

※ 注意：請於試卷上依序作答，並應註明作答之大題及其題號。

一、請說明下列酵素所催化的反應，反應機制，以及在生物體中的功能。(每小題 4 分)

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|-------------------------|--|
| 1. DNA polymerase | 6. single-stranded DNA binding protein |
| 2. DNA ligase | 7. telomerase |
| 3. Restriction enzyme | 8. UvrABC |
| 4. helicase | 9. RecA |
| 5. DNA topoisomerase II | 10. primase |

二、簡答題：請簡明扼要作答。

- (a) Please explain "wobble hypothesis"?
- (b) 5'-UCU-3' is a codon in mRNA that specifies the amino acid serine in the position 72 of human protein A. Please list all the possibilities including wobble hypothesis and also indicate the 5' and 3' directions clearly in your answer.
 - What is the corresponding anticodon in tRNA?
 - What is the corresponding triplet in the coding DNA strand?
 - What is the corresponding triplet in the template DNA strand? (10 分)
- Describe how siRNA functions in regulation of gene expression, and how this can be used as a tool in genetic research. (8 分)

三、名詞解釋：(12 分)

- Zinc finger domain
- Enhancer
- Epigenetic gene regulation
- Operon

四、配合題(15 分，每個答案 3 分)

- 在細菌的 RNA 轉錄週期中所謂的 "holoenzyme" 係由_____和_____組成。
- 在真核細胞 RNA polymerase 結合至啟動子前，_____轉錄因子首先結合至啟動子。
- 在 splicing 的過程中，_____會辨認並結合至 5' splice site。
- _____大量表現時，會使噬菌體走向 lysogenic growth。

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|--------------------------------|-----------|
| A. U1 | I. RPB1 |
| B. U2 | J. RPB2 |
| C. λ repressor | K. Rho |
| D. hnRNP1 | L. TFIIA |
| E. σ | M. TFIIIB |
| F. $\alpha 2\beta\beta'\omega$ | N. TFIIID |
| G. ω | O. RNAPII |
| H. $\alpha 2\beta 2\delta$ | P. Cro |

五、名詞解釋(15 分，每題 5 分)

- RNAi
- 454 sequencing
- yeast two-hybrid system

試題隨卷繳回