b) $N(\phi) = mL(\operatorname{sn}\phi\,\dot{\phi}^2 - \operatorname{cn}\phi\,\ddot{\phi})$

Pero $\dot{\phi} = \frac{V_0}{L}\frac{1}{\sqrt{1+\operatorname{cn}^2\phi}}$

$\Rightarrow \ddot{\phi} = \frac{-V_0}{L(1+\operatorname{cn}^2\phi)^{3/2}}\, 2\operatorname{cn}\phi \operatorname{sn}\phi\,\dot{\phi}$

$= -\frac{V_0^2}{L^2}\frac{2\operatorname{cn}\phi\operatorname{sn}\phi}{(1+\operatorname{cn}^2\phi)^2}$

$\Rightarrow N(\phi) = mL\left(\frac{\operatorname{sn}\phi V_0^2}{L^2(1+\operatorname{cn}^2\phi)} + \frac{2V_0^2\operatorname{cn}^2\phi\operatorname{sn}\phi}{L^2(1+\operatorname{cn}^2\phi)^2}\right)$

$\phi = \pi/2 \Rightarrow \operatorname{sn}\phi = 1$

$\operatorname{cn}\phi = 0$

$\Rightarrow \boxed{N(\pi/2) = \frac{mV_0^2}{L}}$