Problem 1: Callen, 1.8-3.

Problem 2: Callen, 1.8-5.

Problem 3: Callen, 2.2-6.

Problem 4: Given the equations of state

$$U = PV/2, \quad T^2 = \frac{AU^{3/2}}{VN^{1/2}}, \tag{1}$$

find the entropy $S(U, V, N)$. ($A$ is a constant).