MC

(15) E Area of F vs x graph equals work and Work = change in energy, in this case Kinetic energy. Graph E has the greatest area

(21) C Power $P = \frac{W}{t} = \frac{F \cdot d}{t} = F \cdot v = \mu m g v$ since the force F equals friction

(34) C $U_0 + K_0 = K + E_{LOST}$

↑ we used Q for heat in class

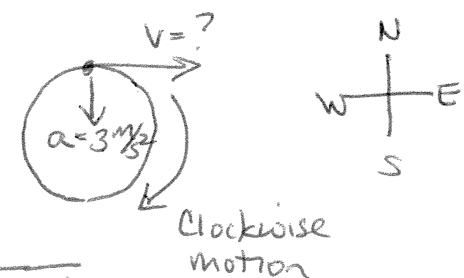
$$E_{Lost} = U_0 + K_0 - K = mgh + \frac{1}{2}mv_0^2 - \frac{1}{2}mv^2$$

$$E_{LOST} = 1(10)(70) + \frac{1}{2}(1)(10)^2 - \frac{1}{2}(1)(30)^2$$

$$E_{LOST} = 700 + 50 - 450 = \underline{300\ J}$$

(18) D Energy is conserved but K & U change during the oscillations $K + U = \text{Constant}$

(30) A Moving East so



and $a = \frac{v^2}{r}$

$\therefore\ v = \sqrt{ar} = \sqrt{(3\frac{m}{s^2})(300m)}$

$v = \underline{30\ m/s}$

(33) C Since $x = t^{3/2}$ $v = \frac{dx}{dt} = \frac{3}{2}t^{\frac{1}{2}}$

$K = \frac{1}{2}mv^2 = \frac{1}{2}m\left(\frac{3}{2}t^{\frac{1}{2}}\right)^2$ $\therefore\ K \propto t$

↑ proportional symbol

$K = \frac{9}{8}mt$

(9/8: constant)

MC CONTINUED

(8) D

Remember: $K = \frac{1}{2}mv^2$ and $p = mv$

momentum is conserved so $p_{Gun} = p_{Proj.}$

Combining the two eqns above $K = \frac{p^2}{2m}$

so $p = \sqrt{2mK}$

$\therefore$

GUN PROJ

$$\sqrt{2(M_2 - M_1)K_G} = \sqrt{2M_1K}$$

or $K_G = \frac{M_1}{M_2 - M_1} K$

(24) C

Position Q is upward, centripetal (inward) acceleration

Position R is downward, Gravity, $v = 0$ so there is no inward acceleration (centripetal)

(29) B

Horizontal bar is $\frac{1}{3}$ the total mass so it is $\frac{2}{3}$ the distance from the center of mass and the other two vertical bars are $\frac{1}{3}$ the distance since they are $\frac{2}{3}$ the mass