**ChE 221A Chemical Engineering Thermodynamics**

Quiz 1 (30 Points) Time: 45 min

1. A thermodynamic system is observed to obey the following equations of state: $T=\frac{3aS^2}{NV}$ and $P=\frac{aS^3}{NV^2}$, where $a$ is a positive constant.
   i. Using Gibbs – Duhem equation obtain expression for the chemical potential $(\mu)$. (10 Points)
   ii. Using Euler equation obtain fundamental equation in the internal energy representation. (5 Points)

2. The fundamental equation in Enthalpy representation is given by: $H=2\left(\frac{CS^3P}{N}\right)^{1/2}$. By carrying out inverse Legendre transformation obtain fundamental equation in the Internal energy representation. (15 Points)