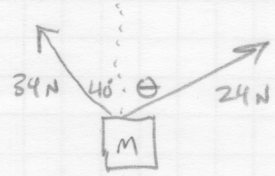
1)



$\Sigma F_x = ma_x^{\nearrow 0}$

$34 \sin 40 = 24 \sin \theta$

$\sin^{-1}\left(\frac{34 \sin 40}{24}\right) = \theta = 65.6°$

$\Sigma F_y = ma_y^{\nearrow 0}$

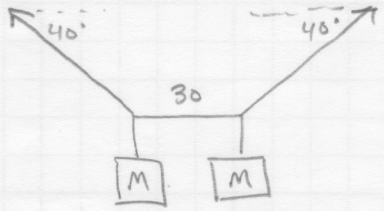
$34 \cos 40 + 24 \cos \theta = Mg$

$\frac{34 \cos 40 + 24 \cos(65.6)}{10} = M$

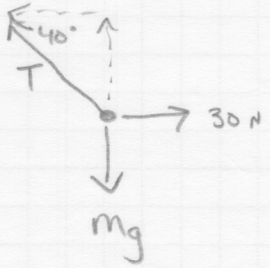
$3.6 = M$

D b/c "9.8"

2)



SPLIT IN HALF



$\Sigma F_x = ma_x^{\nearrow 0}$ $\Sigma F_y = ma_y^{\nearrow 0}$

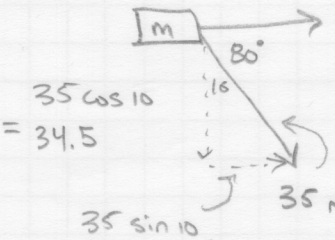
$T \cos 40 = 30$ $T \sin 40 = Mg$

$T = \frac{30}{\cos 40}$ $\frac{\left(\frac{30}{\cos 40}\right) \sin 40}{10} = M$

$2.52 = M$

C

3)



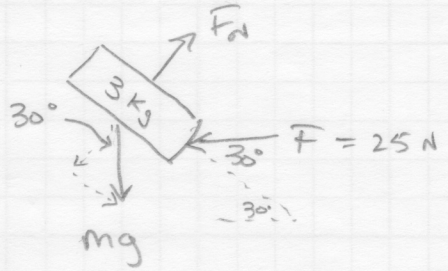
$a = 20 \frac{m}{s^2}$

$F_{NET} = \sqrt{F_x^2 + F_y^2} = ma$

$\frac{\sqrt{(26.1)^2 + (34.5)^2}}{a} = m$

B $2.16 \text{ kg} = m$

4)



$\Sigma F_x = ma_x$

$mg\sin 30 - F\cos 30 = ma$

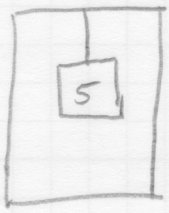
$30(.5) - 25\left(\frac{\sqrt{3}}{2}\right) = 3a$

A

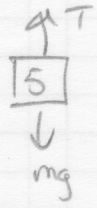
$\frac{15 - 21.65}{3} = a = -2.21 \frac{m}{s^2}$

↑ up ramp

5)



$a \uparrow 4 \frac{m}{s^2}$

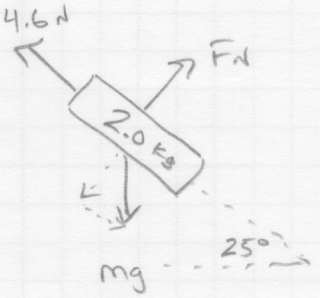


$\Sigma F_y = ma_y$

$T - mg = 5(4)$ A

$T = 20 + 50 = 70$ N

6)



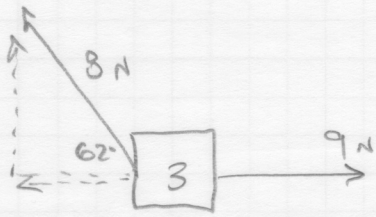
$\Sigma F_x = ma_x$

$mg\sin\theta - F = 2a$

$\frac{20\sin(25) - 4.6}{2} = a = 1.93 \frac{m}{s^2}$ down ramp

1D

7)



$\Sigma F = ma$

$\sqrt{F_x^2 + F_y^2} = ma$

$\frac{\sqrt{(9 - 8\cos 62)^2 + (8\sin 62)^2}}{3} = a$

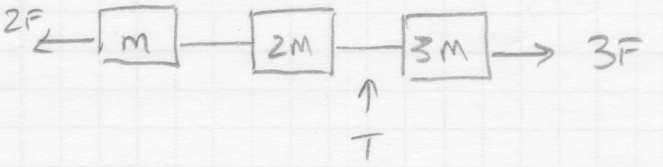
D

$2.93 \frac{m}{s^2} = a$

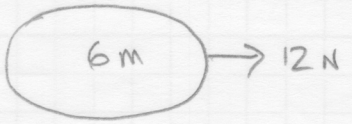
8) E

9) B

10)



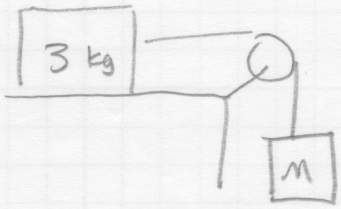
$F_{NET} = 1F \rightarrow$
$= 12\,N$



$a = \frac{12}{6m} = \frac{2}{m}$

$F_{NET} = 3m\left(\frac{2}{m}\right) = 6$ $\quad$ $T = 30$ $\quad$ B

11)



$\Delta x = 0.5\,m$

$t = 1\,s$

$V_0 = 0$

$\Delta x = \cancel{V_0 t}^{\,0} + \frac{1}{2}at^2$

$\frac{2(.5)}{1^2} = a = 1\ \frac{m}{s^2}$

"BLACK BAG"

Total Force = total mass (a)

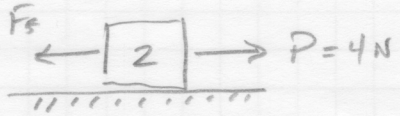
$Mg = (3+m)(1)$

$10m = 3 + m$

$9m = 3$

$m = \frac{1}{3}\,kg$ $\quad$ B

12)



I

$\Sigma F_x = ma_x$

$P - F_f = 2(1.2)$

$4 - 2.4 = F_f = 1.6\,N$

II

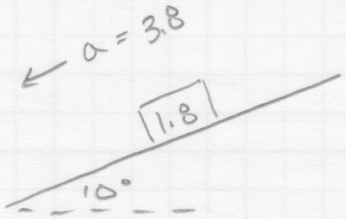
$\Sigma F = ma_x$

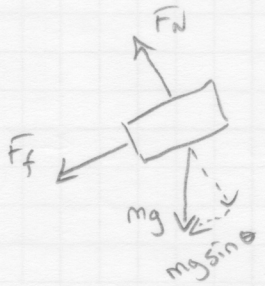
$5 - 1.6 = 2(a)$

$\frac{3.4}{2} = a = 1.7\,\frac{m}{s^2}$

D

13)





$\Sigma F_x = ma_x$

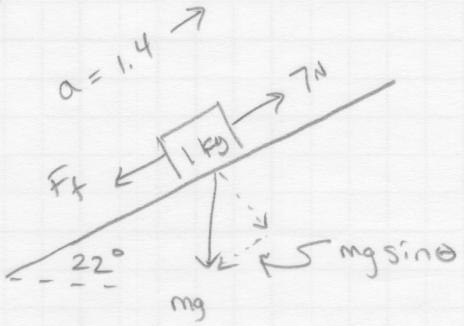
$F_f + mg\sin\theta = ma$

$f_f = 1.8(3.8) - 1.8(10)\sin 10°$

B

$F_f = 3.7\,N$

14)



$\Sigma F_x = ma_x$

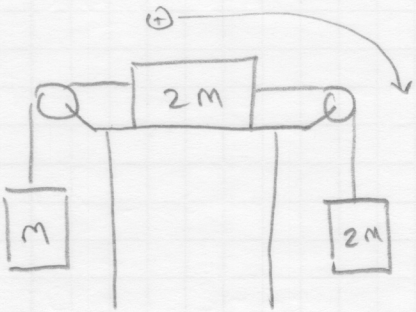
$7 - mg\sin\theta - F_f = ma$

$7 - 10\sin(22) - 1(1.4) = F_f$

A

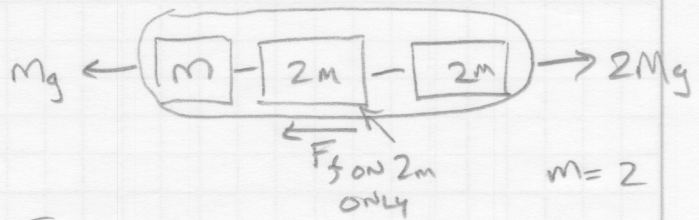
$1.85\,N = F_f$

15)*



a = 1.5

"BLACK BAG"



m = 2

IF WE USE g = 9.8

$2(9.8) - F_f = 5(2)(1.5)$

$F_f = 4.6$

D

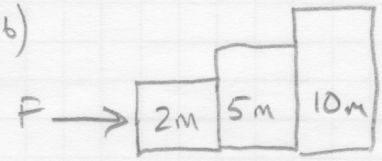
$F_{NET} = m_{TOT}(a)$ (using g=10)

$20 - F_f = 5(2)(1.5)$

$F_f = 5\,N$

B* NOT REALLY

16)

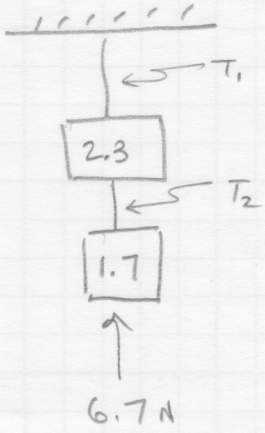


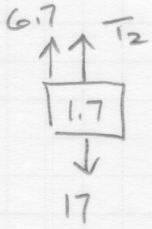
F pushes on 17 m

Since the 2m block pushes 15 m total but the 5m block only pushes 10 m and all blocks have the same acceleration.

$F > F_{N_{2-5}} > F_{N_{5-10}}$ **D**

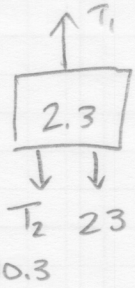
17)





$T_2 = 17 - 6.7$

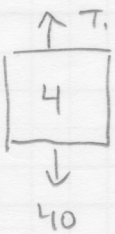
$T_2 = 10.3$



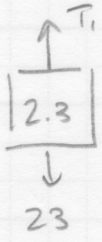
E

$T_1 = 33.3$

18) w/o 6.7 N PUSH ON ABOVE



$T_1 = 40$ before cut



$T_1 = 23$ AFTER CUT

D

A)

$\Sigma F = ma$ F_{fs} is only horizontal Force

$\mu_s mg\cos\theta = ma$

$(0.3)(10)\cos 0° = a = \boxed{3\ \frac{m}{s^2}}$ **D**