

香港中文大學  
The Chinese University of Hong Kong  
Course Examinations 2001-02 年度科目考試

Course Code & Title 科目編號及名稱: BCH2010 Cellular Basis of Biochemistry

Time allowed 時間: 2 hours 小時 \_\_\_\_\_ minutes 分鐘

Student I.D. No. 學生編號: \_\_\_\_\_ Seat No. 座號: \_\_\_\_\_

**Answer parts I and II in separate answer books.**

**Part I (50 marks) Attempt BOTH question 1 and 2.**

1. (30 marks) Choose either question A or question B.
  - A. Design an experiment to indicate the path of a biosynthesized product is transported directionally outside the cell.
  - B. Describe how you can demonstrate experimentally the shift from attractant to repellent in the suspension medium changes the rotational direction of the *E. coli* flagellar bundle.
  
2. (20 marks) Choose either question A or question B.
  - A. Describe the cytoskeletal events responsible for the cell amoeboid movement; provide an explanation to how the driving force is generated.
  - B. What is the role played by centrosome and its accessory spindle fibres in cell division?

**Part II (50 marks) Question 3 is compulsory and answer ANY ONE from questions 4-5.**

3. (30 marks) Write brief notes on **ANY TWO** of the following topics: (**compulsory**)
  - A. Roles of calcium and calmodulin in signal transduction
  - B. Numerical and structural abnormalities of human chromosomes.
  - C. Characteristics and functional roles of gap junctions.
  
4. (20 marks) The human genome is the term used to describe the total genetic information in human cells. It really comprises two genomes: a nuclear genome and a mitochondrial genome.
  - A. Describe the classification, organization and distribution of genes in the nuclear genome.
  - B. Compare and contrast the characteristics of these two genomes.
  
5. (20 marks) Signal transduction cascades can be mediated by the adenylate cyclase, phosphatidylinositol 4,5-bisphosphate or ras protein. Explain briefly the similarities of and differences among these three pathways.