c) $T = \frac{1}{2} \sum_{i,j} \omega_i^* I_{ij}^* \omega_j^* \Rightarrow$

$T = \frac{1}{4} M R^2 \dot{\alpha}^2 + M(R^2/8 + d^2/24)\dot{\beta}^2$ or

$$\boxed{T = (1/4) M R^2 a^2 + M(R^2/8 + d^2/24)(b + 2ct)^2}$$

d) Euler's eqns give $N_1^* = I_1 \dot{\omega}_1^* + \omega_2^* \omega_3^* (I_3 - I_2)$, etc. The result is

$$\boxed{N_1^* = 0}$$

$$N_2^* = \left(\frac{MR^2}{4} + \frac{Md^2}{12}\right)\left\{2c \sin at + a(b+2ct)\cos at\right\}$$

$$+ a(b+2ct)\cos at \left(\frac{MR^2}{4} - \frac{Md^2}{12}\right) \Rightarrow$$

$$\boxed{N_2^* = \frac{MR^2}{2} a(b+2ct)\cos at + \left(\frac{MR^2}{2} + \frac{Md^2}{6}\right) c \sin at}$$

$$N_3^* = \left(\frac{MR^2}{4} + \frac{Md^2}{12}\right)\left\{2c(\cos at) - a(b+2ct)\sin at\right\} + a(b+2ct)\sin at \left(-\frac{MR^2}{4} + \frac{Md^2}{12}\right) \Rightarrow$$

$$\boxed{N_3^* = -\frac{MR^2}{2} a(b+2ct)\sin at + \left(\frac{MR^2}{2} + \frac{Md^2}{6}\right) c \cos at}$$