Question 1

mass = 15.5g

Speed = 441.0 m/s

1 kg — 1000 g

— 15.5g = $\frac{15.5}{1000}$ = 1.55×10^{-2} kg

K.E = $\frac{1}{2} mv^2$

= $\frac{1}{2} \times 1.55 \times 10^{-2}$ kg $\times (441.0)^2 \times \frac{m^2}{s^2}$

= 1507.23 kg $m^2 s^{-2}$

= ~~1507.23 J~~ 1507 J

Question 2

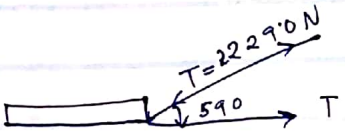
$F_s = -kx$

$-k = \frac{F_s}{x} = \frac{11.0\ N}{37.5\ cm} = 0.293\ N/cm$

F_s = 0.293 x 77.0

= 22.6 N

Question 3



distance moved = 992.5m

W = F x s

T = 2229.0N x Cos 59°

= 1148.0N

W = 1148.0N x 992.5m = 1.139×10^6 Nm

= 1.139×10^6 T

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Question 4

55.0 slug automobile

1 slug – 14.56 kg

55.0 slug

$= (55.0 \times 14.56)\ kg$

$= 801\ kg$

Question 5

Mass: 132.35 kg

distance: 84.00 m

$W = F \times d$

$F = mg$ where $g_R = 9.8\ m/s^2$

$F = 132.35 \times 9.8$

$= 1297.03\ N$

$W = 1297.03\ N \times 84.00\ m$

$= 109000\ N_m$

$= 109000\ J$

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Question 6

Weight: 165.00 lb

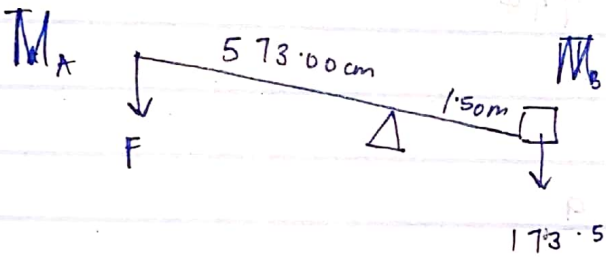
Area of each boot: 27.00 in^2

$$\text{Stress} = \frac{F}{A} = \frac{165.00\ lb}{2(27.00)\ in^2}$$

$$= 3.056\ lb/in^2$$

$$= 3.056\ psi$$

Question 7



$W = mg$

$= (173.50 \times g)\ N$

$M_A = F_A \times 5.73\ m$

$M_B = 173.50g\ N \times 1.50\ m$

$M_A = M_B$; $173.50g\ N \times 1.50\ m = F_A\ N \times 5.73m$

$$F_A = \frac{173.50 \times 9.8 \times 1.50}{5.73}$$

$$= 445\ N$$

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Question 8

$T = 29.5^\circ F = -1.389^\circ C = -1.39^\circ C$

$R.T = 77.5^\circ F = 25.3^\circ C$

$CSA = 27.5 \times 41.0 = 1127.5\ in^2$

$$Q = \frac{K A t \Delta T}{L} = \frac{0.023 \times 1127.5 \times 48}{\left(\frac{2.0}{12}\right) \times (12 \times 12)}$$

$$= \frac{52}{744} = 0.07\ Btu/hr$$

Question 9

$r = 4cm$

$T = 18.50$

$T = F_r$

$18.50 = F \times 4$

$F = \frac{18.50}{4} = 4.625\ N$

Question 10

$W = 778.50\ lb \qquad \mu = 0.39$

$F_f = \mu \cdot F_N$

$= 0.39 \times 778.50$

$= 303.62\ lb$

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