

# CLEP

*Biology*

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## Question: 1

The hydrogen bonds between its molecules make water a good:

- A. Solvent for lipids
- B. Participant in replacement reactions
- C. Surface for small particles and living organisms to move across
- D. Solvent for polysaccharides such as cellulose
- E. Example of an acid

**Answer: C**

Explanation:

The hydrogen bonds between water molecules cause water molecules to attract each other (negative pole to positive pole) and "stick" together. This gives water a high surface tension which allows small living organisms, such as water striders, to move across its surface. Since water is a polar molecule, it readily dissolves other polar and ionic molecules, such as carbohydrates and amino acids. Polarity alone is not sufficient to make something soluble in water, however; for example, cellulose is polar but its molecular weight is so large that it is not soluble in water.

## Question: 2

The breakdown of a disaccharide releases energy, which is stored as ATP. This is an example of a(n):

- A. Combination reaction
- B. Replacement reaction
- C. Endothermic reaction
- D. Exothermic reaction
- E. Thermodynamic reaction

**Answer: D**

Explanation:

An exothermic reaction releases energy, whereas an endothermic reaction requires energy. The breakdown of a chemical compound is an example of a decomposition reaction ( $AB \rightarrow A + B$ ). A combination reaction ( $A + B \rightarrow AB$ ) is the reverse of a decomposition reaction, and a replacement (displacement) reaction is one where a compound breaks apart and forms a new compound plus a free reactant ( $AB + C \rightarrow AC + B$  or  $AB + CD \rightarrow AD + CB$ ).

## Question: 3

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Which of the following metabolic compounds is composed of only carbon, oxygen, and hydrogen?

- A. Phospholipids
- B. Glycogen
- C. Peptides
- D. RNA
- E. Vitamins

**Answer: B**

Explanation:

Glycogen is a polysaccharide, a molecule composed of many bonded glucose molecules. Glucose is a carbohydrate, and all carbohydrates are composed of only carbon, oxygen, and hydrogen. Most other metabolic compounds contain other atoms, particularly nitrogen, phosphorus, and sulfur.

### Question: 4

When an animal takes in more energy than it uses over an extended time, the extra chemical energy is stored as:

- A. Fat
- B. Starch
- C. Protein
- D. Enzymes
- E. Cholesterol

**Answer: A**

Explanation:

Long-term energy storage in animals takes the form of fat. Animals also store energy as glycogen, and plants store energy as starch, but these substances are for shorter-term use. Fats are a good storage form for chemical energy because fatty acids bond to glycerol in a condensation reaction to form fats (triglycerides). This reaction, which releases water, allows for the compacting of high-energy fatty acids in a concentrated form.

### Question: 5

Which of the following molecules is thought to have acted as the first enzyme in early life on earth?

- A. Protein
- B. RNA
- C. DNA

- D. Triglycerides
- E. Phospholipids

**Answer: B**

Explanation:

Some RNA molecules in extant organisms have enzymatic activity; for example, the formation of peptide bonds on ribosomes is catalyzed by an RNA molecule. This and other information have led scientists to believe that the most likely molecules to first demonstrate enzymatic activity were RNA molecules.

### Question: 6

Which Of the following are formed when the plasma membrane surrounds a particle outside of the cell?

- A. Golgi bodies
- B. Rough endoplasmic reticulum
- C. Lysosomes
- D. Secretory vesicles
- E. Endocytic vesicles

**Answer: E**

Explanation:

Endocytosis is a process by which cells absorb larger molecules (or even tiny organisms, such as bacteria) than would be able to pass through the plasma membrane. Endocytic vesicles containing molecules from the extracellular environment often undergo further processing once they enter the cell.

### Question: 7

Which of the following plant organelles contain pigments that give leaves their color?

- A. Centrioles
- B. Cell walls
- C. Chloroplasts
- D. Central vacuole
- E. Golgi apparatus

**Answer: C**

Explanation:

Chloroplasts contain the light-absorbing compound chlorophyll, which is essential in photosynthesis. This gives leaves their green color. Chloroplasts also contain yellow and red

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carotenoid pigments, which give leaves red and yellow colors in the fall as chloroplasts lose their chlorophyll.

### Question: 8

All but which of the following processes are ways of moving solutes across a plasma membrane?

- A. Osmosis
- B. Passive transport
- C. Active transport
- D. Facilitated diffusion
- E. Endocytosis

**Answer: A**

Explanation:

Osmosis is the movement of water molecules (not solutes) across a semi-permeable membrane. Water moves from a region of higher concentration to a region of lower concentration. Osmosis occurs when the concentrations of a solute differ on either side of a semi-permeable membrane. For example, a cell (containing a higher concentration of water) in a salty solution (containing a lower concentration of water) will lose water as water leaves the cell. This continues until the solution outside the cell has the same salt concentration as the cytoplasm.

### Question: 9

Prokaryotic and eukaryotic cells are similar in having which of the following?

- A. Membrane-bound organelles
- B. Protein-studded DNA
- C. Presence of a nucleus
- D. Integral membrane proteins in the plasma membrane
- E. Flagella composed of microtubules

**Answer: D**

Explanation:

Both prokaryotes and eukaryotes interact with the extracellular environment and use membrane-bound or membrane-associated proteins to achieve this. They both use diffusion and active transport to move materials in and out of their cells. Prokaryotes have very few proteins associated with their DNA, whereas eukaryotes' DNA is richly studded with proteins. Both types of living things can have flagella, although with different structural characteristics in the two groups. The most important differences between prokaryotes and eukaryotes are the lack of a nucleus and membrane-bound organelles in prokaryotes.

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### Question: 10

Which of the following cell types has a peptidoglycan cell wall?

- A. Algae
- B. Bacteria
- C. Fungi
- D. Land plants
- E. Protists

**Answer: B**

Explanation:

Bacteria and cyanobacteria have cell walls constructed from peptidoglycans—a polysaccharide and protein molecule. Other types of organisms with cell walls, for instance, plants and fungi, have cell walls composed of different polysaccharides. Plant cell walls are composed of cellulose, and fungal cell walls are composed of chitin.

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