

※ 考生請注意：本試題不可使用計算機

一、問答題與簡答題：試題共 9 題，總分 100 分。

1. Please describe in detail about (1) the stages and (2) differences of mitosis and meiosis. (15 points)
2. Autophagy (“self eating”) is the basic catabolic mechanism that involves cell degradation of unnecessary or dysfunctional cellular components. Please describe in detail about (1) stages and (2) regulation of autophagy. (15 points)
3. Please first draw and describe an eukaryotic cell and a prokaryotic cell, and further compare the differences between both the eukaryotic and prokaryotic cells. (10%)
4. Please first define the general features of targeting sequences (or signals) that control the transportation of proteins into nucleus, mitochondrion, endoplasmic reticulum (ER) and peroxisome, and further describe the detailed processes of transportation of proteins into ER lumen. (10%)
5. Please first define the embryonic stem (ES) cell, stem cell, induced pluripotent stem (iPS) cell and cancer stem cell, and then describe the method for isolation of ES cell. (10%)
6. Please describe the detailed processes of oogenesis, spermatogenesis and sperminogenesis. (10%)
7. There are three major distinct cellular functions involving microtubules. What are they? (6%)
8. APC promotes mitosis during cell cycle progression. What does APC stand for? (4%) What is the ultimate activity triggered by APC during the mitotic phase? (4%) What molecules are involved in this APC-triggered activity? (4%) What will happen if the microtubule/kinetochore attachment is not properly occurring? (4%)
9. An important cell-cell adhesion model in the blood stream involving at least two different adhesion events has been used to illustrate both leukocytes and cancer cells in response to inflammatory and metastatic stimuli, respectively. Please use *leukocytes as an example* to describe how this model works, including *cellular and molecular events*. (8%)