May 22, 2018

1) answers #9-17 WS

2) In Class Assignment

Test Thurs May 31

Dec 6-2:41 PM

9. $m = 100kg$
$F_a = 1040N$
$a = ?$

(+) ↑ 1040N

(-) ↓ $|F_g| = mg$
$F_g = (100)(9.81)$
$F_g = 981\ N$

$F_{net} = F_a + F_g$
$F_{net} = 1040 + (-981)$
$F_{net} = 59N$

$F_{net} = ma$
$\frac{59}{100} = \frac{100a}{100}$
$0.59 m/s^2 = a$

10. $F_g = 3000N$
$a = 1.5 m/s^2$
$F_a = ?$

↑ F_a

•

↓ F_g

$F_g = mg$
$\frac{3000}{9.81} = \frac{m(9.81)}{9.81}$
$306kg = m$

$F_{net} = ma$
$F_{net} = (306)(1.5)$
$F_{net} = 459\ N$

$F_{net} = F_g + F_a$
$459 = -3000 + F_a$
$+3000 \quad +3000$
$3459 = F_a$

11. $m = 873\,kg$
$v_0 = 0\,m/s$
$v_f = 26.3\,m/s$
$t = 0.59\,s$

a) $a = \frac{v_f - v_0}{t}$
$a = \frac{26.3 - 0}{0.59}$
$a = \frac{26.3}{0.59}$
$a = 44.6\,m/s^2$

b) $F = ma$
$F = (873)(44.6)$
$F = 38\,934\,N$

c) $m_{driver} = 68\,kg$
$F_{seatbelt} = ?$

$F = ma$
$F = (68)(44.6)$
$F = 3033\,N$

12. $a = -6500\,m/s^2$
$m = 0.70\,kg$

$F_{net} = ma$
$F_{net} = (0.70)(-6500)$
$F_{net} = -4550\,N$

13. $m = 1550\,kg$
$v_0 = 10\,m/s$
$v_f = 30\,m/s$
$t = 10\,s$
$F_{avg} = ?$

$a = \frac{v_f - v_0}{t}$
$a = \frac{30 - 10}{10}$
$a = \frac{20}{10}$
$a = 2\,m/s^2$

$F_{net} = ma$
$F_{net} = (1550)(2)$
$F_{net} = 3100\,N$

14. $m = 710kg$
$v_0 = 0m/s$
$d_f = 40m$
$t = 3.0s$
$d_0 = 0m$

$d_f = d_0 + v_0t + \frac{1}{2}at^2$

$40 = 0 + (0)(3) + \frac{1}{2}a(3)^2$

$40 = 0 + \frac{1}{2}a9$

$\frac{40}{4.5} = \frac{4.5a}{4.5}$

$8.89 m/s^2 = a$

$F_{net} = ma$
$F_{net} = (710)(8.89)$
$F_{net} = 6312 N$

15. $F = -9000N$
$m = 1500kg$
$d_0 = 0$
$v_f = 0$
$v_0 = 20m/s$
$d_{braking} = ?$

$F_{net} = ma$

$\frac{-9000}{1500} = \frac{1500a}{1500}$

$6 = a$

$v_f^2 = v_0^2 + 2a(d_f - d_0)$

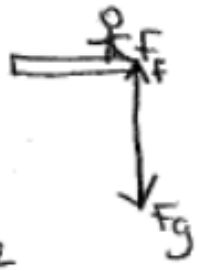
$(0)^2 = (20)^2 + 2(6)(0 - d)$

$-400 0 = 400 + 12d - 400$

$\frac{-400}{12} = \frac{12d}{12}$

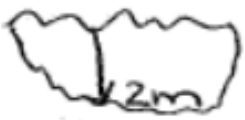
$33 = d$

16a) $m = 65\,kg$
$d = 10\,m$
$v_0 = ?$
$v_f = 0\,m/s$
$a = -9.81\,m/s^2$



$v_f^2 = v_0^2 + 2a(d_f - d_0)$
$0^2 = v_0^2 + 2(-9.81)(10)$
$0 = v_0^2 + -196.2$
$196.2 = v_0^2$
$-14\,m/s = v_0$ or $14\,m/s$ down

b) $v_i = -14\,m/s$
$v_f = 0\,m/s$
$d_f = -2\,m$
$m = 65\,kg$
$d_0 = 0\,m$



$v_f^2 = v_0^2 + 2a(d_f - d_0)$
$(0) = (-14)^2 + 2a(2)$
$0 = 196 + 4a$
$\frac{-196}{4} = \frac{4a}{4}$
$49 = a$

$F_{net} = ma$
$F_{net} = (65)(49)$
$F_{net} = 3185\,N$

17. $m = 825\ kg$
$v_0 = 62\ m/s\ [E]$
$v_f = 25\ m/s\ [W]$
$t = 9.5\ s$

a) $a = \frac{v_f - v_0}{t}$

$a = \frac{-25 - 62}{9.5}$

$a = \frac{-87}{9.5}$

$a = -9.16\ m/s^2$

$F_{net} = ma$

$F_{net} = (825)(-9.16)$

$F_{net} = -7557\ N$

b) $d_0 = 0\ m$
$d_f = ?$

$v_f^2 = v_0^2 + 2a(d_f - d_0)$

$(-25)^2 = (62)^2 + 2(-9.16)(d_f)$

$625 = 3844 + -18.32d_f - 3844$

$\frac{-3219}{-18.32} = \frac{-18.32d_f}{-18.32}$

$176\ m\ [E] = d_f$

Newtons Law Assignment

Nov 30-3:14 PM