LPDE midsem 2025

Samyadeb Bhattacharya

Full marks: 50

1. Derive the Maxwell's Thermodynamic equations (You can use any method) (10)

2. The real gas equation for n moles is given by: $\left(P + \frac{an^2}{V^2}\right)(V - nb) = nRT$.

i) Use this to find the adiabetic equation for real gas. (10)
ii) Further find the adiabetic lapse rate for real gas. (15)
iii) Find $\left(\frac{\partial U}{\partial V}\right)_T$ for n moles of real gas. (5)

3. Find the efficiency of Carnot heat engine. (10)