

一、是非題(40分，每小題2分)

注意：正確請畫O，錯誤請畫X。請於試卷上「選擇題作答區」依序作答，答案均寫於A欄內。

1. In feedback inhibition, a metabolic pathway is switched off by the inhibitory binding of its intermediate product to an enzyme that acts early in the pathway.
2. The water vascular system is unique to echinoderms that include sea stars, sea cucumbers, and sponges.
3. Fermentation enables some cells to produce ATP with the use of oxygen.
4. A living organism is an open system since it exchanges material and energy with its surroundings.
5. Animals are multicellular, heterotrophic eukaryotes with tissues that develop from embryonic layers.
6. Toxins can become concentrated in successive trophic levels of food webs, a process called biological magnification.
7. Chaperonins, also named chaperone proteins, are proteins that assist the proper folding of other proteins.
8. Allergies are hypersensitive responses to allergens involving mast cells and IgE antibodies.
9. The pharyngeal slits function mainly as suspension-feeding devices in many vertebrate chordates.
10. Signaling molecules with intracellular receptors are either hydrophilic enough or small enough to cross the phospholipid interior of the target cell's plasma membrane.
11. The transcription of a eukaryotic gene results in pre-mRNA which is general termed as primary transcript for an initial RNA transcript.
12. Unlike a prophage, the provirus never leaves the host's genome, remaining a permanent resident of the cell.
13. The cuticle of land plants, one of their derived traits, consists of polyesters and waxes and therefore acts as waterproofing and protection. Although with different compositions, nematode's cuticle functions similarly.
14. The Cambrian explosion refers a phenomenon that animal diversification appears to have accelerated dramatically between one billion and 575 million years ago.
15. Now that the complete sequence of the human genome is available, we know what makes up most of the 98.5% that does not code for proteins, rRNAs, or tRNAs, meaning that exons make up only about 1.5% of the human genome.
16. Red algae and green algae are the closest relatives of land plants.
17. According to the origination of the pacemaker, the vertebrate heart is referred to as a neurogenic heart, in contrast, most arthropods have myogenic hearts.
18. Plant organs - roots, stems except leaves - have dermal, vascular, and ground tissues.
19. Today only three lineages of lobe-fins survive: coelacanth, lungfishes, and tetrapods, including humans.
20. Plant biotechnology is transforming agriculture but it also has the unstoppable nature should be concerned.

二、解釋名詞(20分，每題4分)

注意：請分別定義並比較下列成對名詞。請於試卷上「非選擇題作答區」標明題號，依序作答。

1. Bacterial mats, stromatolites 2. Hemoglobin, myoglobin 3. Prokaryotes, eukaryotes
4. Slime molds, fungi 5. Ecdysozoans, lophotrochozoans

三、問答題(40分) *注意：請於試卷上「非選擇題作答區」標明題號，依序作答。

1. Scientific evidence is accumulating that chemical and physical processes on early Earth, aided by the emerging force of selection, produced very simple cells through a sequence four main stages. Please describe these stages briefly and point out the key evidence for each of these four stages. (15分)
2. In species that reproduce sexually, the behavior of chromosomes during meiosis and fertilization is responsible for most of the variation that arises each generation. What mechanisms that contribute to the genetic variation arising from sexual reproduction? And how do they work? (15分)
3. The resurgence of malaria (瘧疾) has been led by the emergence of resistant varieties of both *Anopheles* mosquitoes, which spread the disease, and *Plasmodium*, the parasite that causes malaria. Please demonstrate all you learned about this parasite, then discuss the approaches and problems encountered to prevent this disease. (10分)