國立政治大學 應用數學系 101 學年度第二學期　學科 考試試題

NATIONAL CHENGCHI UNIVERSITY EXAMINATION FORM　　Page　/Total

考試科目 Course	組合學	開課系級 Dept, & Class	研究所	日　期 Date, Period	102 年 3 月 4 日 上午 9:00~12:00	試題編號 Course No.	

本試卷共有 6 個題目，
碩士班：請選 5 題作答，每題 20 分，請在答案卷最前面註明所選的 5 題，否則依學生作答之前 5 題計分。
博士班：6 題全做答，每題 17 分，超過 100 分則以 100 分計。

1. Let $S=\{x_1, x_2, \ldots, x_n\}$ be a set of $n \geq 3$ points in the plane such that the distance between any two points is at least one. Show that there are at most $3n-6$ pairs of points at distance exactly one.

2. Show that if any two odd cycles of G have a vertex in common, then $\chi(G) \leq 5$.

3. For any integers $p, q \geq 3$, Ramsey number $R(p, q) \leq R(p, q-1) + R(p-1, q)$.

4. For $n=1, 2, 3, \ldots$, let $h(n)$ equal the number of different ways in which the squares of a 1-by-n chessboard can be colored using the colors red, white and blue so that no two adjacent squares are colored red. Find and verify a formula for $h(n)$.

5. How many ways to color the six faces of a cube with Colors A, B, C & D, such that 2 faces with color A, 2 faces with color B, 1 face with color C and 1 face with color D.

6. How many ways to pick n pieces of fruits from unlimited number of apples, pears and oranges such that the number of oranges is even?

本考試：☑不需使用簡易計算機，□ 使用簡易計算機　　←請出題老師勾選，謝謝！

命題老師：
(Teacher)

試題隨卷繳交

命題紙使用說明：試題將用原件印製，敬請使用黑色墨水正楷書寫或打字（紅色不能表現，勿使用）。

Remarks : For the convenience of reprinting please Write questions in black or blue-black (but no red) ink.