

東吳大學 102 學年度碩士班研究生招生考試試題

第 1 頁，共 1 頁

系級	微生物學系碩士班 C 組	考試時間	100 分鐘
科目	分子生物學	本科總分	100 分

1. In *Escherichia coli*, you suspect that the promoters of gene X can be recognized by two sigma factors, sigma factor 70 (σ^{70}) and sigma 32 (σ^{32}). Answer the following questions. (20 分)
 - (1) How does a sigma factor recognize an *E. coli* promoter?
 - (2) How do you show the promoters of gene X are recognized by σ^{70} and σ^{32} ?

2. The technique of polymerase chain reactions (PCR) is widely used in the field of molecular biology. Answer the following questions. (20 分)
 - (1) What are the differences between PCR and reverse transcription PCR (RT-PCR).
 - (2) How does real-time PCR provide a better quantitative measurement than PCR?

3. The eukaryotic RNA polymerase and general transcription factors bind together at the promoter to form pre-initiation complex. Answer the following questions. (15 分)
 - (1) What are the functions of general transcription factors?
 - (2) Why is it necessary to form pre-initiation complex?

4. What is epigenetics(表觀遺傳學)? How is epigenetics regulated? (15 分)

5. Negative regulation of transcription in eukaryotes is often acted by interfering with activators while simple repressing by obstructing the movement of RNA polymerase is common in prokaryotes. Do you agree with the above statement and why? (15 分)

6. Explain the following terms.(15 分)
 - (1) Shine-Dalgarno sequence (SD sequence)
 - (2) siRNA
 - (3) semi-conservative DNA replication
 - (4) apoptosis
 - (5) open reading frame