College of Maritime Engineering, and Biological, Oceanical and NN.RR. Sciences

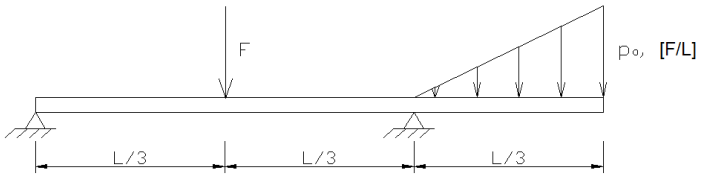
Introduction to the Theory of Structures

First evaluation – II 2016 **Dec. 08, 2016**

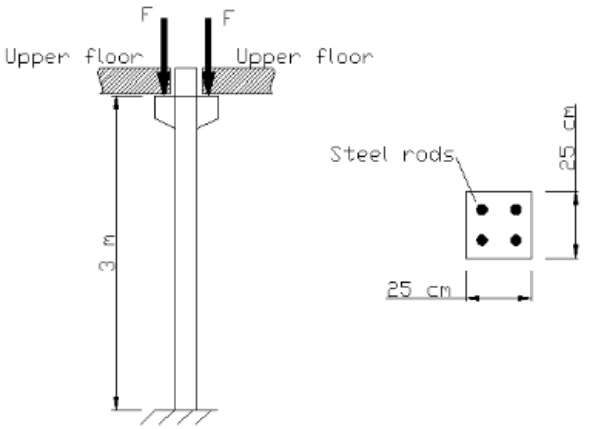
Student: .....

Book closed

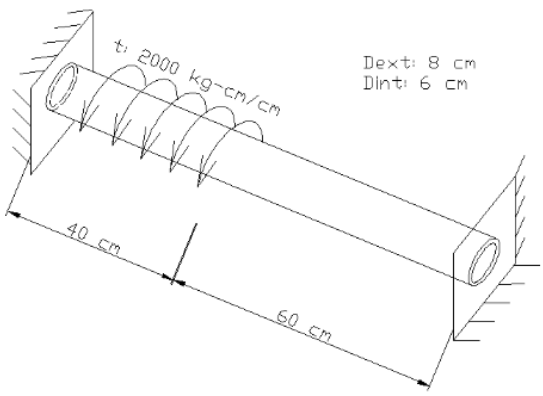
1.- Applying the Integration method, determine the Reactions of the simply supported beam with an internal support. Two loads are acting, one concentrated, $F = p_o L$, and another linearly varying in the last segment of the beam. Plot Shear force and Bending moment distributions, and identify their maximum values. (35)



2.- Determine the maximum allowable floor loadings F on a column, which supports the upper floor of a building. The column has square constant section 25x25 cm, and it is made from high strength concrete and reinforced with four 2 cm diameter steel rods, as shown in the figure. For the concrete: E: 29 GPa, and allowable normal stress: 17 N/mm^2; for steel use a safety factor of 1.5. (35)



3.- Calculate the maximum shear stress on a shaft subjected to a uniform distributed torque of 2000 kg cm/cm, over a 40 cm length. The system is clamped on both ends, and has constant section in its 100 cm total length. The shaft is made of an aluminum alloy tube (E: 73 GPa, and Poisson ratio, ν : 0.35), with 8 and 6 cm of external and internal diameters. (30)



jrml/2016

I certify that during this exam I have fulfilled code of ethics of our university.

.....