Philadelphia University
Department of Basic Sciences and Mathematics

Academic Year:	2015–2016	**Course Name:**	Linear Algebra (1)[1]
Semester:	Second Semester	**Course Number:**	250241
Exam:	Second Exam	**Instructor Name:**	Feras Awad
Quiz Date:	11/05/2016	**Student Name:**	________
Quiz Day:	Wednesday	**University ID:**	________
Mark:	[20]	**Serial:**	________

Question ONE : (5 points) Write the symbol of the *most* correct answer in the blank.

1. [   ] If the ith row of an $n \times n$ matrix A is zero, what we can conclude about AB where B is of the same size of A ?

   (A) The ith column of AB is zero. (B) The ith row of AB is zero.

   (C) The trace of AB equals zero. (D) None of the above.

2. [   ] Let A and B be $n \times n$ matrices. Which rule is false ?

   (A) $(A+B)^T = B^T + A^T$ (B) $A^3A^5 = A^8$

   (C) $(AB)^T = A^TB^T$ (D) $(B^TB)^T = B^TB$

3. [   ] Which of these is an elementary matrix ?

   (A) $\begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{bmatrix}$ (B) $\begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$ (C) $\begin{bmatrix} 2 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 2 \end{bmatrix}$ (D) $\begin{bmatrix} 1 & 0 & 3 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

4. [   ] What is the determinant of the matrix $\begin{bmatrix} 5 & 2 & 0 \\ 0 & 3 & -1 \\ 0 & 0 & 2 \end{bmatrix}$.

   (A) 30 (B) 10 (C) 15 (D) 0

[1]Internal Examiner : Dr. Marouf Samhan

5. [ ] Let A be an $n \times n$ invertible matrix, which conclusion is not satisfied ?

(A) A is row equivalent to the $n \times n$ identity matrix.

(B) The equation $A\mathbf{x} = \mathbf{0}$ has only the trivial solution.

(C) For every $n \times n$ matrix B, $(AB)^{-1} = B^{-1}A^{-1}$.

(D) $\det(A^T) = \det(A)$.

Question TWO : (3 points) Prove: If $A^T A = A$, then A is symmetric and $A^2 = A$.

Question THREE : (2 points) Fill in the missing entries (marked with $\times$) so the matrix $A = \begin{bmatrix} \times & \times & 4 \\ 0 & \times & \times \\ \times & -1 & \times \end{bmatrix}$ is skew−symmetric.

Question FOUR : (4 points) If $\begin{vmatrix} a & b & c \\ d & e & f \\ g & h & i \end{vmatrix} = -3$, find $\begin{vmatrix} -a & -b & -c \\ 2g & 2h & 2i \\ d-g & e-h & f-i \end{vmatrix}$.

Question FIVE : (6 points) For the matrix $A = \begin{bmatrix} 2 & 6 & 6 \\ 2 & 7 & 6 \\ 2 & 7 & 7 \end{bmatrix}$, find A^{-1} and $\det(A)$.