**IB Biology:** Proteins & Enzymes Review (2.4, 2.5, & 7.3) **NAME:**

1. Draw a generalized **amino acid**:
2. Explain the four levels of protein structure:
3. Explain how changes in pH and temperature lead to **denaturation** of proteins:
4. Outline the significance of these structures in the R-groups (side-chains) of amino acids (think about what type of bonds they might form in either secondary or tertiary structures).
* *Polar R-groups:*
* *Non-polar R-groups:*
* *Positively or negatively charged R-groups:*
* *Sulphur-containing R-groups:*
1. Compare fibrous and globular proteins:

|  |  |  |
| --- | --- | --- |
|  | **Fibrous** | **Globular** |
| ***What does it look like?*** |  |  |
| ***Solubility*** |  |  |
| ***Functions*** |  |  |
| ***Examples*** |  |  |

1. Proteins are used on the plasma membrane and for other diverse functions. Complete the table below:

|  |  |  |
| --- | --- | --- |
| **Protein Function** | **Example** | **What does it do?** |
| Gas / Nutrient Transport |  |  |
| Catalyst / Enzyme |  |  |
| Immunity / Defense |  |  |
| Hormones |  |  |
| Structure / Tensile Strength |  |  |
| Movement / Muscle Contraction |  |  |
| DNA Packaging |  |  |

1. Complete the table describing the functions of the six specific protein example, below:

|  |  |
| --- | --- |
| **Protein Example** | **Function** |
| Rubisco |  |
| Insulin |  |
| Immunoglobulin (Antibodies) |  |
| Collagen |  |
| Rhodopsin |  |
| Spider silk |  |

1. Define the following:

|  |  |
| --- | --- |
| **enzyme** | *“globular protein which acts as a catalyst for biological reactions”* |
| **active site** |  |
| **denaturation** |  |

1. List three examples of enzymes, with their functions.
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1. Explain *enzyme-substrate specificity*. Include a diagram:
2. State the function of *polar regions* of amino acids on the active site of the enzyme.
3. Explain the lowering of *activation energy* by enzymes.

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1. Explain the effects of temperature, pH and substrate concentration on the rate of an enzyme-controlled reaction. Draw a sample graph in the space on the left and then explain/ describe on the right:

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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, including two advantages of lactose-free milk: