

南華大學九十四學年度 碩士班 招生考試試題卷

系所別：資訊管理學系碩士班

科目編號：A2-25-2

科目：離散數學

試題紙第 1 頁共

1. Let p be prime. Prove that $a^p \equiv a \pmod{p}$ for any positive integer a . (10%)
2. Which of the following relations are equivalence relations? State your reasons. (10%)
 - (a) "Having a common friend" for a class of students.
 - (b) "Difference is odd" for a collection of numbers.
3. $|A| = 3, |B| = 8$: (10%)
 - (a) How many functions are there from A to B ?
 - (b) How many 1-1 functions are there from A to B ?
 - (c) How many onto functions are there from A to B ?
4. Suppose that a tree has ten vertices of degree 2, ten vertices of degree 3, ten vertices of degree 4, one vertices of degree 5, and its remaining vertices have degree 1. How many vertices does the tree have? (10%)
5. Given an infix form: $((A+B)*C+D)*E - ((A+B)*C+D)$. (10%)
 - (a) Find a binary tree to the expression.
 - (b) Find its prefix form and postfix form.
6. (Lagrange 定理) 證若 $(G, *)$ 為一有限群, 且 $(H, *)$ 為其一子群, 則 $|H|$ 整除 $|G|$ (20%)
7. 求 $a_n - 4a_{n-1} + 4a_{n-2} = 2^n$ 之一般解 (10%)
8. 試排列 a, b, c, d 求出並解釋 $4P_2$ 與 $4C_2$ 之異同 (20%)