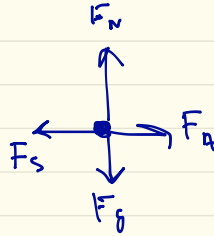


# Quiz # 6

#1.  $m = 0.90 \text{ kg}$

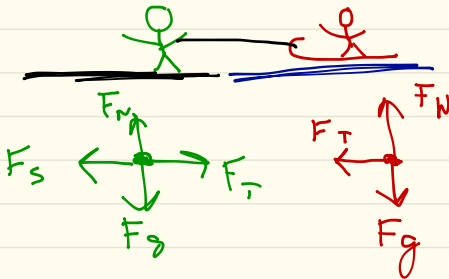
$\mu_s = 0.18$



$$\begin{aligned}
 F_A &= F_s \\
 &= \mu_s F_N \\
 &= \mu_s mg \\
 &= (0.18)(0.9 \text{ kg})\left(9.8 \frac{\text{m}}{\text{s}^2}\right)
 \end{aligned}$$

$F_A = 1.6 \text{ N}$

2.



①

$$\begin{aligned}
 F_T &= F_s \\
 &= \mu_s F_N \\
 &= \mu_s mg \\
 &= (0.70)(120 \text{ kg})\left(9.8 \frac{\text{m}}{\text{s}^2}\right)
 \end{aligned}$$

$F_T = 494 \text{ N}$

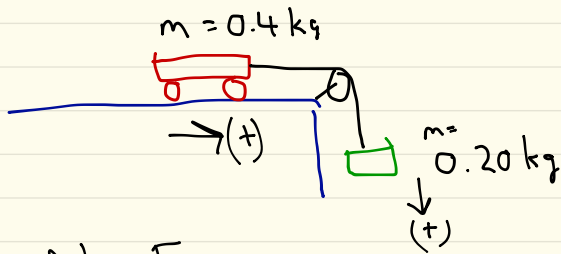
$F_T = 490 \text{ N}$

$$\begin{aligned}
 F_T &= F_{\text{NET}} \\
 F_T &= ma \\
 494 \text{ N} &= (120 \text{ kg}) a
 \end{aligned}$$

$$\vec{a} = \frac{494 \text{ N}}{120 \text{ kg}}$$

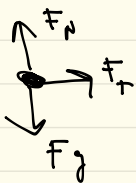
$a = 4.1 \text{ m/s}^2$

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# 40



a) No Friction

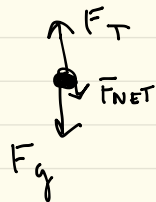
FBD CART



$$F_T = F_{NET}$$

$$F_T = ma$$

FBD of Mass



$$F_{NET} = F_g - F_T$$

$$ma = mg - F_T$$

$$\textcircled{1} F_T = (0.4 \text{ kg}) a \quad \textcircled{2} (0.2 \text{ kg}) a = (0.2 \text{ kg}) \left( \frac{9.8 \text{ m}}{\text{s}^2} \right) - F_T$$

subst.  $\textcircled{1}$  into  $\textcircled{2}$

$$\begin{aligned} (0.2 \text{ kg}) a &= (0.2 \text{ kg}) \left( \frac{9.8 \text{ m}}{\text{s}^2} \right) - (0.4 \text{ kg}) a \\ (0.2 \text{ kg}) a &= 1.96 \text{ N} - (0.4 \text{ kg}) a \end{aligned}$$

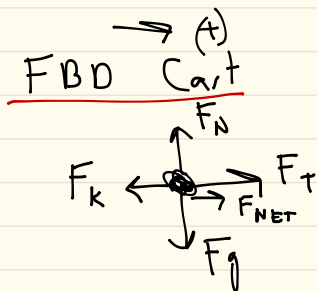
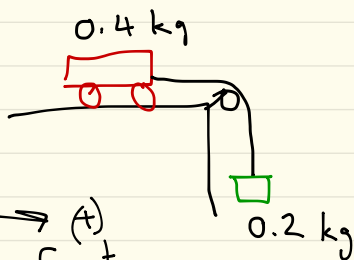
$$(0.6 \text{ kg})a = 1.96 \text{ N}$$

$$a = \frac{1.96 \cancel{\text{ kg}} \frac{\text{m}}{\text{s}^2}}{0.6 \cancel{\text{ kg}}}$$

$$a = 3.3 \text{ m/s}^2$$

$$a = 3 \text{ m/s}^2 \quad (1 \text{ sig dig})$$

b)



$$F_{\text{NET}} = ma$$

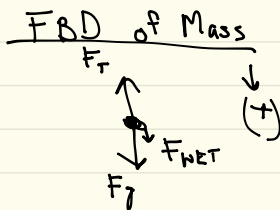
$$F_{\text{NET}} = F_T - F_k$$

$$ma = F_T - 0.10 \text{ N}$$

$$(0.4 \text{ kg})a = F_T - 0.10 \text{ N}$$

isolate  $F_T$

$$\textcircled{1} F_T = (0.4 \text{ kg})a + 0.10 \text{ N}$$



$$F_{\text{NET}} = ma$$

$$F_{\text{NET}} = F_g - F_T$$

$$ma = mg - F_T$$

$$\textcircled{2} (0.2 \text{ kg})a = (0.2 \text{ kg})\left(\frac{9.8 \text{ m}}{\text{s}^2}\right) - F_T$$

Subst.  $\textcircled{1}$  into  $\textcircled{2}$

① into ②

$$(0.2 \text{ kg})a = (0.2 \text{ kg})\left(9.8 \frac{\text{m}}{\text{s}^2}\right) - [(0.4 \text{ kg})a + 0.10 \text{ N}]$$

$$(0.2 \text{ kg})a = 1.96 \text{ N} - (0.4 \text{ kg})a - 0.10 \text{ N}$$

$$(0.6 \text{ kg})a = 1.86 \text{ N}$$

$$a = \frac{1.86 \text{ N}}{0.6 \text{ kg}}$$

$$a = 3.1 \text{ m/s}^2$$

$$a = 3 \text{ m/s}^2$$

$$\hookrightarrow F_T = (0.4 \text{ kg})a + 0.10 \text{ N}$$

$$F_T = (0.4 \text{ kg})\left(3.1 \frac{\text{m}}{\text{s}^2}\right) + 0.10 \text{ N}$$

$$F_T = 1.24 \text{ N} + 0.10 \text{ N}$$

$$F_T = 1.34 \text{ N}$$

$$F_T = 1 \text{ N}$$

# Test Prep

MC

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