

40. Since the speed is constant $\Delta K = 0$ and Eq. 8-31 (an application of the energy conservation concept) implies

$$W_{\text{applied}} = \Delta E_{\text{th}} = \Delta E_{\text{th (cube)}} + \Delta E_{\text{th (floor)}} .$$

Thus, if $W_{\text{applied}} = (15)(3.0) = 45 \text{ J}$, and we are told that $\Delta E_{\text{th (cube)}} = 20 \text{ J}$, then we conclude that $\Delta E_{\text{th (floor)}} = 25 \text{ J}$.