

本科目不得使用計算機

本科目試題共 1 頁

A. Explain the terms (5 pt each, total 20 pt):

1. PCR (used for molecular biology)
2. DNA microarrays
3. Yeast two-hybrid analysis
4. Ubiquitin and Molecular Chaperon

B. Essay (Total 80 pt):

1. A DNA element located ~ 1 kilo-bases away from the transcription start site of one gene may interfere the expression of that gene. Please **diagram** to show how is this possible and what factors and/or elements are also involved in the gene regulation? (10 pt)
2. Most human genes contain one or more introns. Since bacteria cannot excise introns from nuclear messenger RNA (snRNPs are needed), how can bacteria be used to make large quantities of a human protein? (10 pt)
3. Please **diagram** the "Z scheme" to show the integration of photosystems I and II in chloroplasts. (10 pt)
4. Please **diagram** to show the conversion of stored fatty acids to sucrose in germinating seeds. (15 pt)
5. Please **diagram** to show the structure of an antibody and indicate the antigen-binding sites. Also explain what is ELISA? (10 pt)
6. What is proteomics? What methods are used to analyze proteins from isolation from crude extract to identification of proteins and their possible functions? (15 pt)
7. Please **diagram** to show the DNA replication (including the replication fork and replisome) as currently believed to occur in *E. coli*. (10 pt)