

QPCODE: 22710
 Q2. SE/Sem III/Chem. Engg.

$$C_p = 103A - 56 \frac{kJ}{\text{mol} \cdot K} \quad C_v = 1026.246 \frac{kJ}{\text{mol} \cdot K}$$

$$\Delta U_{1-2} = 0$$

$$\Delta U_{2-3} = -40498.4$$

$$\Delta U_{3-4} = -102624.6$$

$$\Delta U_{4-5} = 5652.562$$

$$\Delta U_{5-1} = 507470.437$$

$$\Sigma \Delta U = 0$$

$$\Delta H_{1-2} = 0$$

$$\Delta H_{2-3} = -413824$$

$$\Delta H_{3-4} = -103456$$

$$\Delta H_{4-5} = 5698.356$$

$$\Delta H_{5-1} = 511581.543$$

$$\Sigma \Delta H = -0.10 \approx 0$$

$$W_{1-2} = 10704.693$$

$$W_{2-3} = 0$$

$$W_{3-4} = -831.5$$

$$W_{4-5} = -5642$$

$$W_{5-1} = 4111$$

$$\Sigma W = 8341.63$$

$$Q_{1-2} = 10704.693$$

$$Q_{2-3} = -410498.4$$

$$Q_{3-4} = -103456.1$$

$$Q_{4-5} = 0$$

$$Q_{5-1} = 511581.437$$

$$\Sigma Q = 8331.63$$

$$Q.3.(b) \alpha = 2528.87, \beta = 0.1776$$

$$W = 2 = 0.94304, \Delta H = -703.25, \Delta S = -0.7243$$

$$Q4(b) \quad a = 0.42 \frac{R^2 T_c^{2.5}}{P_c} = 743.177$$

$$b = 0.08664 \frac{RT_c}{P_c}$$

$$b = 0.0393$$

$$v = 2.89 \text{ m}^3/\text{mol}$$

for $P = 1 \text{ bar}$ (ideal pressure)

$$z = 0.932$$

$$Q5(b) \quad \Delta S_S = -5.2439, \quad \Delta S_O = 9.3955$$

$$\Delta S_T = \Delta S_S + \Delta S_O = 4.1516 \frac{\text{FJ}}{\text{K}}$$