Version A

Quiz 5 Solutions

(1) (C) $KE = \frac{1}{2}mv^2 \rightarrow KE_C = \frac{1}{2}(2m)(3v)^2 = 9mv^2$

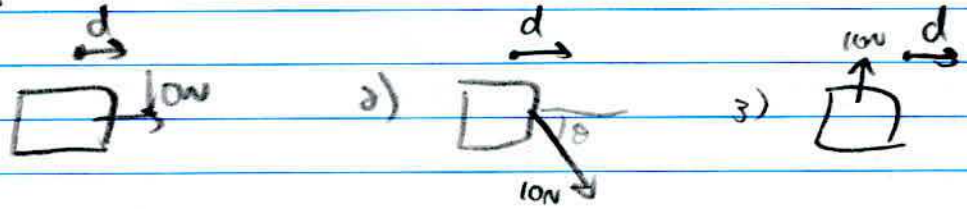
(2) 

$T = \frac{mv^2}{R} \rightarrow mv^2 = TR = 8\ kg\ m^2/s^2$

$KE = \frac{1}{2}mv^2 = 4\ J$

(3) 

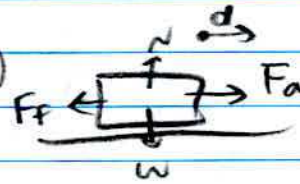
$a = 0 \quad W = Fd \rightarrow d = 0$ so $W = 0$

(4) 

1) $W = F \cdot d = (10)(10) = 100\ J$

2) $W = F \cdot d = (10)(10)\cos\theta < 100\ J$ so 1, 2, 3

3) $W = Fd = 0\ J$

(5) 

const. speed $\rightarrow \Sigma F = 0$

x) $F_a = F_f = \mu_K(mg) = 250\ N$

$W_{F_a} = \vec{F_a} \cdot \vec{d} = (F_a)(1000\ m) = (250\ N)(1000\ m) =$

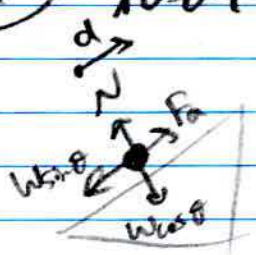
$2.5 \times 10^5\ J$

(6) 

$F > W\sin\theta \qquad F > W$

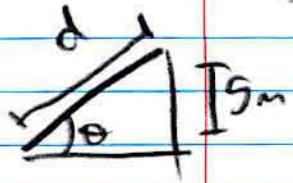
less force required

(7) $P = \frac{W}{\Delta t}$ ΔKE = 0 b/c const. speed



$W_{tot} = \Delta KE = 0$

$W_{tot} = W_{Fa} + W_g + W_N^{0} = 0$



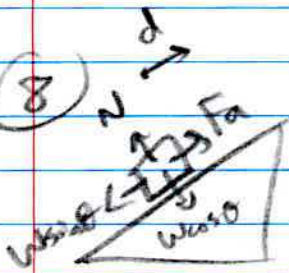
$W_g = \vec{F}_g \cdot \vec{d} = -(W\sin\theta)\left(\frac{5}{\sin\theta}\right) = -5mg$

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

$W_{Fa} = -W_g = 5(20.60\,kg)(9.8\,m/s^2) = 98{,}800\ J$

so $P_{Fa} = \frac{W_{Fa}}{\Delta t} \approx$ 1000 W

(8)



$W_{tot} = \Delta KE = 0$

$W_{tot} = W_{Fa} + W_g = 0$

$W_g = \vec{F}_g \cdot \vec{d}$

so $W_g = -(W\sin\theta)(d) = -100\ J$

$W_{Fa} = -W_g =$ 100 J