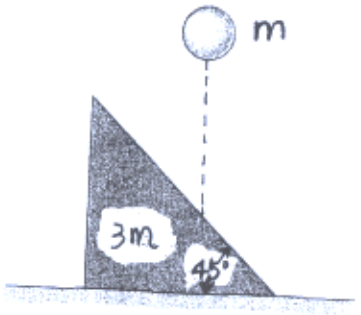
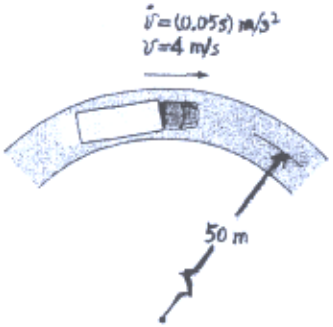
93學年度國立成功大學研究所招生考試 系統及船舶機電工程學系 乙組 動力學 試題 共 2 頁 第 1 頁

每題 20 分

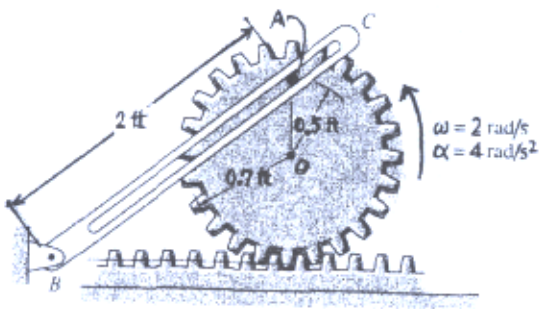
1. The sphere of mass **m** falls and strikes the triangular block with a vertical velocity **V**. If the block rests on a smooth surface and has a mass 3 m, determine its velocity just after the collision. The coefficient of restitution is **e**.



2. The truck travels in a circular path having a radius of 50 m at a speed of 4 m/s. For a short distance s = 0, its speed is increased by $\dot{v} = (0.05s)\ m/s^2$, where s is in meters. Determine its speed and the magnitude of its acceleration when it has moved s = 10 m.

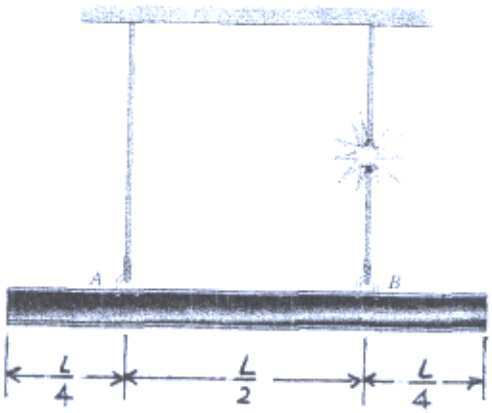


3. The gear has the angular motion shown. Determine the angular velocity and angular acceleration of the slotted link BC at this instant. The peg at A is fixed to the gear.



(背面仍有題目,請繼續作答)

4. The uniform beam has a weight W. If it is originally at rest while being supported at A and B by cables, determine the tension in cable A if cable B suddenly fails. Assume the beam is a slender rod.



5. The dresser has a weight of 80 lb and is pushed along the floor. If the coefficient of static friction at A and B is μ_s=0.3, and the coefficient of kinetic friction is μ_k=0.2, determine the smallest horizontal force P needed to cause motion. If this force is increased slightly, determine the acceleration of the dresser. Also, what are the normal reactions at A and B when it begins to move?