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Answers

A 4.00 kg object is lifted above the surface until it has a potential energy of 300.0 J. (Assume Earth)

A) How much work was done to lift it.
Work = Change in energy = 300.0 J

B) How much power was needed to lift it in 2.00s?
Power = Work/time = 300.0 J/2.00 s = 150. watts

C) When dropped its final velocity just above the ground is ___? $PE_{TOP} = KE_{BOTTOM}$

$mgh = \frac{1}{2}mv^2$
$300J = \frac{1}{2}mv^2$
$600J = mv^2$
$v^2 = 600J/m$
$v^2 = 600J/4kg$
$v^2 = 150\ m^2/s^2$
$v = \sqrt{150\ m^2/s^2}$
$v = 12.24\ m/s$

D) Find its KE just before it hits the ground
$KE_{BOTTOM} = PE_{TOP} = 300J$

E) How long did it take to fall?
$V_f = V_i + at$
$V_f = 0 + gt$
$V_f = gt$
$\sqrt{150} = gt$
$t = \sqrt{150\ m^2/s^2}/9.80\ m/s^2$
$t = 12.24\ m/s / 9.80\ m/s^2$
$t = 1.2497 s = 1.25 seconds$

F) What height was it dropped from?
$PE = mgh$
$300J = (4kg)(9.8\ m/s^2)h$
$h = 300J/39.2N$
$h = 7.653\ m$