

1. Explain concisely the following terms. (20%)
  - a. cDNA library
  - b. DNA fingerprinting
  - c. Okazaki fragments
  - d. Nuclear receptor
  - e. Imprinting
2. Describe the negative and positive transcriptional control of the *lac* operon, and why are they important to the energy efficiency of *E. coli* cells? (10%)
3. Explain the principle of site-directed mutagenesis, and describe a method to carry out this process. (10%)
4. What different functions have been attributed to the oncogenes found in different retroviruses? (15%)
5. Describe the differences between prokaryotic and eukaryotic protein syntheses, and the main components of a mature eukaryotic mRNA and their functions in protein synthesis. (15%)
6. Describe different mechanisms of eukaryotic transcriptional control. (15%)
7. Describe types of DNA damage and DNA repair systems used by cells to withstand alterations to DNA damages. (15%)