

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)

1. What is an open reading frame (ORF)? Write a DNA sequence containing a short ORF. (10%)
2. The tiger pufferfish (*Fugu rubripes*) genome is nine times smaller than the human genome, but it contains just as many genes. How can that be? (10%)
3. What do single-nucleotide polymorphisms (SNPs) and restriction-fragment length polymorphisms (RFLPs) mean? How do SNPs differ from RFLPs? (10%)
4. Compare and contrast "structural genomics" and "functional genomics". (10%)
5. Please describe the properties of enzymes that permit cloning of DNA, DNA sequencing, the polymerase chain reaction (PCR), and production of cDNA. (20%)
6. Someone gave you a test tube containing a complex mixture of nucleic acids. How can you ascertain whether a specific DNA or RNA is present in the mixture? (20%)
7. In the movie *Jurassic Park*, a scientist and an entrepreneur collaborate to generate living dinosaurs. Their strategy is to isolate dinosaur DNA from a Jurassic-period blood-sucking insect, use PCR to amplify this DNA, piece the fragments together, place them in an egg and hatch the dinosaur. Please point out at least four practical problems that make this fantastic endeavor impossible. (20%)