Table : Useful thermodynamic quantities in terms of the microcanonical, canonical and grand canonical partition functions [after Dalvit, Frastai and Lawrie : Problems on statistical Mech].

	Microcanonical	Canonical	Grand canonical
	$\Omega(E,V,N)$	$Z(T,V,N)$	$\Lambda(T,V,\mu)$
$\frac{S}{k}$	$\ln \Omega$	$\left(\frac{\partial (T \ln Z)}{\partial T}\right)_{V,N}$	$\left(\frac{\partial (T \ln \Lambda)}{\partial T}\right)_{V,\mu}$
F	$E - kT\ln\Omega$	$-kT\ln Z$	$kT\mu^2\left(\frac{\partial(\mu^{-1}\ln\Lambda)}{\partial\mu}\right)_{T,V}$
U	Fixed $(=E)$	$kT^2\left(\frac{\partial \ln Z}{\partial T}\right)_{V,N}$	$-\left(\frac{\partial \ln\Lambda}{\partial\beta}\right)_{\beta\mu,V}$
N	Fixed	Fixed	$kT\left(\frac{\partial\ln\Lambda}{\partial\mu}\right)_{T,V}$
kT	$\left(\frac{\partial\ln\Omega}{\partial E}\right)_{V,N}^{-1}$	Fixed	Fixed
$\frac{\mu}{kT}$	$-\left(\frac{\partial\ln\Omega}{\partial N}\right)_{E,V}$	$-\left(\frac{\partial\ln Z}{\partial N}\right)_{T,V}$	Fixed
p	$kT\left(\frac{\partial\ln\Omega}{\partial V}\right)_{E,N}$	$kT\left(\frac{\partial\ln Z}{\partial V}\right)_{T,N}$	$\begin{cases} kT\,\frac{\partial\ln\Lambda}{\partial V} \\ kT\,\frac{\ln\Lambda}{V}\end{cases}$
$\frac{C_v}{k}$	$-\beta^2\left(\frac{\partial^2\ln\Omega}{\partial E^2}\right)_{V,N}^{-1}$	$\beta^2\left(\frac{\partial^2\ln Z}{\partial\beta^2}\right)_{V,N}$	$T\left(\frac{\partial^2(T\ln\Lambda)}{\partial T^2}\right)_{V,\mu}$

$\langle (N - \langle N \rangle)^2 \rangle$	0	0	$\left(\dfrac{\partial^2 \ln \Lambda}{\partial (\beta\mu)^2} \right)_{\beta, V}$
$\langle (E - \langle E \rangle)^2 \rangle$	0	$\left(\dfrac{\partial^2 \ln Z}{\partial \beta^2} \right)_{V, N}$	$\left(\dfrac{\partial^2 \ln \Lambda}{\partial \beta^2} \right)_{\beta\mu, V}$