1. 2 moles of Ne gas undergo the cyclic process abc as shown, with \( p_a = p_b = 7 \times 10^5 \) Pa, \( p_c = 3 \times 10^5 \) Pa, \( V_a = V_c = 2 \times 10^{-3} \) m\(^3\) and \( V_b = 5 \times 10^{-3} \) m\(^3\). (a) What are \( T_a, T_b, \) and \( T_c \)? (b) What are the changes in internal energy \( \Delta U_{ab}, \Delta U_{bc}, \Delta U_{ca} \)? (c) What is the work done by the gas along each path? (d) How much heat is added to or removed from the gas along each path? (e) What is the net heat added to the gas and work done by the gas in one full cycle?

2. 3 moles of \( \text{N}_2 \) gas adiabatically expands from \( V_a = 1 \times 10^{-3} \) m\(^3\) at \( p_a = 8 \times 10^5 \) Pa to \( V_b = 4 \times 10^{-3} \) m\(^3\), then is isothermally compressed back to its starting volume. (a) Draw the process abc on a PV diagram. (b) What is \( p_b \)? (c) What are \( T_a, T_b \) and \( T_c \)? (d) What is \( p_c \)? (e) What are the changes in internal energy \( \Delta U_{ab}, \Delta U_{bc} \)? (f) How much work is done by the gas along ab and bc? (g) How much heat is added to or removed from the gas along ab and bc?