Problem 25.43:

25.43 (a) $$[\alpha] = \left[\frac{\lambda}{x}\right] = \frac{\mathrm{C}}{\mathrm{m}} \cdot \left(\frac{1}{\mathrm{m}}\right) = \boxed{\frac{\mathrm{C}}{\mathrm{m}^2}}$$

(b) $$V = k_e \int \frac{dq}{r} = k_e \int \frac{\lambda\, dx}{r} = k_e \alpha \int_0^L \frac{x\, dx}{(d+x)} = \boxed{k_e \alpha \left[L - d \ln\left(1 + \frac{L}{d}\right)\right]}$$