34. Energy conservation for this situation may be expressed as follows:

$$\begin{aligned} K_1 + U_1 &= K_2 + U_2 \\ \frac{1}{2}mv_1^2 - \frac{GmM}{r_1} &= \frac{1}{2}mv_2^2 - \frac{GmM}{r_2} \end{aligned}$$

where $M = 7.0 \times 10^{24}\,\text{kg}$, $r_2 = R = 1.6 \times 10^6\,\text{m}$ and $r_1 = \infty$ (which means that $U_1 = 0$). We are told to assume the meteor starts at rest, so $v_1 = 0$. Thus, $K_1 + U_1 = 0$ and the above equation is rewritten as

$$\frac{1}{2}mv_2^2 = \frac{GmM}{r_2} \quad \Longrightarrow \quad v_2 = \sqrt{\frac{2GM}{R}} = 2.4 \times 10^4\ \text{m/s}\ .$$