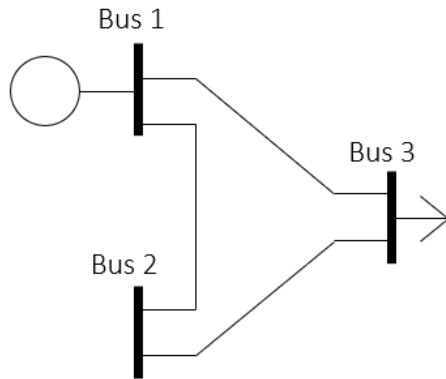


Name: _____ UIN: _____ Section: _____ Score: _____



In this three-bus system

- The line from bus 1 to bus 2 has an impedance $Z = 0.05 + j0.1$
- The other two lines (1-3 and 2-3) both have an impedance $Z = j0.25$
- The load at bus 3 is consuming 150 MW and 87 Mvar
- The generator at Bus1 has a voltage setpoint of 1.03 per-unit

1. Make the Y-bus matrix for this system

$$Y = \begin{bmatrix} 4 - j12 & -4 + j8 & j4 \\ -4 + j8 & 4 - j12 & j4 \\ j4 & j4 & -j8 \end{bmatrix}$$

2. What are the bus types (PV/PQ/Slack) for each of the three buses?

Bus 1 must be Slack, because there must always be a Slack bus and it must be at a generator.

Bus 2 and 3 must be PQ, because PV and Slack buses must have a generator.