ANSWERS

Extra Review Questions: Simple Forces

1) ① Find a

$F_{net} = F_f$

$F_{net} = ma$

$a = \frac{F_{net}}{m}$

$= \frac{9500\,N}{0.055\,kg}$

$a = 172727\,m/s^2$

② $a = -172727\,m/s^2$

$v_f = 0$

$v_i = 250\,m/s^2$

$\Delta d = ?$

$v_f^2 = v_i^2 + 2a\Delta d$ ($v_f = 0$)

$\Delta d = \frac{-v_i^2}{2a}$

$= -\frac{(250\,m/s)^2}{2(-172727\,m/s^2)}$

$= 0.18\,m$

2) 

② $F_g = F_a + F_N$

$F_N = F_g - F_a$

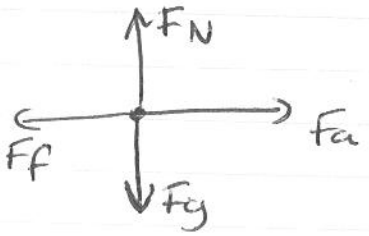
$= 147N - 100N$

$= 47N$

① $F_g = mg$

$= (15\,kg)(9.8\,\frac{m}{s^2})$

$= 147N$

3) 

① $F_g = mg$
$= (25N)(9.8 m/s^2)$
$= 245 N$

② $F_{net} = ma$
$= (25 kg)(1.8 m/s^2)$
$= 45 N$

③ $F_N = F_g = 245N$

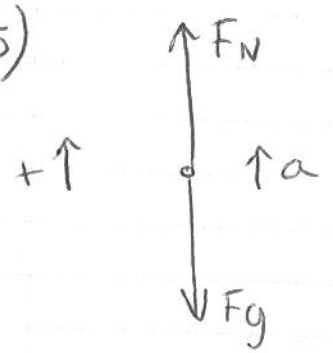
④ $F_{net} = F_a - F_f$
$F_f = F_a - F_{net}$
$= 120N - 45N$
$= 75N$

⑤ $F_f = \mu F_N$
$\mu = \frac{F_f}{F_N}$
$= \frac{75N}{245N}$
$= \underline{0.31}$

4) Say $F = 20N$
$a = 4.0 m/s^2$
So $m = 5 kg$

Now if $F = 20N$
$2m = 10 kg$
$a = \frac{F}{m} = \frac{20N}{10kg} = \underline{2 m/s^2}$

5)

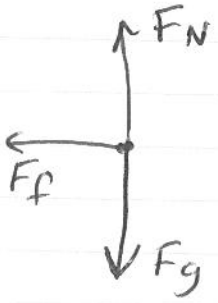


① $F_g = mg$
$= (58.0\,kg)(9.8\,m/s^2)$
$= 568.4\,N$

② $F_{net} = ma$
$= (58.0\,kg)(1.10\,m/s^2)$
$= 63.8\,N$

③ $F_{net} = F_N - F_g$
$F_N = F_{net} + F_g$
$= 63.8\,N + 568.4\,N$
$= \underline{632.2\,N}$

6)



① $F_{net} = ma$
$= (45kg)(0.53 m/s^2)$
$= 23.85 N$
$= F_f$

② $F_f = \mu F_N$
$\mu = \frac{F_f}{F_N}$
$= \frac{23.85 N}{441 N}$
$= \underline{\underline{0.054}}$

$F_g = mg$
$= (45kg)(9.8 \frac{m}{s^2})$
$= 441 N$

7)

① $F_g = mg$
$= (0.50kg)(9.8 m/s^2)$
$= 4.9 N$

② $F_{net} = ma$
$= (0.5kg)(8.5 m/s^2)$
$= 4.25 N$

③ $F_{net} = F_g - F_{air}$
$F_{air} = F_g - F_{net}$
$= 4.9N - 4.25N$
$= \underline{\underline{0.65 N}}$

8)

① $F_g = mg$
$= (3.00\,kg)(9.8\,m/s^2)$
$= 29.4\,N$

② $F_{net} = ma$
$= (3.0\,kg)(2.80\,m/s^2)$
$= 8.4\,N$

③ $F_{net} = T - F_g$
$T = F_{net} + F_g$
$= 29.4\,N + 8.4\,N$
$= \underline{\underline{37.8\,N}}$