

國立成功大學

111學年度碩士班招生考試試題

編 號： 313

系 所： 細胞生物與解剖學研究所

科 目： 細胞生物學

日 期： 0220

節 次： 第 1 節

備 註： 不可使用計算機

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第1頁，共1頁

- ※ 考生請注意：請於答案卷依序寫上題號並以中文或英文作答，於本試題紙上作答者，不予計分。本試題不可使用計算機或任何電子裝置應考。
- ※ Write down the question numbers in series on the answer sheet, followed by your answers to each question in either Chinese or English. The use of calculator or electronic devices in this exam is strictly prohibited.

一、名詞解釋 (40 分，每題 4 分。)

以細胞生物學觀點解釋以下名詞。**任選 10 題作答**，超過 10 題不計分。

PART ONE: Definition of terminology (40%)

Directions: Explain the following terms from the aspect of Cell Biology. Among the total of 12 terms below, you are allowed to **select 10 and ONLY 10** terms to answer. Any additional selections of terms will not be scored. Each term counts 4 points (4%).

- | | |
|--|---------------------------------|
| • Ribosome | • Glycolysis |
| • Apoptosis | • Small interfering RNA (siRNA) |
| • Chaperone protein | • Metastasis |
| • Chromatin | • Autophagy |
| • DNA methylation | • Restriction nuclease |
| • Induced pluripotent stem cell (iPSC) | • Synapse |

二、問答題 (60 分，每題 15 分。)

詳讀並回答以下問題。若有需要可繪圖或製表輔助闡述論點。

PART TWO: Essay (60%, 15% for each question)

Directions: Read and answer the following questions in a well-organized way. Draw pictures or tables to illustrate your points, if necessary.

1. Mitosis is a process in which a eukaryotic cell undergoes chromosome replication and cell division, giving rise to two genetically identical daughter cells. What exactly happens during mitosis? Your answers must include all the various phases for chromosome duplication, separation, and division of the cell. (15%)
2. The shape and internal organization of a eukaryotic cell are maintained by filamentous proteins generally called the cytoskeleton. These specialized proteins are important for numerous cell behaviors as well. What are the main components of the cytoskeleton? Your answers must include both the structure and function of microfilaments, intermediate filaments, and microtubules. (15%)
3. Many substances are transferred across the cell membrane by specialized transport proteins, which provide critical cross-membrane passageways other than diffusion. What are membrane transport proteins? Your answers must be focused on the principle, structure, and mechanism of both transporters and channels. (15%)
4. COVID-19 is caused by the infection of a coronavirus, whose genetic code RNA can be accurately detected by real time reverse transcription-polymerase chain reaction (RT-PCR). What is RT-PCR? Please focus your answers on the principle of this nuclear technology and its differences from the regular PCR. (15%)