慈濟大學100學年度
碩士班暨在職專班招生考試命題紙

科目：生物化學

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1. Explain the principles underlying the following techniques, illustrate with example of application in molecular genetics: **(10%)**
   (a) quantitative RT-PCR (b) restriction fragments length polymorphisim (RFLP)
2. Briefly describe the basic principle of Dideoxy DNA sequencing. **(8%)**
3. Write short notes on: **(12%)**
   (a) Exon and Intron (b) CpG island (c) 5'UTR and 3'UTR regions
4. Briefly describe the following terms: **(12%)**
   (a) frameshift mutation (b) nonsense mutation (c) mutation in a consensus splice site
5. Briefly describe the basic principle for PCR and what are the important elements/reagents needed to perform PCR? **(8%)**
6. Describe the forces that stabilize protein quaternary structure. **(5%)**
7. In what part of the eukaryotic cell does each of the following metabolic process take place? (a) glycolysis (b) citric acid cycle (c) gluconeogenesis; oxaloacetate to glucose (d) gluconeogenesis; pyruvate to malate (e) pentose phosphate pathway **(10%)**
8. (1) Briefly define the primary, secondary and tertiary structure of a protein.**(9%)** (2) Which methods used to determine the primary, secondary and tertiary structure of a protein, respectively? **(6%)**
9. In a mixture of the five proteins listed below, please write down the elute order in size-exclusion (gel-filtration) chromatography? **(5%)**
   Protein A; M_r = 53 KDa
   Protein B; M_r = 145 KDa
   Protein C; M_r = 20.5 KDa
   Protein D; M_r = 450 KDa
   Protein E; M_r = 68.5 KDa
10. Briefly describe the microRNA. **(5%)**
11. Cholesterol is called a membrane fluidity buffer. Why? **(5%)**
12. Which of the following fatty acid that has the higher melting temperature. Why?
    18:0 and $18:1^{\Delta 9}$ **(5%)**