

本試題是否可以使用計算機: 可使用, 不可使用 (請命題老師勾選)

Please answer **all** the questions **in order**.

1. Describe any three mechanisms that lead to genetic alterations in a cell. What consequences the genetic alterations may result in? (15%)
2. Explain concisely the following terms (20%):
 - a. **Operon**
 - b. **SOS responses**
 - c. **Primer extension**
 - d. **Transposition**
3. Name two different types of cloning vectors and describe them concisely. What are the common features of these vectors that are crucial in cloning? (15%)
4. Explain concisely the following terms and describe their applications in Molecular Biology studies (20%):
 - a. Electrophoretic Mobility Shift Assay (EMSA)
 - b. Chromatin Immunoprecipitation (ChIP)
5. a. Explain the following terms (10%):
 - i. **Nucleosome**
 - ii. **Histone acetylation**
 - iii. **Activator sumoylation**

and

 - b. Describe the roles that **Histone acetylation** and **Activator sumoylation** play during promoter activation (10%).
6. RNA interference (RNAi) may cause gene silencing and has been widely used for functional study of the genes. List **two of the frequently used techniques** and **describe their action principles** (10%).