Ayman Ghannam
ch7-A

(A) (1)

(c) $\frac{1}{2}(2M)(3u)^2$

$= M\,9u^2$

(d) $\frac{1}{2}(m)\,16u^2$

$= 8Mu^2$

(2)

$8000\,N = m$

$12\,m/s = u_f$

$4s = t$

$? = \Delta k$

$\Delta k = \vec{F}\cdot\vec{d} =$

$u_k = 0$

$\frac{1}{2}m u_f^2 - \frac{1}{2}m u_i^2 = \Delta k$

$\frac{1}{2}m(12^2)$

(3)

$R = 0.5\,m$

$T = 16\,N$

$K_{max} = ?$

(a) $F_{net} = ma$

$T = \frac{mu^2}{R}$

$16 = \frac{m u^2_{max}}{R}$

~~$\frac{1}{2}m u^2_{max} = 16 = \frac{m u^2_{max}}{R}$~~

$16 \times 0.5 = m u^2_{max} = 8.$

$\therefore K_{max} = \frac{1}{2} m u^2_{max}$

$= \frac{1}{2}(8) = 4\,J$

(6)

Const speed $\Rightarrow a = 0$

$\Rightarrow F_{net} = 0$

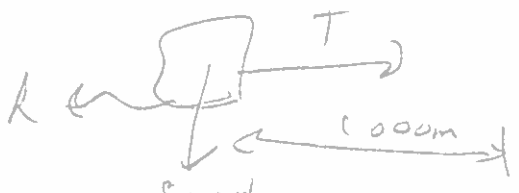
$\Rightarrow T = R$

$W_T = \vec{T}\cdot\vec{d}$

$= (\mu_k N)\cdot d$

$= 0.5\,(500)(1000)$

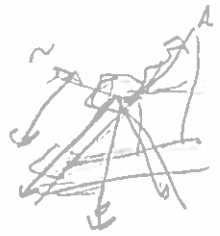
$= 2.5 \times 10^5\,J$



$\mu = 0.5$

(7) $W = \vec{F}\cdot\vec{d} = (4i + 3j - 4k)\cdot(5i) = 20\,J$

(8) $W_{net} = \Delta KE$



(12) $F = 4.1[4.6j - 4.7k]$

$m = 2.3\,kg$

$v_x = 7.2\,m/s$

work rate $\Rightarrow \frac{W}{t} \Rightarrow P = ?$

$P = \vec{F} \cdot \vec{v}$

$= (4.1E) \cdot (7.2)$

$\approx 30\,W$

$N = mg\cos\theta$

$F_{net} = mg\sin\theta - k = ma$

$F_{net} = mg\sin\theta -$

$v = v_0 + at$

$v^2 = v_0 + 2ax$

$= 0 + 2(5)(1.2)$

$\frac{v}{k} = 3.46$

$W = \Delta K = \frac{1}{2}m(3.46)^2$

$600\,J$

(9) $|\vec{v}_i|_0 = \sqrt{4^2+3^2} = 5\,m/s$ $\quad W = \Delta KE$

$|\vec{v}_f|_3 = \sqrt{2^2+3^2} = 3.61\,m/s$ $\quad = \frac{1}{2}m(v_f^2 - v_i^2) = \frac{1}{2}(2)[-25+13] = 12$

(10) $\therefore d = \frac{5}{\sin 30} = 10\,m$

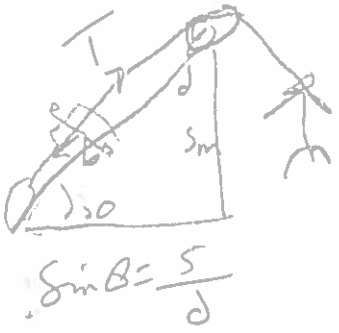
$T - mg\sin\theta = 0$

$\therefore T = mg\sin\theta$

$T = 100\sin 30 = 50\,N$

$W_T = \vec{F} \cdot \vec{d}$

$= (50)(10) = 500\,J$



$\sin\theta = \frac{5}{d}$

(11) $W = F_g \cdot d = (10\times10^3)(9.8)(40)$

$\approx 4\,J$