

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

一、簡答題與問答題 (100 分)

1. Please describe the general mechanisms to repair DNA double strand break. (8 pts)
2. Please describe the role of “activator”, “enhancer”, “eRNA”, and “insulator” in gene expression. (5 pts)
3. Please compare the differences of translation initiation process between prokaryotic and eukaryotic cells from the points of mRNA, tRNA, and ribosome. (6 pts)
4. Please first describe the function of IRES in mRNA translation and then design experiments to prove a potential IRES is indeed functional. (10 pts)
5. Please first describe the general procedures for PCR reactions. And, if you saw 1) no PCR product at all and 2) lower smear PCR products after reaction, what you will do to improve your PCR reactions? (6 pts)
6. Name one technique that can be used to detect large scale RNA-protein interaction, and explain the principle of the method. (5 pts)
7. Describe RNA Splicing in eucaryotes. (10%)
8. Describe miRNA processing in eucaryotes (10%)
9. Describe epigenetic regulation of gene expression in eucaryotes. (10%)
10. Please compare in detail the differences of DNA replication between prokaryotic bacteria and eukaryotic cells. (10%)
11. Please compare in detail the difference of gene expression between prokaryotic bacteria and eukaryotic cells. (10%)
12. Please compare in detail the differences of protein translation between prokaryotic bacteria and eukaryotic cells. (10%)