Name_____ SP211 Quiz

1. (3) A stereo turntable turns at 33 1/3 rev/min. What is the period for one revolution?

$$f = \left(33\tfrac{1}{3}\ \frac{\text{rev}}{\text{min}}\right)\left(\frac{1\ \text{min}}{60\text{s}}\right) = .55\overline{5}\ \frac{\text{rev}}{\text{s}}$$

$$T = \frac{1}{f} = \frac{1}{.555\ \frac{\text{rev}}{\text{s}}} = 1.8\ \frac{\text{s}}{\text{rev}}$$

2. (3) A penny is placed on the turntable 10.0 cm from the axis of rotation. What is the speed of the penny?

$$v = \frac{2\pi r}{T} = \frac{2\pi(.1\text{m})}{1.8\text{s}} = .349\ \frac{\text{m}}{\text{s}} = .111\pi\ \frac{\text{m}}{\text{s}}$$

$$v = r\omega = (.1\text{m})\left(33.333\ \frac{\text{rev}}{\text{min}}\right)\left(\frac{2\pi\ \text{rad}}{\text{rev}}\right)\left(\frac{1\ \text{min}}{60\text{s}}\right) = .349\ \text{m/s}$$

$$v = 20.9\ \text{m/min}$$

3. (3) What is the centripetal acceleration of the penny?

$$a_c = \frac{v^2}{r} = \frac{\left(.349\ \frac{\text{m}}{\text{s}}\right)^2}{.1\ \text{m}} = 1.22\ \text{m/s}^2 = .12\pi^2\ \frac{\text{m}}{\text{s}^2}$$

$$a_c = 1.22\ \frac{\text{m}}{\text{s}^2}\ \frac{(60\text{s})^2}{1\text{m}^2} = 4.38 \times 10^5\ \frac{\text{cm}}{\text{min}^2}$$

4. (1) What force causes the centripetal acceleration on this penny?

FRICTION