**King Saud University MATH 246 (Linear Algebra)**

**Department of Mathematics First MidTerm Exam**

**1nd Semester 1435-1436 H Duration: 90 Min**

### Name:

ID No.

### **Question I:**

### **Determine if the statement is always true or sometimes false, and justify your answer with a logical argument or a counter example.**

1) det (AT BT) = det (BA) . ( )

2) If a square matrix A satisfies A3 +4 A2+-2A+7I = 0, then so is AT. ( )

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3) If A AT  is singular, then so is A. ( )

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4). If A is singular n x n matrix, and B results by interchanging two rows of A, then B may or may not be singular. ( )

**Question II:**

Let 

1. Find.
2. With solving the system find the solution of the linear system AX=0 and justify your answer.
3. With solving the system find the solution of the linear system AX=b, where b= and justify your answer.

**Question III:**

1. Find all values of k for which det(A)=0, where



**(b**) Prove that a system of linear equations either has no solution or one solution or infinitely many solution.

**Question VI:**

1. Find all values of a, b, c that makes the following matrix symmetric

 ****

 (b) IfA is a matrix of size 3\*3 and det(A)=-3, find ****