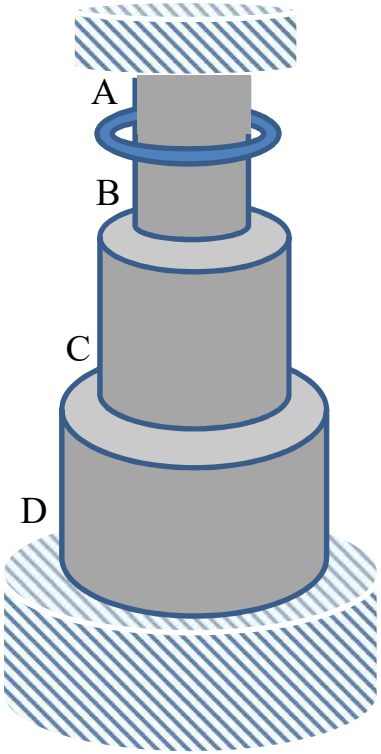

A vertical stepped cylinder has three parts AB, BC and CD each of length L. The area of cross section of AB is a, BC is 2a and CD is 3a. The material of the cylinders has modulus of elasticity E=100 Gpa. The cylinder is fixed at both the ends A and B. A ring of mass M drops from a vertical distance L/2 from the fixed end at A. The inner diameter of the ring is slightly more than that of the part AB and less than that of the part BC. What is the maximum force produced, the maximum displacement at B and the maximum stress produced in the stepped cylinder (between A and D) ? Assume that L is the last two digits of your roll number in cm, a is the last two digits of your roll number sq cm^2. and M is the last two digits of your roll number in kg. that is For example if your roll number is 19XX1234 then L= 34 cm, a = 34 cm^2, M = 34 kg. Use ideas of work energy equivalence and equivalent springs to solve the problem. Acceleration due to gravity is 9.8m/s^2 . Ignore the weight of the cylinder itself in your calculations for displacement.