

國立臺灣海洋大學 103 學年度研究所碩士班招生考試試題

考試科目：普通生物學

系所名稱：水產養殖學系碩士班養殖科學組、水產養殖學系碩士班生命科學組

1. 答案以橫式由左至右書寫。2. 請依題號順序作答。

一、For each levels of biological organization, if you now zoom back out from the molecular level, you can see that novel properties emerge at each step. Please describe how these emergent properties are due to the arrangement and interactions of parts, include the next “lower” level, as complexity increases. (10%)

二、Why are C_4 and CAM photosynthesis more energetically expensive than C_3 photosynthesis? (9%)

三、Give three examples of how genetic engineering has improved food quality or agricultural productivity. (6%)

四、每年五月涼爽無雨的夜晚，總可在海洋大學後山的龍崗步道兩側，見到許多閃爍著青綠色光芒的螢火蟲；請以普通生物學中所習得之知識，具體回答下列問題：

1. 螢火蟲的發光機制為何？此外，請具體說明自然界中，尚有何種生物利用特殊形式或機制發光？(6%)
2. 螢火蟲的發光具有何種功能？請解釋在不同性別與成長階段，螢火蟲雌雄兩性及幼蟲與成蟲發光之功能或目的差異？(6%)
3. 螢火蟲的消失與人類活動有何關聯？而又為何其可作為環境中之指標生物 (index species)? (5%)
4. 請比較並說明陸生與水生螢火蟲之生活史週期與生態習性差異，以及其在生態系中所具有之生態棲位 (biological niche)? (8%)

五、In Taiwan, which aquatic biotechnology may contribute to the industry? (10%)

六、Please describe the eukaryote transcription and translation in detailed. (15%)

七、Please describe the definition of “endocrine” and “paracrine”. (5 points)

八、Please describe and compare “substrate level phosphorylation” and “oxidative phosphorylation” for ATP synthesis during aerobic cellular respiration in multiple cellular organisms. (10%)

九、Please describe how GHRH/GH/IGF1 axis regulates body growth of vertebrates.
(10 points)

GHRH: growth hormone releasing hormone

GH: growth hormone

IGF1: insulin-like growth factor 1