BS(CS)

National University of Computer & Emerging Sciences

Midterm 1 Fall 2016 | MT 104- Linear Algebra
Date: 19th September, 2016 | BS CS
Total marks: 30 | Time: 60 minutes

64/10

Note: Only simple scientific calculators are allowed.

Question 1: (10 marks) Suppose Hasan, Nadir and Mehmood performed holy sacrifice this Eid. Hasan sacrificed 2 cows, 4 lambs and 1 camel, Nadir sacrificed 1 cow, 3 lambs and 1 camel and Mehmood sacrificed 3 cows, 5 lambs and 2 camels. If the Hasan spent Rs. 6.4 hundred thousand, Nadir spent Rs. 5.2 hundred thousand and Mehmood spent Rs. 9.6 hundred thousand. Use **Gauss Jordan elimination** to determine how much each cow, lamb and camel cost?

Question 2: (10 marks) If A and B are nxn symmetric invertible matrices and C is any nxn matrix then simplify the following expression. (Explain each step)

$$(2AB^T)^{-1}(A^{-1}BA)^T(4CA^2)^T(A^{-1}C)^{-1}(2A^{-1})$$

Question 3: (10 marks)

Use inversion algorithm to find the inverse of the matrix (if exists).

$$\begin{pmatrix} 2 & -4 & 0 & 0 \\ 1 & 2 & 12 & 0 \\ 0 & 0 & 2 & 0 \\ 0 & -1 & -4 & -5 \end{pmatrix}$$

$$\begin{bmatrix} 1/4 & 1/2 & -3 & 0 \\ -1/8 & 1/4 & -3/2 & 0 \\ 0 & 0 & 1/2 & 0 \\ 1/40 & -1/20 & -1/10 & -1/5 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

$$\begin{bmatrix} 4 & -2 \\ -3 & 1 \end{bmatrix} \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$$

$$\frac{1}{4-6}\begin{bmatrix} 4 & -3 \\ -2 & 1 \end{bmatrix} = \begin{matrix} -2 & 1 \\ *3/2 & -1/2 \end{matrix}$$

GOOD LUCK!!!!