Question 19160

It is given, that $S = 25\,cm = 0.25\,m = v_0 t_s - \frac{a t_s^2}{2}$, where t_s denotes the time for which the object moved until stop. Also, for velocity, $v = v_0 - a t$, and for stop time $0 = v_0 - a t_s \Rightarrow t_s = \frac{v_0}{a}$.

Plugging this formula into formula for S, obtain: $t_s = 2\frac{S}{v_0} = 0.005\,s$. Hence, the acceleration is $|a| = \frac{v_0}{t_s} = \frac{100\,m/s}{0.005\,s} = 20\,000\,m/s^2$ (actually this acceleration is negative, but one needs the absolute value only). Hence, $|F| = m|a| = 0.005\,kg \cdot 20000\,m/s = 100\,N$.