銘傳大學 95 學年度	資訊工程學系 資訊傳播工程學系（乙組）	碩士班招生考試
	第二節	（第 1 頁共 1 頁）

線性代數試題

（限用答案本作答）

一、(14%) Find the eigenvalues and eigenvectors of $A=\begin{bmatrix}2 & 1 & 1\\ 0 & 1 & 0\\ 1 & -1 & 2\end{bmatrix}$

二、(14%) Use the "Gram-Schmidt algorithm" to convert the given basis B of V into an orthogonal basis that contains the vector (0,1,1). V=R^3, B={(0,1,1),(1,1,1),(1,-2,2)}

三、(14%) Find a linear transformation T: $R^3 \to R^2$ such that

$$T\begin{bmatrix}1\\1\\0\end{bmatrix}=\begin{bmatrix}2\\1\end{bmatrix}, T\begin{bmatrix}1\\0\\1\end{bmatrix}=\begin{bmatrix}1\\-1\end{bmatrix}, T\begin{bmatrix}0\\1\\1\end{bmatrix}=\begin{bmatrix}0\\0\end{bmatrix}$$

四、(14%) Given $(I-2A^T)^{-1}=\begin{bmatrix}2 & 1\\ 1 & 1\end{bmatrix}$,

(a) find A (b) find det(A^9).

五、(14%) Let {u,v,w,z} be linearly independent vectors. Which of the following are linearly independent? (選擇題)

(a){u-v, v-w, w-u} (b){u+v, v+w, w+u} (c) {u-v, v-w, w-z, z-u}

(d){u+v, v+w, w+z, z+u}

六、(15%) Show that

$$\begin{vmatrix}1+x_1 & x_2 & x_3 & \cdots & x_n\\ x_1 & 1+x_2 & x_3 & \cdots & x_n\\ x_1 & x_2 & 1+x_3 & \cdots & x_n\\ \vdots & \vdots & \vdots & & \vdots\\ x_1 & x_2 & x_3 & \cdots & 1+x_n\end{vmatrix} = 1+x_1+x_2+x_3+\ldots+x_n$$

七、(15%) A matrix is skew-symmetric if $A^T=-A$. If A is an n by n skew-symmetric matrix, show that det(A)=$(-1)^n$det(A).

試題完