Biology biochemistry understanding enzymes worksheet answers

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CHEMISTRY WORKSHEET

1. In the following picture, atoms A and B are close enough to react.

A   B

* neutron   * proton   * electron

a)   Are the electrons in atom A attracted to or repelled by the electrons in atom B?

b)   Are the electrons in atom A attracted to or repelled by the nucleus of atom B?

c)   How many electrons does each atom have?

d)   Identify each element. (Hint: the number of electrons equals the atomic number)

e)   How many neutrons does each atom have? (You can either count them or subtract their Atomic Number from their Atomic Mass.)

How do enzymes work biology. What are enzymes class 10 bio. Biochemistry worksheet answer key.

Which of the following statements is not true concerning enzymes? Possible Answers: They increase the rate of a reaction They lower the energy of activation They are biological catalysts They increase the amount of products Correct answer: They increase the amount of products Explanation: Enzymes are biological catalysts that increase the rate of a chemical reaction. This is accomplished by lowering the activation energy for the reaction. Enzymes increase the rate of a reaction, but do NOT increase the amount of products formed in the reaction. They simply cause the products to be formed faster. Which of the following is not a function of an enzyme? Possible Answers: Lower the activation energy of a reaction Lower the energy of the transition state Speed up biological processes Shift the equilibrium between products and reactants Accelerate the rate of a process Correct answer: Shift the equilibrium between products and reactants Explanation: A catalyst speeds up the rate of a reaction by lowering the activation energy, which is caused by the high energy transition state. Enzymes are a class of catalyst specific to biological processes, accelerating these processes by lowering activation energy and transition state energy. Catalysts and enzymes may help reactions move faster, but they do not affect the final equilibrium amounts of reactants and products. At what pH does pepsin best function? Possible Answers: Correct answer: Explanation: Pepsin is an enzyme in the stomach that digests proteins. Because it is active in the stomach, which is highly acidic, pepsin best functions at a low pH between 2 and 2.5. Pepsinogen is secreted by chief cells and converted into active pepsin after catalyzation by hydrochloric acid. The acid is secreted by parietal cells in response to gastrin secretion by G cells. After the stomach contents enter the duodenum of the small intestine, the acid is neutralized by bicarbonate secretions from the pancreas. This prevents the acid from damaging the walls of the small intestine. What is the active site of an enzyme? Possible Answers: The active site is the portion of the substrate that the enzyme binds to, initiating a chemical reaction The active site is a portion of the enzyme that allows the enzyme to diffuse through the plasma membrane, allowing it to exit the cell The active site is the portion of the enzyme that engulfs bacteria and other foreign particles in the cell The active site is the portion of the enzyme that substrates bind to, initiating a chemical reaction The active site is the portion of the enzyme that DNA binds to, initiating a chemical reaction Correct answer: The active site is the portion of the enzyme that substrates bind to, initiating a chemical reaction Explanation: Catalysts are molecules that are capable of increasing reaction speed. Enzymes are a particular subset of catalysts; enzymes are proteins that can aid in biological reactions and are crucial to many metabolic processes that occur in cells. Enzymes lower the activation energy of a given reaction, allowing the reaction to proceed faster. The active site of an enzyme is the region of the enzyme that can bind a substrate, when a substrate collides into the enzyme molecule. Joining of an enzyme and substrate results in a chemical reaction whereby the substrates are converted into products. The active site of an enzyme is specific to the substrate's shape, like a lock-and-key mechanism. Which of the following are false regarding enzymes? Possible Answers: The binding of a substrate will change an enzyme's shape Enzymes are biological catalysts which do not require other molecules to perform their function Isozymes are a class of enzymes Enzymatic activity is regulated Enzyme activity is affected by changes in pH and temperature Correct answer: Enzymes are biological catalysts which do not require other molecules to perform their function Explanation: Enzymes are biological catalysts that bind to specific substrates. Enzyme activity is tightly regulated by activators and/or inhibitors. Enzymes will change shape as a result in an induced fit when bound to their substrates, activators, and/or inhibitors. Since enzymes are proteins, environmental changes will affect their activity. For example, high temperatures will denature the protein, rendering the enzyme inactive. Isozymes are a group of enzymes that do not have the exact same amino acid sequence, yet they catalyze the same reactions. Enzymes need cofactors, such as prosthetic groups and/or coenzymes in order to function properly. The precursors to coenzymes are vitamins in the diet. Which of the following factors affects enzyme activity? Possible Answers: Correct answer: All of these Explanation: Temperature and pH can affect enzyme activity because they may alter the shape and effectiveness of the enzyme through protein denaturation. Likewise, the availability of reactants and substrates controls the amount of product that the enzyme can catalyze during the reaction. If they are present in low concentrations, then they will inhibit the enzyme's activity. The digestive enzyme pepsin is found in the stomach of many mammals, and functions as a digestive enzyme. What pH would a scientist expect pepsin to possess at its most active state? Possible Answers: Correct answer: Explanation: The stomach is an acidic environment; therefore, one would expect pepsin to be most active at an acidic pH. The answer choice "2" is the most acidic pH. It is also the pH that is generally found in the stomach. Although a pH of 6 is slightly acidic, it is not the pH found in the stomach. A catalyst is responsible for a decrease in _____ of a reaction. Possible Answers: Correct answer: activation energy Explanation: A catalyst is responsible for a decrease in activation energy of a reaction. This allows an enzyme to use less energy to manipulate its substrate into a transition state. Which of the following best describes the action of an enzyme? Possible Answers: Slows down reactions so in order to obtain more prducts from the substrate Catalyze reactions by lowering energy of activation They represent the product of a reaction Correct answer: Catalyze reactions by lowering energy of activation Explanation: Enzymes are biological molecules that help catalyze reactions by lowering the energy of activation and increasing the rate of a reaction. They can do this by a number of mechanisms including: providing a template for substrates to join together in an efficient manner; distorting a substrate so it approaches the unstable/transition state; and providing a microenvironment conducive to a reaction. Inhibitors and activators can affect enzymes activity by slowing down and increasing enzyme activity respectively. Which of the following does not affect the activity of enzymes? Possible Answers: Correct answer: Activation energy Explanation: Enzyme activity can be affected by environmental factors such as temperature and pH. This is because proteins denature and lose their shape at high temperatures and extreme pHs. Most enzymes prefer to act under a temperature close to body temperature. Optimal pH is usually physiologic at pH 6 to 8; however, digestive enzymes prefer lower pH around 2 to 3 (e.g. pepsin, which makes sense because pepsin works in acidic conditions within the stomach). Rachel Certified Tutor Oregon State University, Bachelor of Science, Health Promotion and Education. University of Colorado Denver, Masters, Social ... Andrew Certified Tutor The University of Kansas, Bachelor of Science, Biochemistry. If you've found an issue with this question, please let us know. With the help of the community we can continue to improve our educational resources. 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