

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)**Molecular Biology:**

1. What is the Central Dogma of Molecular Biology? Which are "2-way streets", which are not? (10 points)
2. Why is the native double-helix structure of DNA excellent for a mechanism of DNA replication? for DNA repair? and for DNA transcription? (10 points)
3. What are histones and their component proteins? What is a nucleosome? What are the structural components of a nucleosome? Please draw schematically the structure of the histones and DNA in a nucleosome. Can you design a simple experiment to know the length of DNA found in a nucleosome? (20 points)
4. Where, when, how is RNA transcribed? (15 points)
5. Describe how lipid soluble hormones, estrogen for example (a female hormone), regulate gene transcription acting through nuclear hormone receptors. Tamoxifen, a selective estrogen-receptor modulator, is used to reduce the risk of breast cancer. How does it work? (20 points)
6. What are the potential approaches for silencing a specific gene? Explain each strategy, its advantage and disadvantages. (15 points)
7. What are the functions of Reverse Transcriptase and RNaseH in replication of the retrovirus genome? How do both enzymes applied to current molecular biology? (10 points)