**NameSC10Enzu P00GCC29Q7050427**

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**Enzyme Practice 1- Enzyme Specificity**

**Directions:** Read the case study below and mark the text (10 pts). Put a star next to your name if you read the directions for a bonus point.

**Enzyme Deficiency Case Study**

You are a doctor at a local clinic. Today you saw Ashley, a sixteen year old student, had been experiencing occasional discomfort after meals. The discomfort reached a new peak last Thursday evening about an hour after eating a cheeseburger and a large chocolate milk shake. Ashley spent much of that night in pain. She had abdominal cramps and diarrhea and also felt sick to her stomach. Ashley very rarely uses very much milk or cheese when preparing meals at home, Ashley tells you that she almost never cooked with any dairy product.

**Case** **Background**

Lactose intolerance is the inability to digest significant amounts of lactose, a sugar found in milk. Some individuals are born lactose intolerant. These individuals lack the ability to produce lactase from birth. The optimum temperature for lactase is about 77 °F (25 °C) for its activity and has an optimum pH of 6. Most individuals that are lactose intolerant, however, become so gradually as lactase production decreases over time when they stop eating foods that require their body to down lactase.

There is no cure for lactose intolerance, but treatment is fairly simple. Affected individuals are instructed to avoid as much lactose as required in order to avoid discomfort. Different individuals have different levels of intolerance and each affected person needs to determine through trial and error how much lactose he or she can tolerate. In addition to dietary control of lactose intolerance, individuals can also use products that contain lactase.

**QUESTIONS:**

1. Define the following terms. (5 pts each)

Catalyst:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Activation Energy: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. (10 pts) Describe what type of macromolecule lactose is and what the monomer of that macromolecule is.

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1. (10 pts) Describe what type of molecule lactase is and explain its function in the body.

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1. (10 pts) Why is a lack of lactase causing Ashley to be uncomfortable?

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1. (10 pts) Draw a picture of lactase (an enzyme). Label the active site and the substrate (lactose).
2. (40 pts) What would be your diagnosis for Ashley? What treatment would you prescribe and why? What could she take to make her feel better? Write one paragraph with 5-6 sentences. Include an introduction sentence, and evidence from class and from the background information above.

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Bonus: (5 pts) Do you know anyone who is lactose intolerant? How do you know? What are their symptoms? What treatment would you suggest to them?

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