I.　以下皆分子生物學之專有名詞，請詳細解釋之：每題 2 分 （ 以 0.5 分為單位加減分）

1. Homozygous	11. Codon bias
2. Tm	12. *trans*-acting
3. Klenow fragment	13. Zoo blot
4. Palindrome	14. FISH
5. Quorum sensing	15. HAT
6. tmRNA	16. MAR
7. T-DNA	17. SNP
8. RT-PCR	18. SRP
9. RFLP	19. Maternal inheritance
10. Filter hybridization	20. Unequal crossing over

II.　問答題

1. When studying the reassociation kinetics of eukaryotic genomic DNA, you found there are three distinct areas called fast, intermediate and slow components shown on the renaturation curve. What are the features of each component in the term of molecular biology? (3 points)

2. Please describe the major functions of DNA polymerase I, DNA polymerase III, helicase and DNA gyrase in the process of bacterial DNA replication. (8 points)

3. There are two major regulation factors which control the gene expression of *lac* operon in *E.coli*. Please explain how these two accessory factors work with or without the presence of lactose. (4 points)

4. What is the DNA subtraction technique (2 points)? Would you describe the principle and the process of this technique (4 points)?

5. What is DNA fingerprinting (2 points)? Would you describe the principle and the process of this technique (4 points)?

6. Please describe as much details as you can for the whole process of translation in bacteria (10 points). What are the mechanisms that control the accuracy of the translation (5 points)?

7. What is nucleolus? Please describe the components in nucleolus in the term of morphological (形態上) and physiological (功能上) ways (4 points). When the cells are put under stress or undergo development, the numbers of nucleoli increase. What is your hypothesis (2 points)?

8. Four major questions are often asked in the genome research projects: (1) How large is the genome? (2) How many genes present in a genome? (3) How many genes are essential? (4) How many genes are expressed? Please provide your solution to answer each question. (3 points each)