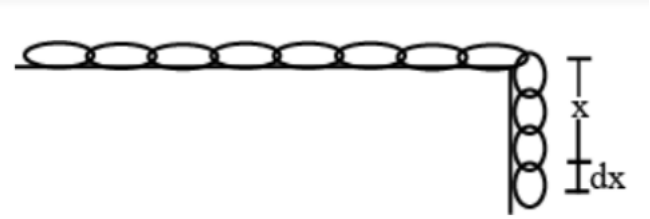
Tutorial 5 PHY 101

(MONSOON 2024)

Q1. Question: A block of mass 5 kg resting on a 30 degree inclined plane is released. The block after travelling a distance of 0.5 m along the inclined plane hits a spring of stiffness 15N/cm. Find the maximum compression of the spring. Assume the coefficient of friction between the block and inclined plane as 0.2.

Q2. If $\vec{F} = 3xy\hat{\imath} - y^2\hat{\jmath}$ evaluate work done $\int \vec{F}.\overrightarrow{dr}$ along the curve C in xy plane given by the equation $y = 2x^2$ in the limit (0,0) to (1,2).

Q3. 3. A uniform chain of length l and mass m overhangs a smooth table with its two third part lying on the table. Find the kinetic energy of the chain as it completely slips off the table.



Q4. A spherical object with a radius of 5 cm is moving through a viscous fluid. The fluid's viscosity is 0.1 Pa·s, and the object is moving with a constant velocity of 0.02 m/s. Calculate the viscous force acting on the object. (Hints: The formula for viscous force by Fv=6πηrv, Symbols have their usual meanings)

Q5. A ball is thrown upward with an initial velocity Vo from the surface of the earth. The motion of the ball is affected by a drag force equal to $m\gamma v^2$ (where m is the mass of the ball, v is its instantaneous velocity and γ is a constant). Calculate time taken by the ball to rise to its zenith.