Goldstein

2.5.

(?)

$$L = T - V$$

$$= \frac{1}{2} m \dot{x}^2 + Fx$$

$$= \frac{1}{2} m (B + 2Ct)^2 + Fx.$$

$$\frac{dL}{dx} = F \quad \frac{d}{dt}\left(\frac{dL}{d\dot{x}}\right) = m\ddot{x}, \quad \text{eqm:} \quad F = m\ddot{x}.$$

$$m\ddot{x} = 2Ctm \Rightarrow \quad \cancel{F = 2Ctm} \quad F = 2Ctm,$$

or $\boxed{C = F/2tm}$.

The boundary condition is given by $x(t=0) = 0$, thus $\boxed{A = 0}$.
$x(t = t_0) = a$ implies.

$$Bt_0 + Ct_0^2 = a$$

$$Bt_0 + \frac{F}{2tm} t_0^2 = a.$$

$$\boxed{B = \left[a - \frac{F}{2tm} t_0^2\right] / t_0.}$$