MIDTERM EXAMINATION
Spring 2010 (mnadeem204@gmail.com)
MTH501- Linear Algebra (Session - 3)

Time: 60 min
Dated 27-05-2010

Question No: 1 (Marks: 1) - Please choose one

If A is a 2×2 matrix, the area of the parallelogram determined by the columns of A is

- ▶ A^{-1}
- ▶ **det A**
- ▶ adj A

Question No: 2 (Marks: 1) - Please choose one

Cramer's rule leads easily to a general formula for

- ▶ **the inverse of an $n\times n$ matrix A**
- ▶ the adjugate of an $n\times n$ matrix A
- ▶ the determinant of an $n\times n$ matrix A

Question No: 3 (Marks: 1) - Please choose one

The transpose of an lower triangular matrix is

- ▶ lower triangular matrix
- ▶ **upper triangular matrix**
- ▶ diagonal matrix

Question No: 4 (Marks: 1) - Please choose one

The transpose of an upper triangular matrix is

- ▶ **lower triangular matrix**
- ▶ upper triangular matrix
- ▶ diagonal matrix

Question No: 5 (Marks: 1) - Please choose one

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Let A be a square matrix of order 3×3 with $\det(A)=21$, then $\det(2A)=$

- **168**
- 186
- 21
- 126

Question No: 6 (Marks: 1) - Please choose one

A basis is a linearly independent set that is as large as possible.

- **True**
- False

Question No: 7 (Marks: 1) - Please choose one

Let A be an $m\times n$ matrix. If for each b in $\mathbb{R}^m$ the equation Ax=b has a solution then

- **A has pivot position in only one row (may be this option is true)**
- Columns of A span $\mathbb{R}^m$
- Rows of A span $\mathbb{R}^m$

Question No: 8 (Marks: 1) - Please choose one

Reduced echelon form of the matrix $\begin{bmatrix}1&2&3\\2&3&4\end{bmatrix}$ is

- $\begin{bmatrix}1&2&3\\0&0&1\end{bmatrix}$
- $\begin{bmatrix}1&0&3\\0&0&1\end{bmatrix}$
- $\begin{bmatrix}1&0&-1\\0&1&2\end{bmatrix}$

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$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \end{bmatrix}$$

▶

Question No: 22 (Marks: 3)

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find that is invertible or not $T(X_1,X_2)=T(6X_1+8X_2 , 5X_1-8X_2)$

Question No: 23 (Marks: 3)

Find the volume of parallelogram of the vertices (1,2,4) (2,4,-7) and (-1,-3,20

Question No: 24 (Marks: 2)

Which of the following is true? If V is a vector space over the field F.(justify your answer)

(a) $\{x+y / x \in V, y \in V\} = V$

(b) $\{x+y / x \in V, y \in V\} = V \times V$

(c) $\{\lambda v / v \in V, \lambda \in F\} = F \times V$

Question No: 25 (Marks: 5)

Let $\begin{bmatrix} 1 \\ 0 \\ -2 \end{bmatrix}, \begin{bmatrix} 3 \\ 2 \\ -4 \end{bmatrix}, \begin{bmatrix} -3 \\ -5 \\ 1 \end{bmatrix}$. is this in R^3 or not?

Question No: 26 (Marks: 5)

Justify that $A^2=I$ if $A=\begin{bmatrix} 1 & 0 \\ 3 & -1 \end{bmatrix}$, if and only $M^2=I$. justify your answer by portioned matrix of M

$$M=\begin{bmatrix} 1 & 0 & 0 & 0 \\ 3 & -1 & 0 & 0 \\ 1 & 0 & -1 & 0 \\ 0 & 1 & -3 & 1 \end{bmatrix}$$

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