慈濟大學100學年度
碩士班暨在職專班招生考試命題紙

科目：普通生物學　　共1頁

問答題[1-5題任選4題，6-10題任選3題作答(每題20分)，滿分100分]：

1. Please describe the experiment that Hershey and Chase did to determine the genetic material of phage T2. (10分)

2. Please describe the current model for membranes and the ways that membrane proteins help moving substances, including specific ligands, across the plasma membrane. (10分)

3. Please summarize the three stages of cellular respiration, and describe how to obtain total of 30 or 32 ATP from one molecule of glucose through cellular respiration. (10分)

4. Please use "endosymbiosis" hypothesis to describe the possible origin of autotrophic eukaryotes. (10分)

5. Restriction endonucleases have been a key element in the development of molecular biology/biotechnology/recombinant DNA technology. However, it is a defensive weapon found in different bacterial species. Please explain this defensive mechanism. (10分)

6. Please describe and compare the three common types of sexual life cycles for (a) animals, (b) vascular plants, and (c) most fungi.

7. Please use AABB x aabb as an example to describe Mendel's "the law of independent assortment." In addition, under what circumstances will this law not be obeyed? Why?

8. The endomembrane system regulates protein traffic and performs metabolic functions in the cell. Please list the elements of the endomembrane system and describe the function of each element.

9. Please give examples to describe (a) open circulatory system, (b) single circulation of closed circulatory system, (c) double circulation of closed circulatory system.

10. Please choose and use the following items to compose a hypothetic signal transduction pathway which controls the expression of *ACB* gene, and describe the mechanism of the activation and inactivation of this pathway. (a) a ligand; (b) a cytokine receptor; (c) a receptor tyrosine kinase; (d) a G protein-coupled receptor; (e) Jak kinase; (f) trimeric G protein; (g) PI3-kinase; (h) MAP kinases; (i) STAT; (j) SMAD; (k) transcription factor; (l) adenylyl cyclise; (m) protein kinase A; (n) phosphodiesterase; (o) phosphotase; (p) phopholipase C.