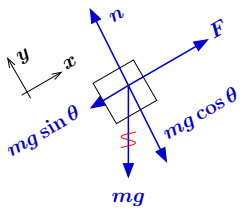
Phys 206 – Fall 2019

All *University Physics* Sections

Exam II

Short answer

A) i) [LO 9.1, 23.1, 26.1]



ii) $v_f = +\sqrt{2L\left(\frac{F}{M} - g\sin\theta\right)}$ [LO 1.1, 5.1, 14.1, 15.1, 21.1, 23.2]

B) $v_f = +\sqrt{2L\left(\frac{F}{M} - g\sin\theta\right)}$ [LO 5.2, 32.1, 34.1, 38.1, 39.1, 40.1]

C) i) $\vec{v}(t) = \frac{\vec{F}t}{m}$ (in same direction as $\vec{F}$) [LO 6.1, 12.1, 13.1, 14.2, 15.2, 21.2]

ii) $P = \frac{F^2 t}{m}$ [LO 2.1, 33.1]

iii) $f_k = \mu_k mg$ [LO 21.3, 23.3, 26.3, 28.1]

Problem 1:

a) $F_x = +\frac{C}{x^2}$ [LO 8.1, 36.1, 37.1]

b) $a_x = \frac{C}{mx^2}$ is not constant [LO 15.3, 21.4]

c) $W = C\left(\frac{1}{x_0} - \frac{1}{x}\right)$ is positive since $\Delta K > 0$ [LO 32.2, 36.2, 37.2, 37.3]

d) $K_\infty = \frac{C}{x_0}$ and $v_\infty = \sqrt{\frac{2C}{mx_0}}$; energy is conserved [LO 6.2, 34.2, 39.2, 40.2]

Problem 2:

a) $W_1 = -\frac{1}{4}mv_0^2$ [LO 32.3, 34.3, 39.3]

b) $\mu_k = \frac{v_0^2}{8\pi r g}$ [LO 3.1, 16.1, 21.5, 23.4, 26.4, 28.2, 32.4, 36.3]

c) $a_{\text{rad}} = \frac{v_0^2}{2r}$ [LO 18.1]

d) $P = -\frac{1}{\sqrt{2}}\left(\mu_k mg v_0\right)$ [LO 3.2, 28.3, 33.2]

e) 1 more revolution [LO 6.3, 34.4, 39.4]

Problem 3:

a) [LO 23.5, 25.1]

b) $\Delta y = 2$ cm [LO 3.3, 10.1, 21.6, 23.6, 25.2]

c) $n_{\text{scale}} = 17$ N [LO 3.4, 21.7, 23.7, 26.5]

d) $U_{\text{el}} = 0.02$ J [LO 38.2]

e) $y = -6$ cm and $|F_{\text{el}}| = 6$ N [LO 3.5, 5.3, 5.4, 9.2, 10.2, 25.3, 38.3, 38.4, 40.3]