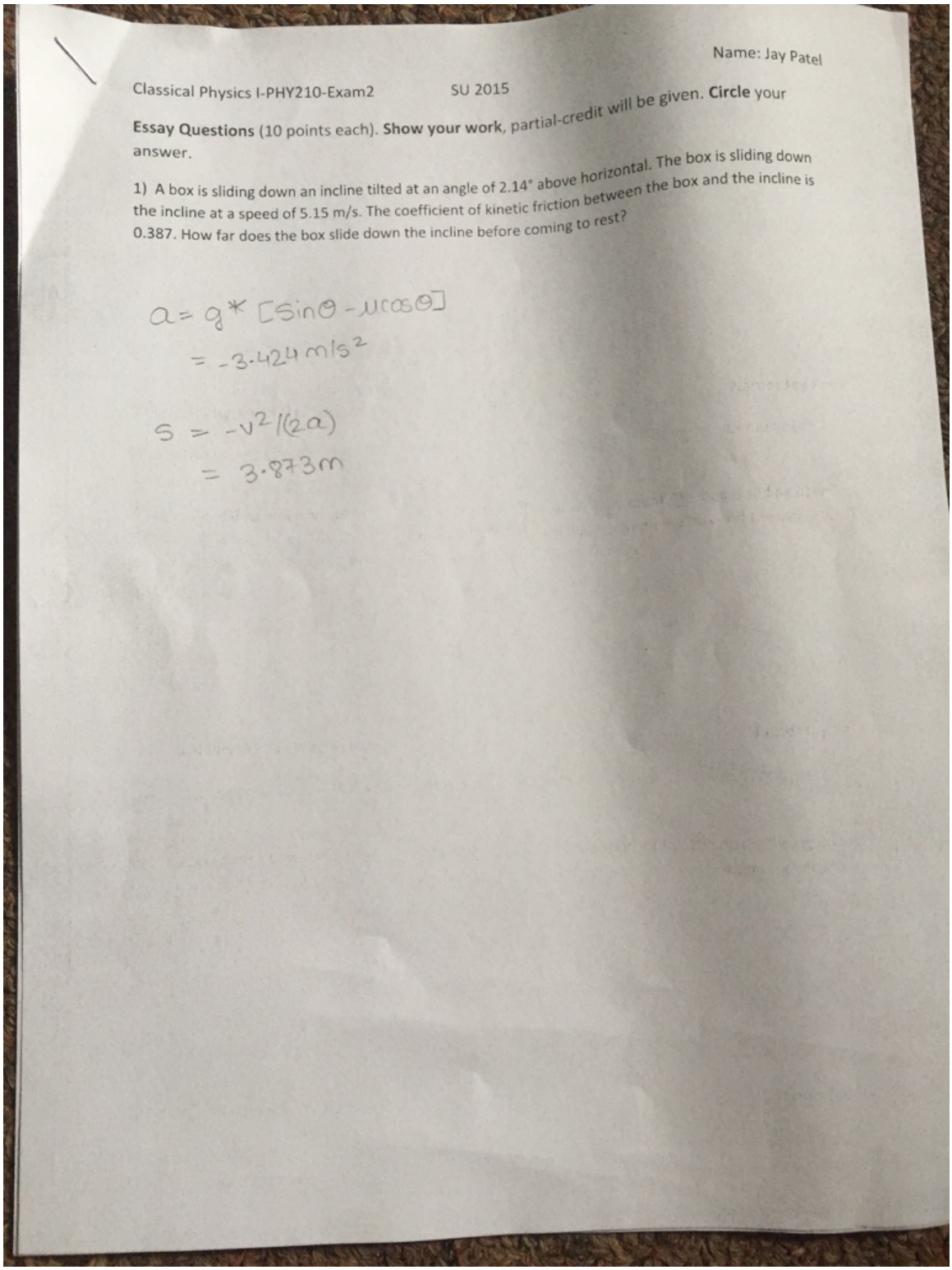
Essay Exam 2, Jay Patel, Classical Physics1 OL01 Professor Van, Huett



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Classical Physics I-PHY210-Exam2 SU 2015

Essay Questions (10 points each). **Show your work**, partial-credit will be given. **Circle** your answer.

1) A box is sliding down an incline tilted at an angle of 2.14° above horizontal. The box is sliding down the incline at a speed of 5.15 m/s. The coefficient of kinetic friction between the box and the incline is 0.387. How far does the box slide down the incline before coming to rest?

$a = g * [\sin\theta - \mu\cos\theta]$

$= -3.424\ m/s^2$

$s = -v^2/(2a)$

$= 3.873m$

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2) A rifle bullet with a mass of 15 g, traveling with a speed of 425 m/s, strikes a large wooden block and penetrates it to a depth of 18 cm. Determine the magnitude of the frictional force (assumed constant) that acts on the bullet.

$a = v^2/(2x)$

$= 425^2/(2*0.18)$

$= 501736\ m/s^2$

$Fav = m*a$

$= 7526\ N$

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3) A 125-kg sled is dragged by a team of dogs a distance of 2 km over a horizontal surface at a constant velocity. If the coefficient of friction between the sled and the snow is 0.15, find

(a) the work done by the team of dogs and

(b) the energy lost due to friction.

Work = Ff * d
Ff = 0.15 * 125 * 9.8
= 183.75N

a. W = μmgs
= 0.15 * 125 * 9.8 * 2000

So, work = 183.75 * 2000
= 375 KJ

b] E = -W
So energy lost due to the friction is the work done by the friction which is also 375 KJ