First Semester 1442	**First Exam**	**King Saud University**
(without calculators)	**Time: 8 - 9:30 am**	**College of Science**
Wednesday 13-2-1442	**240 Math**	**Math. Department**

Q1: If $A=\begin{bmatrix}1 & 1\\ 1 & -1\end{bmatrix}$, $B=\begin{bmatrix}1 & 0 & 2\\ 2 & 2 & 0\end{bmatrix}$, $C=\begin{bmatrix}1 & 1 & 1\\ 2 & 3 & 2\\ 0 & 1 & 1\end{bmatrix}$ and $P(x)=x^2+x-2$, then find the following:

(a) P(A) (3 marks)

(b) adj(BB^T) in details (2 marks)

(c) the inverse of C (3 marks)

(d) Solution of Bx=0 by Gauss-Jordan Elimination. (4 marks)

(e) $T_B(1,2,3)$. (2 marks)

Q2: Find the determinant of the following matrix, then find the cofactor C_{12}:

(5 marks)

$$\begin{bmatrix}1 & 2 & 3 & 4\\ 1 & 3 & 3 & 4\\ 1 & 2 & 3 & 5\\ 1 & 2 & 5 & 4\end{bmatrix}$$

Q3: (a) If $E=\begin{bmatrix}a & b & a\\ e & -2a & e\\ a & a & a\end{bmatrix}$, then find det(E) and tr(E). (2 marks)

(b) Prove that if A is an invertible symmetric matrix, then A^{-1} is symmetric.

(2 marks)

(c) If A is an invertible matrix of size 3×3 and |A|=2, then find $|2(A^T)^{-1}|$.

(2 marks)