacteriophage.
 - d. enzyme.
- _____ 25. Genetic information is passed from parent to offspring in the form of
- a. DNA.
 - b. RNA.
 - c. proteins.
 - d. amino acids.
- _____ 26. What type of electron is available to form bonds?
- a. valence
 - b. nucleus
 - c. ionic
 - d. covalent
- _____ 27. Ice floats on water because
- a. of cohesion.
 - b. ice has a higher density than water.
 - c. water shrinks when it freezes.
 - d. water expands when it freezes.
- _____ 28. A substance with a pH of 6 is called
- a. an acid.
 - b. a base.
 - c. both an acid and a base.
 - d. neither an acid nor a base.
- _____ 29. A monosaccharide is a
- a. carbohydrate.
 - b. lipid.
 - c. nucleic acid.
 - d. protein.
- _____ 30. All matter is composed of
- a. cells.
 - b. molecules.
 - c. atoms.
 - d. carbon.

- _____ 31. When placed in the same container, oil and water do not mix because
- they are both polar.
 - water is polar and oil is nonpolar.
 - they are both nonpolar.
 - water is nonpolar and oil is polar.
- _____ 32. All organic compounds contain the element
- carbon.
 - nitrogen.
 - calcium.
 - sodium.
- _____ 33. The two types of nucleic acids are
- chlorophyll and retinal.
 - DNA and RNA.
 - lipids and sugars.
 - glucose and glycogen.
- _____ 34. The two strands of a DNA molecule are held together by
- ionic bonds.
 - covalent bonds.
 - hydrogen bonds.
 - None of the above
- _____ 35. How do isotopes of the same element differ from each other?
- number of protons
 - number of electrons
 - number of neutrons
 - valence electron distribution
 - amount of radioactivity

Use the figure below to answer the following questions.



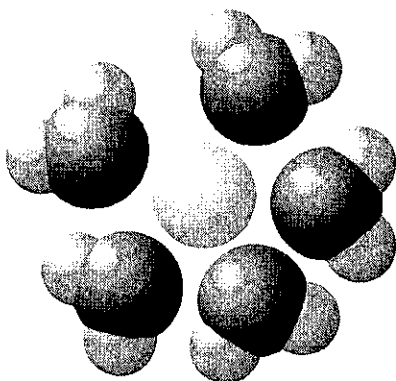
- _____ 36. Which drawing depicts the electron configuration of oxygen (^{16}O)?
8
- Drawing A
 - Drawing B
 - Drawing C
 - Drawing D
 - Drawing E
- _____ 37. Which drawing is of an atom with the atomic number of 6?
- Drawing A
 - Drawing B
 - Drawing C
 - Drawing D
 - Drawing E
- _____ 38. Which drawing depicts an atom that is inert or chemically unreactive?
- Drawing A
 - Drawing B
 - Drawing C
 - Drawing D
 - Drawing E

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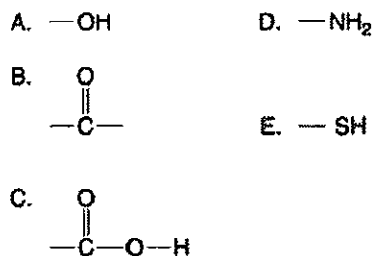
- _____ 39. What determines the cohesiveness of water molecules?
- hydrophobic interactions
 - nonpolar covalent bonds
 - ionic bonds
 - hydrogen bonds
 - both A and C
- _____ 40. What do cohesion, surface tension, and adhesion have in common with reference to water?
- All increase when temperature increases.
 - All are produced by ionic bonding.
 - All are properties related to hydrogen bonding.
 - All have to do with nonpolar covalent bonds.
 - C and D only
- _____ 41. Which bonds must be broken for water to vaporize?
- ionic bonds
 - nonpolar covalent bonds
 - polar covalent bonds
 - hydrogen bonds
 - covalent bonds
- _____ 42. At what temperature is water at its densest?
- 0°C
 - 4°C
 - 32°C
 - 100°C
 - 212°C
- _____ 43. Ice is lighter and floats in water because it is a crystalline structure in which each water molecule is bonded to a maximum of four other water molecules by which kind of bond?
- ionic
 - hydrogen
 - covalent
 - A and C only
 - A, B, and C

The picture below illustrates a solute molecule surrounded by a hydration shell of water. Use it to answer the following question.



- _____ 44. Based on your knowledge of the polarity of water molecules, the solute molecule is most likely
- positively charged.
 - negatively charged.
 - without charge.
 - hydrophobic.
 - nonpolar.
- _____ 45. Which two functional groups are *always* found in amino acids?
- ketone and aldehyde
 - carbonyl and carboxyl
 - carboxyl and amino
 - phosphate and sulfhydryl
 - hydroxyl and aldehyde

Use the figure below to answer the following questions.



- _____ 46. Which is a hydroxyl functional group?
- Group A
 - Group B
 - Group C
 - Group D
 - Group E

**MCC Spring 2010 Test 1
Answer Section****MULTIPLE CHOICE**

- | | |
|------------|--------|
| 1. ANS: D | PTS: 1 |
| 2. ANS: A | PTS: 1 |
| 3. ANS: D | PTS: 1 |
| 4. ANS: A | PTS: 1 |
| 5. ANS: B | PTS: 1 |
| 6. ANS: C | PTS: 1 |
| 7. ANS: C | PTS: 1 |
| 8. ANS: C | PTS: 1 |
| 9. ANS: B | PTS: 1 |
| 10. ANS: C | PTS: 1 |
| 11. ANS: A | PTS: 1 |
| 12. ANS: D | PTS: 1 |
| 13. ANS: B | PTS: 1 |
| 14. ANS: C | PTS: 1 |
| 15. ANS: A | PTS: 1 |
| 16. ANS: B | PTS: 1 |
| 17. ANS: A | PTS: 1 |
| 18. ANS: D | PTS: 1 |
| 19. ANS: C | PTS: 1 |
| 20. ANS: B | PTS: 1 |
| 21. ANS: C | PTS: 1 |
| 22. ANS: B | PTS: 1 |
| 23. ANS: A | PTS: 1 |
| 24. ANS: A | PTS: 1 |
| 25. ANS: A | PTS: 1 |
| 26. ANS: A | PTS: 1 |
| 27. ANS: D | PTS: 1 |
| 28. ANS: A | PTS: 1 |
| 29. ANS: A | PTS: 1 |
| 30. ANS: C | PTS: 1 |
| 31. ANS: B | PTS: 1 |
| 32. ANS: A | PTS: 1 |
| 33. ANS: B | PTS: 1 |
| 34. ANS: C | PTS: 1 |
| 35. ANS: C | PTS: 1 |
| 36. ANS: C | PTS: 1 |
| 37. ANS: A | PTS: 1 |
| 38. ANS: E | PTS: 1 |
| 39. ANS: D | PTS: 1 |

- 40. ANS: C PTS: 1
- 41. ANS: D PTS: 1
- 42. ANS: B PTS: 1
- 43. ANS: B PTS: 1
- 44. ANS: A PTS: 1
- 45. ANS: C PTS: 1
- 46. ANS: A PTS: 1
- 47. ANS: A PTS: 1
- 48. ANS: A PTS: 1
- 49. ANS: C PTS: 1
- 50. ANS: E PTS: 1

Experiment:

A scientist wanted to determine if classical music helped people relax more than rap music. She asked 1,000 20-year-old men and 1,000 20-year-old women to participate in her experiment at the same time each day, in the same location and under the same conditions. She had each person rest on a bed while she played a classical music recording for 30 seconds and then she asked them to describe how they felt. She would then repeat this procedure, playing rap music instead of classical music. She alternated the type of music played first, but she always used the same sample of classical music and the same sample of rap music.

4. What question is tested by this experiment? (1 point)

DOES CLASSICAL music help people relax more than rap music?

5. Write two hypotheses and one null hypothesis for this experiment. (3 points)

H1: EX) People will say that they are more relaxed when they listen to classical music

H2:

Ho: The Type of music people listen to will have no effect on their level of relaxation

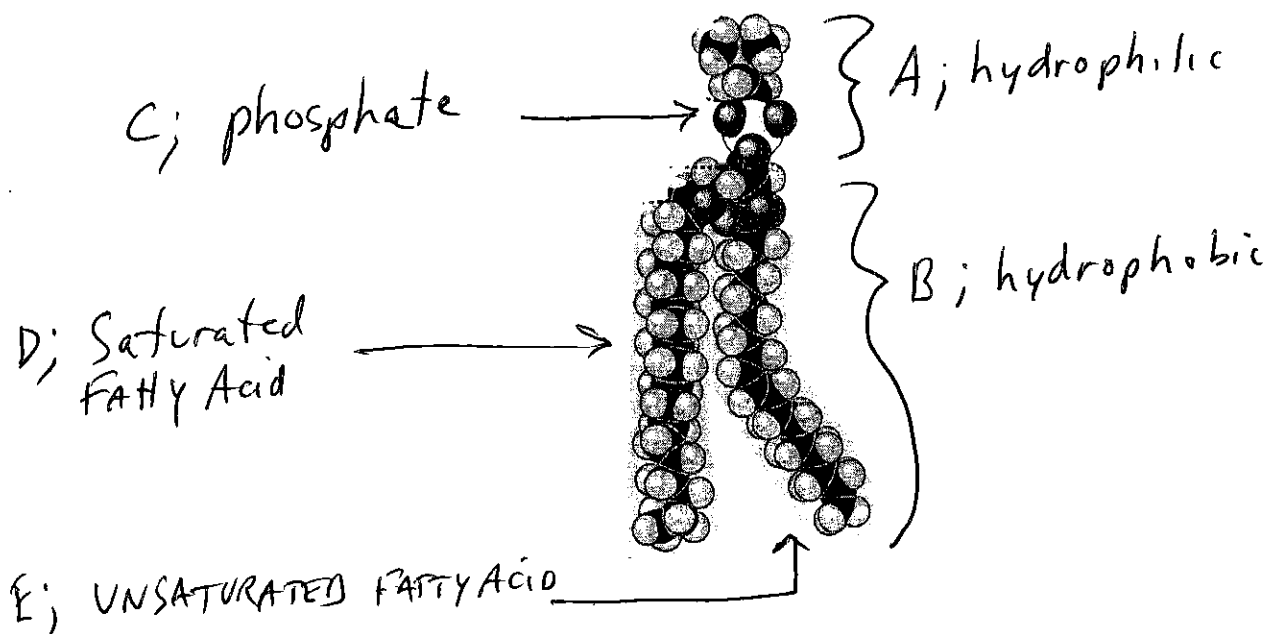
6. What is the variable? (1 point)

the Type of music

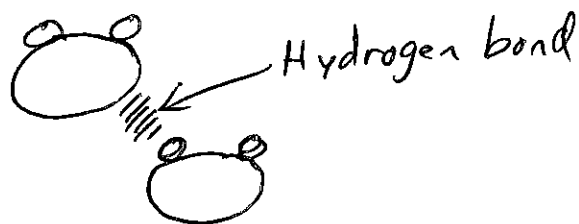
7. What factors are held constant in the experiment? (1 point)

Length of time each person listens to the music sample, the place and position of their body when they listen, the age of the men/women, etc.

1. The molecule below is a phospholipid. Phospholipids are the main component in cell membranes because they have a dual personality; half the molecule is hydrophilic and the other half is hydrophobic. Label the following: (A) hydrophilic side of the molecule; (B) hydrophobic side of the molecule; (C) the location of the phosphate functional group; (D) the saturated fatty acid chain; (E) the unsaturated fatty acid chain. (5 points)



2. Sketch a hydrogen bond between two (2) water molecules. (3 points)



3. Explain why water has the molecular formula H_2O and not H_4O . (You must be specific in you answer). (2 points)

Oxygen has 6 e^- in outer shell
H has 1 e^- in outer shell
When covalently bonded they share
 e^- completing the outer shell