# 淡江大學 106 學年度碩士班招生考試試題

44-1

系別：資訊工程學系 B 組　　科目：線性代數

考試日期：3 月 4 日(星期六) 第 2 節　　本試題共 7 大題，2 頁

本試題雙面印刷

1. (15Pts) Ture-False (是非題)

(a).____ The liner system whose equations are all homogeneous must have a unique solution

(b). ____ There are two matrices $A$ and $B$. If $AB = BA$, then $A$ is equal to $B$.

(c). ____ If vectors $u \neq 0$ and $v \neq 0$, then $u \cdot v \neq 0$

(d). ____If $Ax = b$ has a unique solution, then the $Ax = c$ also must have a unique solution.

(e). ____Two equivalent vectors may not have the same initial points.

2. (10pts) Find all values of x in order for $A$ to be invertible:

$$A = \begin{bmatrix} 1-x & 5 & x^2 \\ 0 & x & x-5 \\ 0 & 0 & x-1 \end{bmatrix}$$

3. (12 pts) Determine the value of "a" for which the system is inconsistent;

$$\begin{cases} x+2y-3z=2 \\ 2x-2y+3Z=1 \\ x+2y-az=0 \end{cases}$$

4. (8 pts) **True/False**: Let $u$, $v$, $w$ are vectors in n-space; determine whether the expression makes sense mathematically? (**T**: make sense; **F:** NOT make sense)

(a)_____ $u \cdot v - \| u \cdot v \|$

(b)_____ $\| u \| \cdot \| v \|$

(c) _____ $u \cdot v - w$

(d) _____ $(u \cdot v) \times (u \cdot w)$

背面尚有試題

# 淡江大學 106 學年度碩士班招生考試試題

44-2

系別：資訊工程學系 B 組　　科目：線性代數

考試日期：3 月 4 日(星期六) 第 2 節　　本試題共 7 大題，2 頁

5. (15 pts) Suppose that $u\cdot(v\times w)=1$, Find $v\cdot(w\times w)$=?

6. (30 pts) Let vectors $u=(-1,1,0)$ and $v=(1,1,2)$

(a) Find the distance between $u$ and $v$

(b) Find the radian measure of angle between u and v：

(c) Find a point-normal from the equation of the plane through $P=(0,1,0)$ and have $u=(-1,1,0)$ as a normal. ：

7. (10 pts) Calculate det(A): **(Show detailed work to get fill credits 詳細寫出計算過程, 否則至多拿到一半分數)**

$$A=\begin{bmatrix} 2/3 & 0 & -3/2 & 1/3 & 3 \\ 2/3 & 2/3 & 5/2 & 8/5 & -3/2 \\ 4/3 & -2/3 & -1/2 & -3/5 & 1/2 \\ 2 & 0 & 2 & 1 & -1 \\ 9/4 & 7/4 & 5/4 & 3/4 & 1/4 \end{bmatrix}$$