

**一、問答題（100分）**

1. Describe the theory and application of sodium dodecyl sulfate-polyacrylamide gel electrophoresis. (10%)
2. Describe the theory and application of hydrophobic interaction chromatography in protein purification. (10%)
3. Describe the protocol and application of western blot analysis. (10%)
4. The recombinant plasmid is used for protein expression in mammalian cells. Describe the essential features for the recombinant plasmid to be an effective transfection vector? (10%)
5. You knock-out a novel gene and find the gene knock-out mice has higher bone density than wild type mice. Please hypothesize the possible biological function of the novel gene. (6%)
6. Please describe (a) the detailed experimental steps of polymerase chain reaction (PCR) (3%)  
(b) the utilities (applications) of PCR technology( 3%)
7. What is the utilities (applications) of DNA microarray? (6%)
8. Please compare the advantages and disadvantages of protein drugs and small molecule drugs ( chemical compound) (6%)
9. It was found that overexpression of the cytokine-A is associated with the pathogenesis of breast cancer. Please describe your strategy to develop drugs targeting this cytokine (6%)
10. Describe different types of stem cells and their application. (10%)
11. Describe transcriptome and the experimental approaches for analyzing transcriptome in cancer. (10%)
12. Describe the principle and application of next-generation sequencing. (10%)