中國文化大學 97 學年度 碩 班入學考試	NO3-25
系所(組)別：數位機電科技研究所	考試科目：工程數學

M-9-2

(1) A,B are two matrices, indicate true or false for each of the following statements(no proof is needed)(10%)
   1.) AI=IA
   2.) AB=BA
   3.) A+B=B+A
   4.) A+(B+C)=(A+B)+C
   5.) $A^{-1}A=AA^{-1}=I$
(2) AX=b is a matrix equation, under what condition --the equation is a homogeneous equation?(5%)
(3) A is a nxn complex matrix, under what condition—A will be a Hermitian matrix?(10%)
(4) A=[2 3 3;0 5 7;6 9 8], find L,U matrix, satisfy A=LU(10%)
(5) Prove $(AB)^{-1}=B^{-1}A^{-1}$(10%)
(6) Find inverse of the matrix for A=[1 4 5;4 2 5;-3 9 8](10%)
(7) Describe geometrically the subspace of R^3 spanned by(10%)
   (a) (0,0,1), (0,1,1),(0,2,1)
   (b) (0,0,0),(0,2,0),(0,5,0)
(8) Find two different bases for the subspace of all vectors in R^3,where first two components are equal.(10%)
(9) Given the matrix A=[1 2 3 4;2 5 6 8;3 6 7 12;4 8 12 17]
   (a) Compute the determinant of A
   (b) Does A have any complex eigenvalues? Explain without computation(10%)
(10) Find the PA=LDU factorizations of A=[0 1;2 3], and A=[1 2 3;2 4 2;1 1 1](P is a permutation matrix)(15%)