1. Define the following:

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| enzyme | *“globular protein\* which acts as a catalyst for biological reactions”*(1 p. 18) |
| active site |  |
| denaturation |  |

\*Read ahead – state the level of protein structure of a globular protein.



1. State the suffix usually applied to the end of the name of enzymes and list three examples, with their functions.

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1. Explain *enzyme-substrate specificity*, using a diagram and referring to the lock-and-key model.

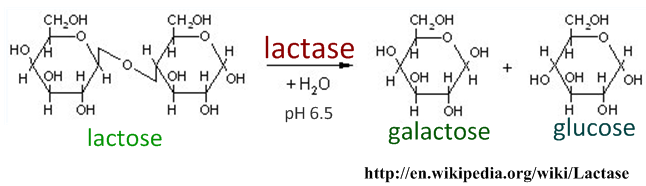
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1. State the function of *polar regions* of amino acids on the active site of the enzyme.
2. Explain the effects of temperature, pH and substrate concentration on the rate of an enzyme-controlled reaction.

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| Temperature |  |
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| pH |  |
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|  |  |
| Substrate concentration |  |
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1. Explain the industrial production of lactose-free milk.

**Problem:** some people are lactose-intolerant and cannot digest lactose.



1. Describe why simply adding lactose to milk is ineffective.

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1. Explain the use of *immobilized lactase* in production of lactose-free milk

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1. List two other commercial uses of enzymes.

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1. Explain the lowering of *activation energy* by enzymes. SKIP this until asked to answer this.

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1. Describe the *induced-fit* model of enzyme activity, with reference to *conformational change* and *activation energy*.

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1. A *metabolic pathway* is a chain or cycle of enzyme-controlled reactions.
   1. List two examples of *chain pathways*.

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* 1. List two examples of *cyclical pathways*.

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1. In the space below, draw and annotate diagrams to explain the difference between competitive and non-competitive inhibitors.

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| --- | --- |
| **Competitive** | **Non-competitive** |

1. Distinguish between competitive and non-competitive inhibition.

|  |  |  |
| --- | --- | --- |
|  | **Competitive** | **Non-competitive** |
| Place of action | *Active site* | *Allosteric site* |
| Effect on enzyme |  | *Conformational change of active site* |
| Effect on activity |  | *Fewer active sites available for reaction* |
| Graph of effect of inhibitor on activity |  |  |
| Therapeutic example | ***Antabuse*** *is a competitive inhibitor of aldehyde oxidase, which breaks down the toxic intermediate step of alcohol metabolism. It is used in* ***treating alcoholism*** *– if the patient drinks alcohol he/she will feel very ill.* |  |

1. Explain end-product inhibition of enzyme-controlled pathways as an example of negative feedback control, using E. coli’s control of tryptophan as an example.