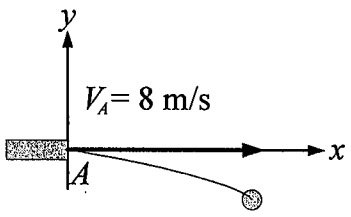
題號： 249　　國立臺灣大學 108 學年度碩士班招生考試試題

科目： 動力學(C)

節次： 2

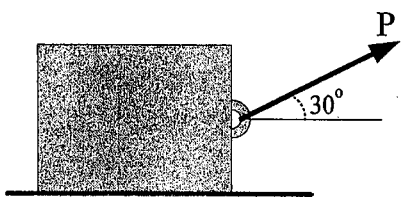
1. (20%)

The ball is rejected horizontally from the tube with a speed of 8 m/s. Find the equation of the path $y = f(x)$, and then determine the ball's velocity, the normal and the tangential components of acceleration when $t = 0.25\ s$.



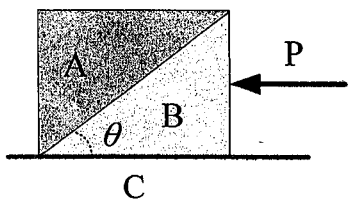
2. (20%)

If the coefficient of kinetic friction between the 50 Kg crate and the ground is $\mu = 0.3$, determine the distance the crate travels and its velocity when $t = 3$ s. The create starts from rest, and P=200 N.



3. (20%)

Blocks **A** and **B** each have a mass m. Determine the largest horizontal force **P** which can be applied to **B** so that **A** will not slip on **B**. The coefficient of static friction between **A** and **B** is μ, Neglect friction between B and **C**.



4. (20%)

If the engine of a 1.5-Mg car generates a constant power of 15 kW, determine the speed of the car after it has traveled a distance of 200 m on a level road starting from rest. Neglect friction.

5. (20%)

A four-engine commercial jumbo airplane is cruising at a constant speed of 800 km/h in level flight when all four engines are in operation. Each of the engines is capable discharging combustion gases with a velocity of 775 m/s relative to the airplane. If during a test two of the engines, one on each side of the plane, are shut off, determine the new cruising speed of the airplane. Assume that air resistance (the drag) is proportional to the square of the speed, $Drag = cv^2$, where c is a constant to be determined from the force balance. Neglect the loss of mass due to fuel consumption.

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