King Saud University Department of Mathematics Math-254
Third Semester Second Short Exam 1444H
Time Allowed: $\mathbf{3 5}$ Mins. Group No. $82440 \quad$ Max Marks=10

Name of the Student: $\quad$ KSU ID:
Questions:
$(3+2+5)$
Consider the linear system $A x=b$ with $A=\left[\begin{array}{cc}3 & \frac{1}{3} \\ 6 & -4\end{array}\right]$ and $b=\left[\begin{array}{c}-2 \\ 3\end{array}\right]$
(1) Find inverse of $A$ by Gauss-Elimination with Partial Pivoting. Use the inverse of $A$ to find solution of the linear system.
(2) Find determinant of matrix A using LU decomposition by Crout method.
(3) Consider the linear system $A x=b$ with $A=\left[\begin{array}{cc}3 & \frac{1}{3} \\ 2 & -6\end{array}\right]$ and $b=\left[\begin{array}{c}-1 \\ 2\end{array}\right]$.

Find $x^{(1)}$ using the matrix form of Jacobi's iterative method starting with $x^{(0)}=[-1,-2]^{T}$. Find the error bounds for $\left\|x-x^{(4)}\right\|$. Find the number of iterations $N$ of the Jacobi method required to satisfy the error tolerance $\epsilon=10^{-2}$. Use the EB formula

$$
\begin{gathered}
\left\|x-x^{(N)}\right\|_{\infty} \leq \frac{\|T\|_{\infty}^{N}}{1-\|T\|_{\infty}}\left\|x^{(1)}-x^{(0)}\right\|_{\infty} \\
\text { - Good Luck -- }
\end{gathered}
$$

Start your solutions from here ....

