34. If the description of the scenario seems confusing, reference to Figure 8-31 in the textbook is helpful. We note that the block being unattached means that for $y > 0.25$ m, the elastic potential energy vanishes. With $k = 400$ N/m, $m = 40.0/9.8 = 4.08$ kg and length in meters, the energy equation is

$$E = \begin{cases} \frac{1}{2}k\left(\frac{1}{4}\right)^2 & y = 0 \\ K + mgy + \frac{1}{2}k\left(\frac{1}{4} - y\right)^2 & 0 \le y \le \frac{1}{4} \\ K + mgy & \frac{1}{4} \le y \end{cases}$$

In this way, the kinetic energy K for each region is related to E – which by conservation of energy is always equal to the value 12.5 J that it had at $y = 0$. We arrange our results in a table (with energies in Joules) where it is clear that the sum of each column (of energies) is 12.5 J:

part	(a)	(b)	(c)	(d)	(e)	(f)	(g)
position y	0	0.05	0.10	0.15	0.20	0.25	0.30
U_g	0	2.0	4.0	6.0	8.0	10.0	12.0
U_e	12.5	8.0	4.5	2.0	0.5	0	0
K	0	2.5	4.0	4.5	4.0	2.5	0.5

Finally (for part (h)), where $y \ge 0.25$ m, we have $K = E - mgy$, so that $K = 0$ occurs when $y = (12.5\text{ J})/(40\text{ N}) = 0.313$ m.