※ 注意：請於試卷上「非選擇題作答區」內依序作答，並應註明作答之部份及其題號。

第一部份考題（共 25 分）

1. 英國生物學家達爾文(Charles Robert Darwin)所發表的物種起源(The Origin of Species)提出的生物演化的觀點影響至今。請條列說明其主要的論述為何？(4 分)

2. 請說明構成細胞的四類有機大分子(organic macromolecules)，Carbohydrates, Lipids, Proteins, Nucleic Acids 的基本單元、化學特性及細胞/組織內的角色。(8 分)

3. 粒線體(mitochondria)及葉綠體(chloroplasts)為細胞內能量生產的胞器。請試比較兩者的異同。(6 分)

4. 細胞內骨架(cytoskeleton)調控細胞的結構和活性。請舉出其基本組成的三類微細纖維(microfibers)。(3 分)

5. 動物的免疫反應可分為先天免疫(innate immunity)及後天免疫(acquired immunity)。請敘述後天免疫反應內 humoral imminity 及 cell-mediated immunity 的主要成員。(4 分)

第二部份考題（共 25 分）

1. How does the brain determine the volume and pitch of sounds? (10 分)
2. 請解釋下列各名詞: (每小題 3 分，共 15 分)
   (1) dominant allele　(2) nucleosome　(3) pheromone
   (4) synapse　(5) homologous chromosomes

第三部份考題（共 25 分）

1. How was the eukaryotic cells originated? Please describe two commonly accepted processes with supporting evidences. (6 points)
2. How organisms or microorganisms are categorized according to their carbon and energy sources? Please describe one example for each group. (6 points)
3. What four types of modified leaves make up a flower? Please draw a picture and specify each structure. (4 points)
4. What four features distinguish the animals in phylum Chordata? (4 points)
5. Why have fungi and plants been classified in different kingdoms? (5 points)

見背面

第四部份考題（共 25 分）

1. 選擇題（請註明題號）(7 分)

(1) Which of these is the smallest unit upon which natural selection directly acts? (a) a species' gene frequency (b) a population's gene frequency (c) an individual's genome (d) an individual's phenotype.

(2) Which of these is the smallest unit that natural selection can change? (a) a species' gene frequency (b) a population's gene frequency (c) an individual's genome (d) an individual's phenotype.

(3) Sources of genetic variation for evolution include all of the following except (a) mistakes in translation of structural genes (b) mistakes in DNA replication (c) recombination at fertilization (d) recombination by crossing over in meiosis.

(4) Gene flow is a concept best used to describe an exchange between (a) species (b) males and females (c) populations (d) individuals.

(5) Natural selection changes allele frequencies in populations because some _____ survive and reproduce more successfully than others. (a) alleles (b) loci (c) species (d) individuals.

(6) The biological species concept is inadequate for grouping (a) plants (b) parasites (c) asexual organisms (d) sympatric populations.

(7) A rapid method of speciation that has been important in the history of flowering plants is (a) genetic drift (b) a mutation in the gene controlling the timing of flowering (c) behavioral isolation (d) polyploidy.

2. Explain and compare allopatric speciation and sympatric speciation. (8 分)

3. Explain the possible threats to biodiversity. (10 分)

試題隨卷繳回