Name _____ **Period** _____

AP Biology **Date** _____

ENZYMES AT WORK

1. An important cause of the deterioration in flavor, texture, and vitamin content of frozen fruits and vegetables during storage is the action of hydrolytic enzymes released from the vacuoles of the cells. Blanching (a quick dip in boiling water) prior freezing improves the keeping qualities of produce. How do you suppose blanching works?

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2. Some fruits and vegetables turn brown when peeled because they contain the enzyme catecholase, which catalyzes a reaction between oxygen and a colorless compound, catechol. The product of this reaction is benzoquinone, which forms the red and brown pigments responsible for the browning. When preparing fruit salads, some cooks sprinkle the sliced fruits with lemon juice to prevent discoloration. How might lemon juice act to prevent the browning of fruit?

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3. Commercial meat tenderizers often contain papain, a proteolytic (protein-digesting) enzyme derived from papayas. How might such products make meat more tender?

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4. Meat tenderizers are sometimes used as a home remedy for treating stings inflicted by the Portuguese man-of-war. Based on this information, to what class of organic compounds do you suppose the toxins released by the man-of-war belongs?

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5. The following table shows the relative activity of two digestive enzymes, pepsin and salivary amylase, at various pH levels. On graph paper, plot the pepsin data, connect the points with straight lines, and label the curve "Pepsin". On the same graph, plot the salivary amylase data, connect the point with straight lines, and label the curve "salivary Amylase". Then answer the questions that follow.

Effect of pH on the Relative Activity of Pepsin and Salivary Amylase

	Enzyme Activity (% of maximum)	
pH	**Pepsin**	**Salivary amylase**
0	0	0
1	37	0
2	100	0
3	67	0
4	33	0
5	19	19
6	5	58
7	0	100
8	0	40
9	0	13
10	0	0

a. According to these data, what is the pH optimum of pepsin? _____

b. Relate this to the environment in which pepsin acts during digestion.

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c. Salivary amylase breaks down starch (a polysaccharide). The digestion of starch by salivary amylase begins in the mouth, ceases in the stomach, and resumes in the small intestine. Refer to your graph to explain why.

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