國立嘉義大學九十五學年度

生物科技研究所碩士班招生考試試題

科目：分子生物學

1. Please explain the following terms: **(25%)**

(a) activators (in gene expression) (b) coactivator (in gene expression)

(c) nuclear localization signal (d) silent mutation

(e) RNAi (RNA interference)

2. What is the function of telomere? How can it be synthesized? **(25%)**

3.

(a) "DNA cloning" is a major and routine procedure in molecular biology studies. Briefly describe the 5 general steps in the procedure. **(10%)**

(b) Several methods are used for protein-DNA interaction studies. Describe one of these methods (including procedure and principle). **(5%)**

(c) Quantification of cellular RNA may be performed by "Northern blotting", "primer extension" or "S1 mapping". Choose one of these methods and briefly describe the procedure. **(5%)**

(d) For many hybridization-based experiments, several methods have been developed to label the probe. Describe one of them. **(5%)**

4. In eukaryotes, there are three distinct RNA polymerases, i.e. pol I, pol II, and pol III.

(a)They not only transcribe different sets of eukaryotic genes, but reveal very different sensitivity towards the toxin "α-amanitin". Please describe both these differences among RNA polymerases. **(6%)**

(b)What are the subunits in pol II that are functionally corresponding to that in the core polymerase of prokaryotes (i.e. α, β, or β')?**(3%)**

(c) The promoter structures of class I, II, and III are very different. Briefly describe their differences. **(6%)**

(d)Briefly describe the roles of a general transcription factor and a gene specific transcription factor playing in the class II gene transcription. **(5%)**

(e)TATA box binding proteins, TBP, seemed to be required in most class II gene transcription even in class I, III genes and genes with TATA-less promoter. Could you show a rational mechanism for the assembly of preinitiation complex of transcription on a TATA-less promoter. **(5%)**