

國立臺北科技大學

九十二學年度生物科技研究所入學考試

分子生物學試題

填准考證號碼

第一頁 共一頁

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注意事項：

1. 本試題共 **10** 題，配分共 100 分。
2. 請按順序標明題號作答，不必抄題。
3. 全部答案均須答在答案卷之答案欄內，否則不予計分。

Part I. Define the terms (Total 40%)

1. Hairpin loop
2. In situ hybridization
3. Yeast artificial chromosomes
4. Transposable elements
5. Gene network
6. RNA splicing
7. Monoclonal antibodies
8. Oncogene
9. Human genome project
10. Edman degradation

Part II. Answer the following questions (10 points each question, total 60%)

1. The code word GGG cannot be deciphered in the same way as can UUU, CCC, and AAA, because poly(G) does not act as a template. Poly(G) forms a triple-strand helical structure. Why is it an ineffective template?
2. Which protein in G-protein cascades play a role similar to that of elongation factor Ts?
3. Compare and contrast protein synthesis by ribosomes with protein synthesis by solid-phase methods.
4. What is bioinformatics? How to apply the bioinformatics to study the human genome project?
5. Suppose that you wish to make a sample of DNA duplex highly radioactive to use as a DNA probe. You have a DNA endonuclease that cleaves the DNA internally to generate 3'-OH and 5'-phosphate groups, intact DNA polymerase I, and radioactive dNTPs. Suggest a means for making the DNA radioactive.
6. The restriction enzyme HpaII a powerful tool for analyzing DNA methylation. This enzyme cleaves sites of the form 5'-CCGG-3' but will not cleave such sites if the DNA is methylated on any of the cytosine residues. Genomic DNA from different organisms is treated with HpaII and the results are analyzed by gel electrophoresis (see the adjoining patterns). Provide an explanation for the observed patterns.

