PROGRAMMING ASSIGNMENT – I

Solve the following system of nonlinear equations arising from a pipe network application.

$$
\begin{aligned}
Q_1^2 + Q_2^2 + Q_3^2 &= 6 \\
2Q_2^2 + Q_3^2 + 2Q_4^2 &= 14 \\
Q_3^2 + Q_4^2 + 2Q_5^2 &= 10 \\
Q_1 + Q_5 &= 2 \\
Q_4 + Q_6 &= 4 \\
Q_2 + Q_6 &= 4
\end{aligned}
$$

Write two programs – one based on fixed point iteration and one on the Newton-Raphson scheme. Show the required formulation separately in your report.

Use Gaussian elimination to solve the linearized system of equations.

Continue iterations till the relative percentage error falls below 10^{-5}.