

國立高雄師範大學 108 學年度碩士班招生考試試題

系所別：生物科技系

科 目：生物技術概論 (A)

※注意：1.作答時請將試題題號及答案依序寫在答案卷上，於本試題上作答者，不予計分。
2.答案卷限用藍、黑色筆作答，以其他顏色作答之部分，該題不予計分。

1. 微生物應用於發酵食品，舉一例子，說明其生產流程與品管方法 (30%)
2. 何謂生物農藥，舉一例子說明其作用機制 (20%)
3. 請閱讀以下段落並回答問題：(20%)

Genome editing (also called gene editing) is a group of technologies that give scientists the ability to change an organism's DNA. These technologies allow genetic material to be added, removed, or altered at particular locations in the genome. Several approaches to genome editing have been developed. A recent one was adapted from a naturally occurring genome editing system in bacteria. The bacteria capture snippets of DNA from invading viruses and use them to create DNA segments. The DNA segments allow the bacteria to "remember" the viruses (or closely related ones). If the viruses attack again, the bacteria produce RNA segments from the DNA segments to target the viruses' DNA. The bacteria then use Cas9 or a similar enzyme to cut the DNA apart, which disables the virus. This system works similarly in the lab. Researchers create a small piece of RNA with a short "guide" sequence that attaches (binds) to a specific target sequence of DNA in a genome. The RNA also binds to the Cas9 enzyme. As in bacteria, the modified RNA is used to recognize the DNA sequence, and the Cas9 enzyme cuts the DNA at the targeted location. Once the DNA is cut, researchers use the cell's own DNA repair machinery to add or delete pieces of genetic material, or to make changes to the DNA by replacing an existing segment with a customized DNA sequence.

- 甲、上述段落所談到的基因編輯技術的名稱是什麼？
- 乙、上述技術可以應用的生物範圍有哪些？
- 丙、本系統原本在細菌體被發現，而其在細菌中的作用為何？
- 丁、本技術所面臨的挑戰之一是有脫靶 (off target) 效應，請解釋何謂脫靶效應？
- 戊、請舉出本技術已付諸實際應用或有潛力運用的項目至少兩項

(背面尚有試題)

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4. 重組 DNA 的技術中常使用到限制酵素 (restriction enzyme)，請說明何謂限制酵素、限制酵素的特性、並舉出兩種限制酵素。(10%)
5. cDNA、gDNA、rDNA、mtDNA、cpDNA 分別代表什麼？(10%)
6. 植物組織培養技術的理論基礎是植物細胞具有 totipotency 特性，請問何謂 totipotency？(5%)
7. 請說明目前市面上商品化販售的基因轉殖玉米所轉殖的基因具有何種功能或特性？(5%)