② Catapult:

Total Initial Energy $= 2000\ W \times 2$

$= 2000 \frac{N.m}{s} \times 2 \times 60\ s.$

$= 240000\ N.m.$

Find / Energy

gaining Energy $= mgh + \frac{1}{2} I\omega^2$

$240000\ N.m = 50kg \times 9.8 \times 4m$

$+ \frac{1}{2}\left(\frac{1}{12} mL^2 + mh^2\right) \times \omega^2$

$240000\ N.m = 1962\ N.m + \frac{1}{2}\left[\left[\frac{1}{12} \times (50kg + 15kg) \times (4m)^2\right] + (50kg + 20kg) \times \left(\frac{4}{2}\right)^2\right] \times \omega^2$

$240000.00\ N.m = 1962\ N.m + 133.33\omega^2$

$240000\ N.m - 1962\ N.m = 133.33\omega^2$

$\omega = 42.25$ (21.126) $rad/s.$

So, Initial linear velocity,

$\omega = \frac{V}{r}$

$V = 42.25\ rad/s \times 4m$ (21.126 rad/s)

$= 169.01\ m/s.$

$= 85.04\ m/s$