

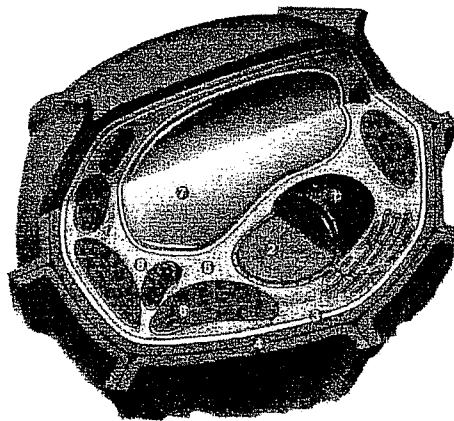
招生學年度	101	招生類別	碩士班
系所班別	自然資源與環境學系碩士班(生態與保育組)		
科目	生物學		
注意事項	本考科禁止使用掌上型計算機		

一、解釋名詞(請以中文簡要解釋該名詞之涵意或機制)(每題3分,共30分)

1. prokaryote
2. meiosis
3. endosymbiont hypothesis
4. respiration
5. mitochondria
6. xylem
7. DNA transcription
8. homeostasis
9. homologous chromosomes
10. mutation

二、問答題(請以中文作答,共50分)

1. 圖一之細胞屬於哪一界之生物?你的判斷依據為何?(4分)
2. 請列出開花植物的六大器官,並簡單描述其功能。(12分)
3. 開花植物行有性繁殖時,有雙受精之現象。請描述該現象並說明雙受精之產物為何。(6分)
4. 人類利用生物技術,製造出許多基因改造生物(Genetically Modified Organism, GMO),這些GMO在應用上造成很大的爭議。請問這些生物對人類有哪些好處?又有哪些問題(壞處)?(10分)
5. 近親交配(inbreeding)可能導致什麼問題?但是在家畜或是作物育種上,近親交配卻是經常使用的一項方法,為什麼?(8分)
6. 內溫動物(endotherm)和外溫動物(ectotherm)主要的差別是什麼?這些差別可能對這二大類動物在生態習性或行為上產生什麼影響?(10分)

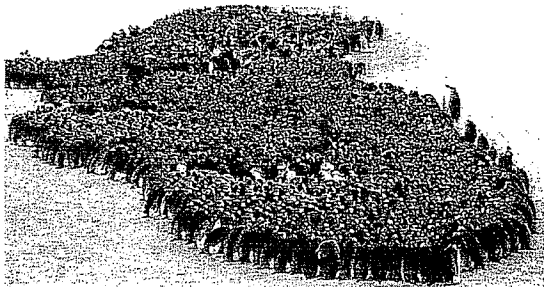


圖一 圖片錄自 Quia.com

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三、閱讀題組：詳閱下面文摘後，並以中文回答文章後的問題（共 20 分）

（前略） We recorded abiotic variables with data loggers glued to the feathers of eight individually marked emperor penguins to investigate their thermoregulatory behavior and to estimate their “huddling time budget” throughout the breeding season (pairing and incubation period). Contrary to the classic view, huddling episodes were discontinuous and of short and variable duration, lasting 1.6 ± 1.7 (S.D.) h on average. Despite heterogeneous huddling groups, birds had equal access to the warmth of the huddles. Throughout the breeding season, males huddled for $38 \pm 18\%$ (S.D.) of their time, which raised the ambient temperature that birds were exposed to above 0°C (at average external temperatures of -17°C). As a consequence of tight huddles, ambient temperatures were above 20°C during $13 \pm 12\%$ (S.D.) of their huddling time. Ambient temperatures increased up to 37.5°C , close to birds' body temperature. This complex social behavior therefore enables all breeders to get a regular and equal access to an environment which allows them to save energy and successfully incubate their eggs during the Antarctic winter.



圖二及短文：摘自 Gilbert et al. 2006. Huddling behavior in emperor penguins: Dynamics of huddling. *Physiology & Behavior* 88: 479-488.

這篇文章是在探討帝王企鵝在繁殖時的結群 (huddling) 行為 (如上圖)。

1. 請簡單說明本研究的實驗方法。(4分)
2. 請說明這份研究有什麼發現？(10分)
3. 根據這份研究結果，你覺得在整群的企鵝中，每隻企鵝在群體中所處的位置對牠本身可能有什麼影響？牠們怎麼解決這些影響？(6分)