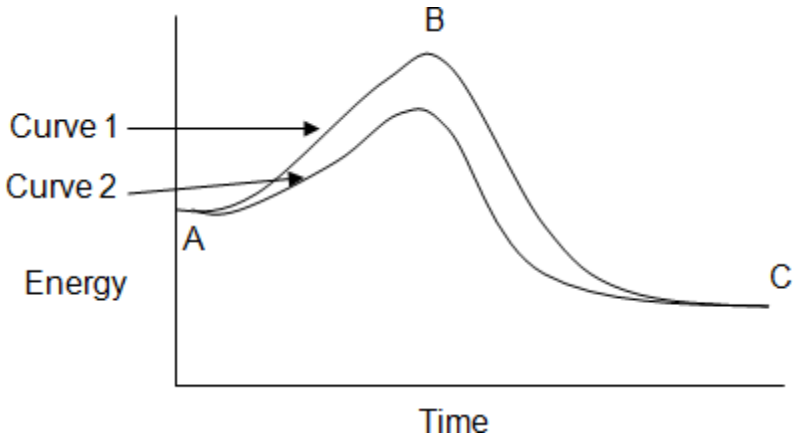
1. Enzymes catalyze biochemical reactions by
    a. Lowering the potential energy of the products
    b. Separating inhibitors from products
    c. Forming a complex with the products
    d. Lowering the activation energy of the reaction
    e. Providing energy to the reaction
2. Which of the following is an example of a cofactor?
    a. Zinc
    b. Actin
    c. Cholesterol
    d. GTP
    e. Chlorophyll

1. Cyanide is a poison that binds to the active site of the enzyme cytochrome c and prevents its activity. Cyanide is a(n):
    a. Prosthetic group
    b. Cofactor
    c. Coenzyme
    d. Inhibitor
    e. Reverse regulator



4. The graph above shows the potential energy of molecules during the process of a chemical reaction. All of the following may be true EXCEPT
    a. This is an endergonic reaction
    b. The activation energy in curve 2 is less than the activation energy in curve 1
    c. The energy of the products is less than the energy of the substrate
    d. Curve 2 shows the reaction in the presence of an enzyme
    e. The reaction required ATP
5. Which of the following is not a characteristic of enzymes?
    a. They change shape when they bind their substrates
    b. They can catalyze reactions in both forward and reverse directions

c. Their activity is sensitive to changes in temperature
d. They are always active on more than one kind of substrate
e. They may have more than one binding site

6. In a strenuously exercising muscle, NADH begins to accumulate in high concentration. Which of the following metabolic process will be activated to reduce the concentration of NADH?
    a. Glycolysis
    b. The Krebs cycle
    c. Lactic acid fermentation
    d. Oxidative phosphorylation
    e. Acetyl CoA synthesis
7. Which of the following statements regarding chemiosmosis in mitochondria is not correct?
    a. ATP synthase is powered by protons flowing through membrane channels
    b. Energy from ATP is used to transport protons to the intermembrane space
    c. Energy from the electron transport chain is used to transport protons to the intermembrane space
    d. An electrical gradient and a pH gradient both exist across the inner membrane
    e. The waste product of chemosmosis is water
8. In photosynthesis, high-energy electrons move through electron transport chains to produce ATP and NADPH. Which of the following provides the energy to create high energy electrons?
    a. NADH
    b. NADP+
    c. O2
    d. Water
    e. Light
9. Which of the following kinds of plants is most likely to perform CAM photosynthesis?
    a. Mosses
    b. Grasses
    c. Deciduous trees
    d. Cacti
    e. Legumes
10. The combination of DNA with histones is called
    a. A centromere
    b. Chromatin
    c. A chromatid
    d. Nucleoli
    e. A plasmid

Answers

1. D. Enzymes act as catalysts for biochemical reactions. A catalyst is not consumed in a reaction, but, rather, lowers the activation energy for that reaction. The potential energy of the substrate and the product remain the same, but the activation energy, which is the energy needed to make the reaction progress, "can be lowered with the help of an enzyme.
2. A. A cofactor is an inorganic substance that is required for an enzymatic reaction to occur. Cofactors bind to the active site of the enzyme and enable the substrate to fit properly. Many cofactors are metal ions, such as zinc, iron, and copper.
3. D. Enzyme inhibitors attach to an enzyme and block substrates from entering the active site, thereby preventing enzyme activity. As stated in the question, cyanide is a poison that irreversibly binds to an enzyme and blocks its active site, thus fitting the definition of an enzyme inhibitor.
4. A. Because the energy of the products is less than the energy of the substrate, the reaction releases energy and is an exergonic reaction.
5. D. Enzymes are substrate-specific. Most enzymes catalyze only one biochemical reaction. Their active sites are specific for a certain type of substrate and do not bind to other substrates and catalyze other reactions.
6. C. Lactic acid fermentation converts pyruvate into lactate using high-energy electrons from NADH. This process allows ATP production to continue in anaerobic conditions by providing NAD+ so that ATP can be made in glycolysis.
7. B. Proteins in the inner membrane of the mitochondrion accept high-energy electrons from NAD and FADH2, and in turn transport protons from the matrix to the intermembrane space. The high proton concentration in the intermembrane space creates a gradient which is harnessed by ATP synthase to produce ATP.
8. E. Electrons trapped by the chlorophyll P680 molecule in photosystem II are energized by light. They are then transferred to electron acceptors in an electron transport chain.
9. D. CAM photosynthesis occurs in plants that grow where water loss must be minimized, such as cacti. These plants open their stomata and fix CO2 at night. During the day, stomata are closed, reducing water loss. Thus, photosynthesis can proceed without water loss.
10. B. DNA wrapped around histone proteins is called chromatin. In a eukaryotic cell, DNA is always associated with protein; it is not “naked” as with prokaryotic cells.