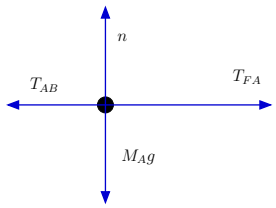
PHYS 206 – Spring 2019 – Exam II

All *University Physics* Sections

Problem 1:

a) $\vec{a} = 3$ m/s^2 to the right [LO 21.1]

b) [LO 23.1, 24.1, 26.1]



c) $T_{AB} = 150$ N [LO 21.2, 24.2]

d) $T_{BC} = 90$ N [LO 21.3, 24.3]

e) $T_{AF} = -180$ N [LO 22.1]

Problem 2:

a) [LO 23.2, 26.2]

b) $\vec{F} = 0.04$ N downwards [LO 3.1, 10.1, 10.2, 14.1, 21.4, 22.2]

c) $h_{\text{max}} = 0.8$ m [LO 3.2, 34.1, 38.1, 40.1]

Problem 3:

a) In the $+\hat{i}$ direction (right) [LO 44.1]

b) In the $-\hat{i}$ direction (left) [LO 44.2]

c) There is no force [LO 44.3]

d) $x = +3$ m [LO 34.2, 40.2, 41.1]

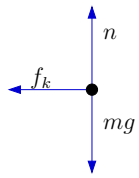
e) $x = 3$ m and $x = 6$ m [LO 41.2, 42.1]

f) $x = 5$ m [LO 41.3, 42.2]

g) $x_{\text{max}} = 7$ m if it started from A, 4 m if from B, and 6 m if from D [LO 42.3, 43.1, 43.2, 43.3]

Problem 4:

a) [LO 23.3, 26.3, 28.1]



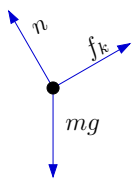
b) $\vec{a} = -5\hat{i}$ m/s^2 (in negative x-direction) [LO 3.3, 13.1, 21.5, 28.2]

c) i) $v_0 = 30$ m/s [LO 3.4, 10.3]

ii) $v_0 = 30$ m/s [LO 14.2, 32.1, 34.3, 39.1]

d) No, the driver was speeding [LO 6.1]

Problem 5: a) [LO 23.4, 26.4, 28.3]



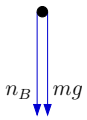
b) $W_{\text{grav}} = mgd\sin\theta$ [LO 32.2, 32.5]

c) $W_{\text{friction}} = -\mu_k mgd\cos\theta$ [LO 28.4, 32.3]

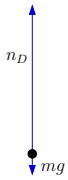
d) $v = \sqrt{2gd(\sin\theta - \mu_k\cos\theta)}$ [LO 3.5, 34.4, 39.2]

e) $x = \sqrt{\frac{2mgd}{k}(\sin\theta - \mu_k\cos\theta)}$ [LO 3.6, 32.4, 38.3, 40.3]

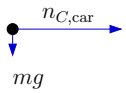
Problem 6: a) $K_B = mgR$ and $\vec{n}_B = -mg\,\hat{j}$ (downwards) [LO 18.1, 23.5, 26.5, 34.5, 38.4, 40.4]



b) $K_D = 3mgR$ and $\vec{n}_D = 7mg\,\hat{j}$ (upwards) [LO 18.2, 23.6, 26.6, 34.6, 38.5, 40.5]



c) $K_D = 2mgR$ and $\vec{n}_D = 4mg\,\hat{i}$ (to the right) [LO 18.3, 23.7, 26.7, 34.7, 38.6, 40.6]



d) $n_{\text{car},C} = -4mg\,\hat{i}$ (to the left) [LO 22.3]

e) $\vec{a} = (4\hat{i} - \hat{j})g$, [LO 13.2, 17.1, 18.4, 21.6]
or $a_x = 4g$ to the right and $a_y = g$ down

f) $h = \frac{5}{2}R$ [LO 6.2, 18.5, 21.7, 38.7, 40.7]