

75. The spring is relaxed at $y = 0$, so the elastic potential energy (Eq. 8-11) is $U_{\text{el}} = \frac{1}{2}ky^2$. The total energy is conserved, and is zero (determined by evaluating it at its initial position). We note that U is the same as ΔU in these manipulations. Thus, we have

$$0 = K + U_g + U_e \implies K = -U_g - U_e$$

where $U_g = mgy = (20 \text{ N})y$ with y in meters (so that the energies are in Joules). We arrange the results

in a table:

position y	-0.05	-0.10	-0.15	-0.20
U_g	-1.0	-2.0	-3.0	-4.0
U_e	0.25	1.0	2.25	4.0
K	0.75	1.0	0.75	0