系所組別： 奈米科技暨微系統工程研究所

考試科目： 生物化學

※ 考生請注意：本試題 □可 ☑不可 使用計算機

1. Describe the amplification of DNA by the polymerase chain reaction as well as the applications of PCR technology. (10%)

2. Define lipids and draw their chemical structures. Describe how lipids are utilized by a living human cell for various functions. (10%)

3. Describe how a single gene can be isolated and cloned. Then describe how recombinant DNA can be constructed and maintained in the laboratory as well as the applications of recombinant DNA technology. (15%)

4. Describe how Michaelis constant, K_M, and the maximal rate, V_{max}, can be readily derived from rates of catalysis measured at different substrate concentrations if the kinetic behavior of an enzyme follows Michaelis-Menten model. (15%)

5. There are four distinct levels of protein structure - primary, secondary, tertiary, and quaternary structures. Define these four levels of protein structure and indicate the differences among them. List and describe all methods that you know about which are used to determine these four levels of protein structure. (20%)

6. Draw a diagram and use the diagram to describe how functional proteins are synthesized from the information coded by the DNA sequence in a living human cell. Try to include as much as detailed information as you can in your answer. (30%)