

銘傳大學 98 學年度研究所碩士班招生考試

資訊工程學系碩士班與資訊傳播工程學系碩士班

第二節

資訊數學(含離散數學、線性代數)試題

(第 1 頁共 2 頁)(限用答案本作答)

可使用計算機 不可使用計算機

第 1 及第 2 題為選擇題，請選出正確答案

1. Find the least squares solution of the linear system  $Ax = b$  given by 15%

$$x_1 - x_2 = 4$$

$$3x_1 + 2x_2 = 1$$

$$-2x_1 + 4x_2 = 3$$

(a)  $x_1 = 17/95, x_2 = 143/285$

(b)  $x_1 = 17/83, x_2 = 13/28$

(c)  $x_1 = 13/32, x_2 = 152/25$

(d)  $x_1 = 21/95, x_2 = 14/25$

2. Find a basis for the subspace of  $R^4$  spanned by the given vectors 15%

$$(1, 1, -4, -3), (2, 0, 2, -2), (2, -1, 3, 2).$$

(a)  $\{(1,0,0,-1/2), (0,1,0,-9), (0,0,1,-1/2)\}$

(b)  $\{(1,1,-4,-3), (0, 1,-5,-2), (0,0,1,-1/2)\}$

(c)  $\{(1,1,0,-1/2), (0,1, -9/2,-3), (0,0,1,-1/2)\}$

(d)  $\{(1,-1,-4,3), (0, 1,-5,-3), (1,0,0,-12)\}$

3.  $C = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 3 \end{bmatrix}$ , Calculate  $C^{-1}$  10%

4. Find the eigenvalues of  $A^4$  for 10%

$$A = \begin{bmatrix} 1 & 7 & 3 & 6 \\ 0 & \frac{1}{2} & 4 & 9 \\ 0 & 0 & 0 & 3 \\ 0 & 0 & 0 & 2 \end{bmatrix}$$

本試題兩面印刷



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第二節  
資訊數學(含離散數學、線性代數)試題

(第 2 頁共 2 頁) (限用答案本作答)

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第 5 至第 7 題為是非題，每一小題請回答 “是”或 “非”

5. True or False. Let A, B, and C be sets and

$$A = \{\{1\}, \{2\}, \{3\}\}, B = \{\{1\}, \{2\}, \{3\}, \phi\}, C = \{\phi, \phi\} \quad (15\%)$$

- (a)  $A - B = B - A = C$
- (b)  $|A| = 3$
- (c)  $|C| = 2$

6. True or False. (10%)

- (a) Let  $S$  be any set,  $\phi$  is an equivalence relation on  $S$ .
- (b) Let  $R$  be a relation on  $N$  (the set of natural number).  $xRy$  if  $y$  is divisible by  $x$ . Then  $R$  is a partial ordering relation on  $S$ .

7. True or False. The followings are **Functions**. (15%)

- (a)  $f(x) = 1/x$ , from  $R$  to  $R$  ( $R$  is the set of real number).
- (b) Set  $X = \{0, 1, 2, 3\}$ .  $R$  is a relation on  $X$  and  $R = \{(0, 0), (1, 1), (2, 3), (3, 0)\}$
- (c)  $f(x) = \sqrt{x}$ , from  $R$  to  $R$  ( $R$  is the set of real number).

8. A set  $S$  has  $n$  elements. How many **Relations** on  $S$ ? (10%)

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試題完