**Question 2 Rubric**

ENZYME QUESTION - 1969 L. PETERSON/AP BIOLOGY

Proteins functioning as enzymes exhibit precise specifications. Discuss the levels

of structural organization within proteins which are responsible for specific molecular interactions.

STANDARDS:

maximum points = 20

PRIMARY STRUCTURE (1/2 PT)

(2) amino acid sequence & number / determining other structures

peptide bonds

SECONDARY STRUCTURE (1/2 PT) folding within polypeptide chain

(4) H-bonds

Disulfide bonds

Alpha Helix - globular proteins

Beta Configuration - fibrous proteins

TERTIARY STRUCTURE (1/2 PT) further folding of alpha helix

(4) H-bonds

Disulfide bonds

electrostatic forces (interactions)

van der Waals forces

QUATERNARY STRUCTURE (1/2 PT)

(2) Conjugated Proteins - many polypeptide chains

ENZYMES ARE SPECIFIC BECAUSE OF ACTIVE SITE

(6) particular shape of molecule

particular charge distribution

Coenzymes or cofactors may be required

Mention of Lock-Key Hypothesis

Mention of Induced-Fit Hypothesis

**Question 3 Rubric**

STANDARDS:

maxiumum points = 13

PROOF THAT IT IS ORGANIC (1/2 PT)

PROOF THAT IT IS PROTEIN (1 PT)

PROTEIN EVIDENCE: (1 PT EACH/MAX, = 5)

DENATURED under different pH or temperatures

MACROMOLECULE

will diffuse through DIALYSIS TUBING if acted on by protease

centrifugation - large molecule - will be in precipitate

NINHYDRIN

will turn blue in presence of amino acids

CHROMATOGRAPHY

RATE OF REACTION (1/2 PT)

(2 PTS EACH/MAX. = 4)

vary amount of substrate - determine changing rate of reaction;

should level-off once maximum turnover rate is reached;

vary pH & temperature - rate of reaction will be at maximum & drop off radically

on either side;

INTERACTION BETWEEN ENZYME & SUBSTRATE (1/2 PT)

X-ray Diffraction

proof of changes in shape of "enzyme" (3/2 PTS)