注意：考試開始鈴響前，不得翻閱試題，並不得書寫、畫記、作答。

國立清華大學 109 學年度碩士班考試入學試題

系所班組別：生命科學院
甲組

科目代碼：0405

考試科目：細胞生物學

—作答注意事項—

1. 請核對答案卷（卡）上之准考證號、科目名稱是否正確。
2. 作答中如有發現試題印刷不清，得舉手請監試人員處理，但不得要求解釋題意。
3. 考生限在答案卷上標記「┏由此開始作答」區內作答，且不可書寫姓名、准考證號或與作答無關之其他文字或符號。
4. 答案卷用盡不得要求加頁。
5. 答案卷可用任何書寫工具作答，惟為方便閱卷辨識，請儘量使用藍色或黑色書寫；答案卡限用 2B 鉛筆畫記；如畫記不清（含未依範例畫記）致光學閱讀機無法辨識答案者，其後果一律由考生自行負責。
6. 其他應考規則、違規處理及扣分方式，請自行詳閱准考證明上「**國立清華大學試場規則及違規處理辦法**」，無法因本試題封面作答注意事項中未列明而稱未知悉。

國立清華大學 109 學年度碩士班考試入學試題

系所班組別：生命科學院甲組

考試科目（代碼）：細胞生物學(0405)

1. About microsome (15%)
   A). What are microsomes and how they different from endoplasmic reticulum (5%)
   B). Describe method(s) that can isolate microsomes from other organelles in the cell (10%)

2. Please use examples to explain how signals are transduced by (10%)
   A). G-protein couple receptor (5%)
   B). Receptor tyrosine kinase (5%)

3. About post-translational modifications (PTMs) (10%)
   A). What are the main PTMs that occur in the endoplasmic reticulum (5%)
   B). What are the major functions of these PTMs (5%)

4. Microfilament is one of the main components of the cytoskeleton (10%)
   A). What are the structural features that are unique to the microfilament (5%)
   B). What are the main functions of the microfilament (5%)

5. Mitochondria are a unique organelle within the cell (10%)
   A). What are the structural features of mitochondria (5%)
   B). Explain how mitochondria become an organelle within the cell during evolution (5%)

6. Indicate which of the following cellular structures and components is found in (15%)
   A). animal cells (5%)
   B). plant cells (5%)
   C). bacterial cells (5%)

   (a) chloroplast
   (b) cell wall
   (c) microtubules
   (d) DNA
   (e) nuclear envelope
   (f) nucleoli
   (g) Golgi complex
   (h) central vacuole
   (i) thylakoids
   (j) ribosomes
   (k) mitochondria
   (l) actin
   (m) plasmodesmata

7. Explain the following pairs of transport mechanisms (15%)
   A). facilitated diffusion and simple diffusion (5%)
   B). symport transport and antiport transport (5%)
   C). direct active transport and indirect active transport (5%)

8. What are the roles of the following proteins/molecules in the signal transduction. You may use examples you know to explain (15%)
   A). adaptor protein (5%)
   B). scaffold protein (5%)
   C). second messenger (5%)