

※注意：各部份考題均請作答於試卷內「非選擇題作答區」，
請依序作答，並應註明作答之部份及其題號。

一、普通生物學第一部份考題(共 25 分)

1. 構成細胞的四類有機大分子(organic macromolecules)為何，並簡述其基本單元、化學特性及細胞/組織內的角色。(8分)
2. 請說明細胞膜的結構及功能(3分)
3. 葡萄糖(glucose)為細胞獲取能量(ATP; adenosine triphosphate)的主要來源。請簡要說明細胞如何利用葡萄糖轉化成 ATP 的主要過程。(6分)
4. 請簡述細胞內具有內膜系統(endomembrane system)的 4 種胞器及其功能。(8分)

二、普通生物學第二部份考題 (共 25 分)

1. Explain why many eukaryotic genes are longer than the mRNA that leaves the nucleus and describe the process for eukaryotic mRNA production. (13分)
2. 請解釋下列各名詞:(每小題 3 分, 共 12 分)
(1) MicroRNA (2) oogenesis (3) pheromone (4) blastocyst

三、Please answer the following questions : (25 points)

1. What are the two main branches of prokaryotes? Please describe their similarities and differences. What structural and functional adaptations that help prokaryotes thrive in diverse habitats? (8 points)
2. What is phototropism? How do plants regulate their phototropic growth toward light? (4 points)
3. Please describe the concept of "RNA world" in the early evolution of life. (3 points)
4. What are radial and bilateral symmetries? Please use a group of animals to describe. How do they differ in their lifestyle? (4 points)
5. Please define and compare the following terms : (2 points of each)
 - a、mycorrhiza vs. lichen
 - b、gametophyte vs. sporophyte
 - c、Ascomycetes vs. Basidiomycetes

見背面

四、普通生物學第四部份考題 (共 25 分)

1. 選擇題 (請註明題號) (10 分)

- (1) The largest unit within which gene flow can readily occur is a (a) population (b) species (c) genus (d) phylum.
- (2) The most serious consequence of a loss in ecosystem biodiversity would be the (a) increase in global warming and thinning of the ozone layer (b) loss of ecosystem services on which people depend (c) increase in the abundance and diversity of edge-adapted species (d) loss of source of genetic diversity to preserve endangered species.
- (3) Which of these evolutionary agents is most consistent at causing populations to become better suited to their environments over the course of generations? (a) mutation (b) gene flow (c) natural selection (d) genetic drift.
- (4) Fossil evidence indicates that horses have gradually increased in size over geologic time. Which of the following terms best describes this? (a) artificial selection (b) directional selection (c) stabilizing selection (d) disruptive selection.
- (5) Which species concept is currently most popular among most biologists? (a) phylogenetic (b) ecological (c) biological (d) morphological.

2. What are the possible causes of biodiversity crisis? (7 分)

habitat destruction, introduced species, and overexploitation.
pollution, global warming, overpopulation of humans.

3. Please explain the reasons how new species evolves. (8 分)

allopatric speciation, sympatric speciation, adaptive radiation and tempo of speciation