

銘傳大學 98 學年度研究所碩士班招生考試

電腦與通訊工程學系碩士班

第二節

離散數學試題

(第 / 頁共 2 頁) (限用答案本作答)

可使用計算機 不可使用計算機

- (10 points) Determine whether $\neg(p \vee (\neg p \wedge q))$ and $\neg p \wedge \neg q$ are logically equivalent.
- Let $L(x, y)$ be the statement " x loves y ", where the universe of discourse for both x and y consists of all people in the world. Use quantifiers to express each of these statements.
 - (5 points) Everybody loves somebody.
 - (5 points) Nobody loves everybody.

本試題兩面印刷

- (10 points) Use mathematical induction to prove that

$$1 \cdot 2 + 2 \cdot 3 + \cdots + n(n+1) = n(n+1)(n+2)/3$$

whenever n is a positive integer.

- (10 points) Give a recursive definition of $a_n = n(n+1)$, where n is a positive integer.
- (10 points) Find the number of integers not exceeding 1000 (and greater than 1) that are not divisible by 2, 3, 5, or 7.
- (10 points) Let m be a positive integer with $m > 1$. Show that the relation

$$R = \{(a, b) | a \equiv b \pmod{m}\}$$

is an equivalence relation on the set of integers.

- (10 points) Determine whether the graphs G and H are isomorphic.



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(第 2 頁共 2 頁) (限用答案本作答)

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8. (10 points) Solve the recurrence relation $a_n - 4a_{n-1} + 3a_{n-2} = 0$ for $n = 2, 3, 4, \dots$ and initial conditions $a_0 = 2$ and $a_1 = 4$.
9. Assume that $A = 2$, $B = 3$, $C = 4$, and $D = 5$.
- (a) (5 points) What is the value of the prefix expression $+ - \times ABC / + ABD$?
- (b) (5 points) What is the value of the postfix expression $ABC \times -D + BC \times +$?
10. (10 points) Find all solutions to the system of congruences
- $$x \equiv 1 \pmod{2}$$
- $$x \equiv 2 \pmod{3}$$
- $$x \equiv 3 \pmod{5}$$

本試題兩面印刷

試題完