

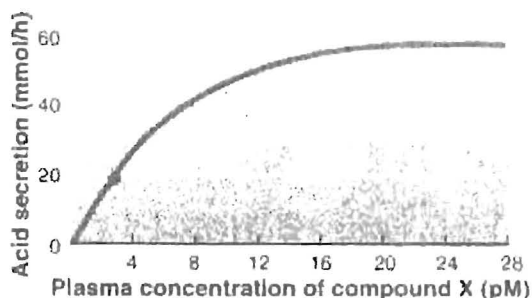
系所組別：生理學研究所甲、乙組

考試科目：生物化學

考試日期：0220，節次：1

※ 考生請注意：本試題 可 不可 使用計算機

1. Disulfide bonds help to stabilize the three-dimensional structure of proteins. What amino acids are involved in the formation of disulfide bonds? Does the formation of a disulfide bond increase or decrease entropy? (10%)
2. The chemical basis of blood-group specificity resides in the carbohydrates displayed on the surface of red blood cells. Carbohydrates have the potential for great structural diversity. Indeed, the structural complexity of the oligosaccharides that can be formed from four sugars is greater than that for oligopeptides from four amino acids. What properties of carbohydrates make this great structural diversity possible? (10%)
3. The triplet code in DNA for the amino acid histidine is G-T-A. Predict the mRNA codon for this amino acid and the tRNA anticodon (10%)?
4. What is the molar concentration of 117 g of sodium chloride dissolved in sufficient water to make 4 L of solution (10%)?
5. Choose the correct answer (10%). A molecule that loses an electron to a free radical
 - (a) becomes more stable.
 - (b) becomes electrically neutral.
 - (c) becomes less reactive.
 - (d) is permanently destroyed.
 - (e) becomes a free radical itself.
6. The following graph shows the relation between the amount of acid secreted and the concentration of compound X, which stimulates acid secretion in the stomach by binding to a membrane protein. At a plasma concentration of 2 pM, compound X produces an acid secretion of 20 mmol/h.



(背面仍有題目,請繼續作答)

系所組別： 生理學研究所甲、乙組

考試科目： 生物化學

考試日期：0220·節次：1

※ 考生請注意：本試題 可 不可 使用計算機

- a. Specify two ways in which acid secretion by compound X could be increased to 50 nmole/h. (10%)
- b. Why will increasing the concentration of compound X to 28 pM fail to produce more acid secretion than increasing the concentration of X to 18 pM? (10%)
7. V-M-Y-F-E-N: This is the single-letter amino acid abbreviation for a peptide. What is the net charge of this peptide at pH 7.0? An enzyme called a protein tyrosine kinase can attach phosphates to the hydroxyl groups of tyrosine. What is the net charge of the peptide at pH 7.0 after it has been phosphorylated by a tyrosine kinase? What is the likely source of phosphate utilized by the kinase for this reaction? (15%)
8. Consider the binding reaction $L + R \rightarrow LR$, where L is a ligand and R is its receptor. When $1 \times 10^{-3} \text{ M}$ L is added to a solution containing $5 \times 10^{-2} \text{ M}$ R, 80% of the L binds to form LR. What is the K_{eq} of this reaction? How will the K_{eq} be affected by the addition of a protein that catalyzes this binding reaction? What is the K_d ? (15%)