

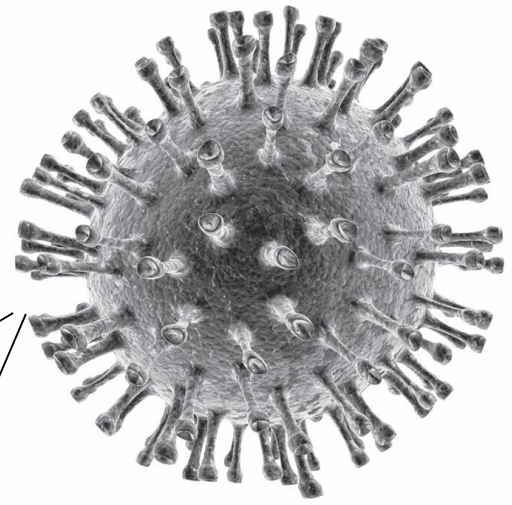
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1 A photograph of a virus is shown below. (R4C)

© iStockphoto.com/Henrick Jonsson

The projections on the surface of this virus allow the virus to —

- A move inside a host cell
- B attach to a host cell
- C control a host cell's DNA
- D signal other viruses to infect a host cell



6 Which of these statements best explains the process of energy conversion that takes place in the mitochondria? (R4B)

- F Energy is required for carbon dioxide molecules to form six-carbon sugar molecules.
- G Water molecules and radiant energy are necessary for anaerobic respiration to take place.
- H Oxygen molecules release energy in the form of heat during combustion reactions.
- J The energy in the bonds of glucose molecules is transferred to the phosphate bonds in ATP.

16 A photomicrograph of onion root tip cells during mitosis is shown below. (R5A)



© iStockphoto.com/Alan John Lander Phillips

Which phase of mitosis is occurring in the cell indicated by the arrow?

- F Prophase
- G Metaphase
- H Anaphase
- J Telophase

20 Proteins and polysaccharides are polymers. These polymers are formed by dehydration synthesis.

Which statement correctly identifies a difference in the structure of proteins and polysaccharides? (R9A)

- F Only polysaccharides are comprised of repeating units of cytosine, adenine, guanine, and thymine.
- G Only proteins are formed from amino acids joined by peptide bonds.
- H Only polysaccharides can be folded and twisted to very specific shapes.
- J Only proteins can be large molecules with thousands of subunits.

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23 Both euglena and cyanobacteria are photosynthetic unicellular organisms found in pond water. The feature that distinguishes euglena from cyanobacteria is the — **(S4A)**

- A** ability to maintain homeostasis
- B** presence of ribosomes
- C** ability to reproduce
- D** presence of a nuclear membrane

29 Which cellular process takes place in the ribosomes that are bound to the endoplasmic reticulum? **(R4B)**

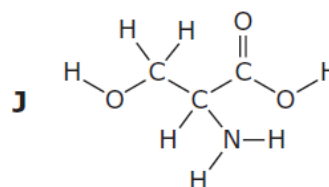
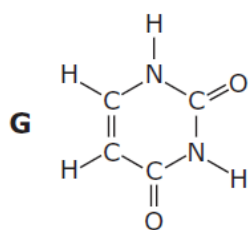
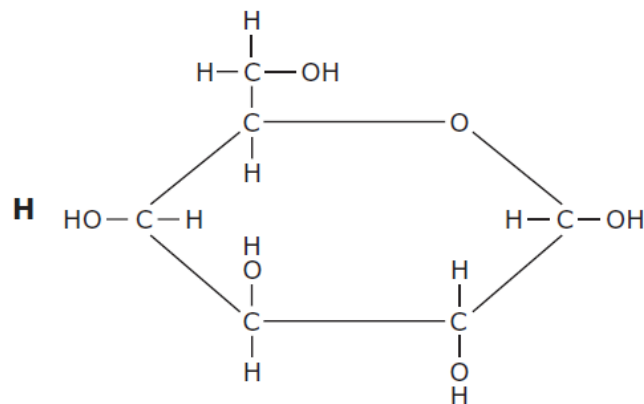
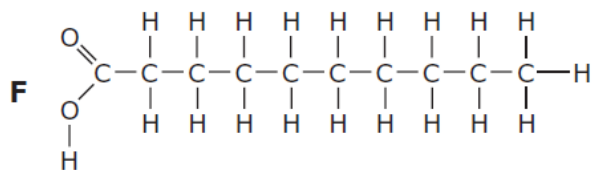
- A** The breakdown of waste material
- B** The conversion of radiant energy to glucose
- C** The synthesis of new proteins
- D** The replication of nucleic acids

33 Which of these must occur during S phase of the cell cycle so that two daughter cells can be produced during M phase? **(R5A)**

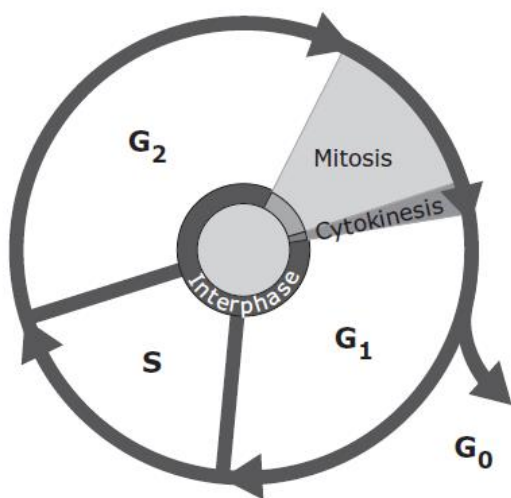
- A** The DNA must be replicated.
- B** The chromosomes must be joined.
- C** The cytoplasm must be separated.
- D** The cell membrane must be expanded.

36 Which of these best represents a fatty-acid molecule? **(R9A)**

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41 The diagram below represents the cell cycle. (R5D)



When cells leave the cell cycle, they exit during G_1 phase and then enter G_0 phase, a resting period. Most normal cells can leave G_0 phase and reenter the cell cycle at G_1 phase before entering S phase. Cancer cells are different because they cannot enter G_0 phase and are likely to do which of the following?

- A** Fail to complete S phase **C** Repeat the cell cycle continuously
B Mutate during G phase **D** Die after completing mitosis

45 Cold sores are caused by the herpes simplex virus type 1. A company that wants to develop antiviral drugs would ask a research immunologist to study — (R4C)

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- A the mechanism used by the virus to infect cells
- B how closely related the virus is to cold viruses
- C the metabolism of the virus
- D meiosis in the virus

47 Cell differentiation is critical during embryonic development. The process of cell differentiation results in the production of many types of cells, including germ, somatic, and stem cells. Cell differentiation is most directly regulated by — **(S5C)**

- A ATP
- B DNA
- C lipids
- D sugars

1. If a person is suffering from severe dehydration and does not have enough water in his or her cells, a physician might give the person an intravenous (IV) solution to rehydrate the cells. This solution is most likely-

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- A. isotonic to the cells.
- B. hypotonic to the cells.
- C. hypertonic to the cells.
- D. hydrotonic to the cells.

2. Which of the following examples illustrates osmosis?

- F. Water leaves the tubules of the kidney in response to the hypertonic fluid surrounding the tubules.
- G. During the process of digestion, digestive enzymes are excreted into the small intestine.
- H. White blood cells consume pathogens and cell debris at the site of an infection.
- J. Calcium is pumped inside a muscle cell after the muscle contracts

5. Cells often need to take in materials from their environment, many of which are found in lower concentrations outside the cell compared to inside the cell. In order to do this, cells must use the energy from ATP to move these materials-

- A. against the concentration gradient through active transport.
- B. with the concentration gradient through active transport.
- C. against the concentration gradient through passive transport.
- D. with the concentration gradient through passive transport.

11. Placing wilted lettuce in cold water will make it crisp again. Which statement best describes what happens to restore the lettuce to its original condition?

- A. Water left the lettuce cells by diffusion.
- B. Water entered the cells of the lettuce by osmosis.
- C. Osmosis caused salts to enter the lettuce cells.
- D. Salts in the leaf caused water to diffuse out of the cells.