

※ 注意：請於試卷上「非選擇題作答區」依序作答，並應註明作答之大題及小題題號。

1. It is known that women have higher rates in depression (憂鬱症) than men. Recently, there is a report shown that using functional magnetic resonance imaging technique (fMRI), the blood flow at different regions of the brain in people of 12~18 years old are different. What is the possible linkage you could propose between these findings? (10%)
2. The movie "Jurassic World" proposes a novel way to manipulate DNA for extinct animals. We know that mammoth elephant (長毛象) is covered with wooly hair but the modern elephants in Asia and Africa do not have wooly hair. How would you study the difference? (10%)
3. How come we are so nervous about the MERS (Middle East respiratory syndrome 中東呼吸綜合症)? Couldn't our immune system fight against this virus? If someone survived the MERS infection, will this person get MERS again? How would this person's immune system response to 2nd MERS infection? (10%)
4. What is population ecology? What is its importance in understanding the environmental issues? (10%)
5. Suppose you find a gene whose function is in boosting your memory. Now you want to produce this protein for sale. How would you do? (6%)
6. How could plants mark the seasons and set the biological clock? (6%)
7. Explaining the following terms (3% each)
 - i. Cytokinins ii. Abscisic acid iii. Nitrogen fixation iv. Guard cells
 - v. Vascular tissue system of plants vi. Semicircular canals
 - vii. Blastula (in embryo development) viii. Antidiuretic hormone
 - ix. Semilunar valve in heart x. Protostomes xi. Symbiosis
 - xii. Single nucleotide polymorphism xiii. Sister chromatids
 - xiv. Mendel's law of segregation xv. Connective tissues xvi. Flagella