

# National University of Computer & Emerging Sciences

Exam: Mid-I

Semester: Fall 2014

Subject: Linear Algebra(CS)

Time: 90 min

Max Marks:40

Note: Attempt all questions. Programmer calculator is not allowed.

## Question # 1 : [10]

Solve the given system of linear equations by any suitable method.

$$0I_1 + 0I_2 + I_3 + I_4 + I_5 = 0$$

$$-I_1 - I_2 + 2I_3 - 3I_4 + I_5 = 0$$

$$I_1 + I_2 - 2I_3 - I_5 = 0$$

$$2I_1 + 2I_2 - I_3 + I_5 = 0$$

## Question # 2: [5+5]

a) Find all the values of  $c$ , if any, for which the given matrix is invertible.

$$\begin{pmatrix} c+2 & 0 & 0 & 0 \\ 1 & c-3 & 0 & 0 \\ 8 & 1 & c+\sqrt{5} & 0 \\ 9 & -11 & 12 & 1 \end{pmatrix}$$

b) Show that if  $p(x) = x^2 - (s+w)x + (sw - tu)$  and  $A = \begin{bmatrix} s & t \\ u & w \end{bmatrix}$  then  $p(A) = 0$

## Question # 3 : [10]

Solve the given matrix for  $X$ .

$$\begin{bmatrix} 1 & 2 & 3 \\ 3 & 7 & 6 \\ 1 & 0 & 8 \end{bmatrix} X = \begin{bmatrix} 1 & 4 & -2 & 0 & 3 \\ 0 & -1 & 5 & 2 & 7 \\ -3 & 6 & 8 & 9 & 0 \end{bmatrix}$$

## Question # 4 : [10]

Evaluate  $\det(A)$  by a cofactor expansion along a row or column of your choice.

$$A = \begin{bmatrix} -6 & 0 & 14 \\ 2 & 5 & 1 \\ -3 & 0 & 15 \end{bmatrix}$$

Best of Luck