Phys 101 – Sec # 2 **Quiz # 3 (Ch. 4)**

Name: Key **ID #** **SN #**

1- A particle leaves the origin with an initial velocity $\vec{v}_0 = (3\hat{i})$ m/s and constant acceleration $\vec{a} = (-\hat{i} - 5\hat{j})$ m/s^2.

What is the particles **velocity** when it reaches its maximum x-coordinate?

$v_{0x} = 3 \frac{m}{s}$, $a_x = -1 \frac{m}{s^2}$, $v_{0y} = 0$, $a_y = -5 \frac{m}{s^2}$

at max. x-coordinate $\boxed{v_x = 0}$

use: $v_x = v_{0x} + a_x t$

$0 = 3 - (1)t \Rightarrow t = 3\ s.$

then use $v_y = v_{0y} + a_y t = 0 - 5(3) = -15 \frac{m}{s}$

$\vec{v}_f = v_x \hat{i} + v_y \hat{j} = \boxed{-15\ \hat{j}\ \frac{m}{s}}$

2- An astronaut is rotated in a horizontal centrifuge at a radius of 5 m. What is the astronaut's speed if the centripetal acceleration has a magnitude of 7g? (Where g = 9.8 m/s^2). Find the Period.

$a = \frac{v^2}{r}$

$v = \sqrt{ar} = \sqrt{7(9.8)(5)}$

$= \boxed{18.5 \frac{m}{s}}$

Period $= \frac{\text{Circumference}}{v} = \frac{2\pi r\ (m)}{18.5\ (\frac{m}{s})} = \frac{31.4}{18.5} = \boxed{1.7\ s}$