Daily Tutorial Sheet-15	Level-3

159.(A) $P \propto T^3$

$PT^{-3} = k$ for adiabatic process, $P^{1-\gamma} \cdot T^{\gamma} = k$

$\Rightarrow \quad P \cdot T^{\gamma/1-\gamma} = k \quad \Rightarrow \quad \frac{\gamma}{1-\gamma} = -3 \quad \Rightarrow \quad \gamma = \frac{3}{2}$

160.(B) According to the first law of thermodynamics $\Delta U = q - w$

In isothermal process, $\Delta U = 0$

$\therefore \quad q = -w$ or $w = -nRT_1 \ln \frac{V_2}{V_1}$

161.(B) Path (B + C) occurs in adiabatic conditions

$\therefore \quad q = 0$

We know that

$\Delta S = \frac{q_{rev}}{T}$

$\therefore \quad q_{rev} = T\Delta S$

$\therefore \quad q_{rev} = nR \ln \frac{V_2}{V_1}$

162.(A) For path A

$\Delta S = \frac{q_{rev}}{T} = \frac{nRT_1}{T_1} \ln \frac{V_2}{V_1} = nR \ln \frac{V_2}{V_1}$

163.(A) $w = q = P_1(V_2 - V_1)$

164.(D) For path $(D + E)$

$\Delta S = nR \ln \frac{V_2}{V_1}$