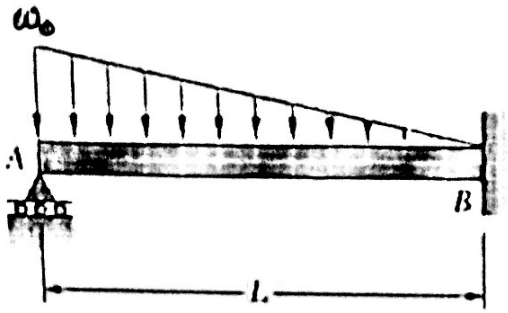
Max marks: 40 TIME: 2 hr 20/11/2016

MECHANICS OF SOLIDS (APL108)

DEPARTMENT OF APPLIED MECHANICS, IITD

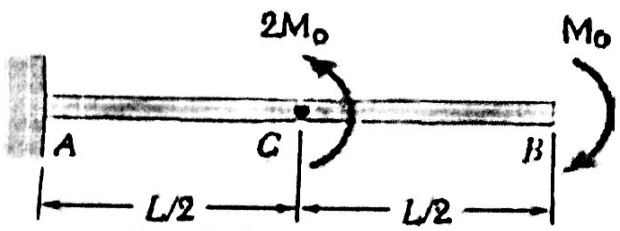
Question 1: [10 marks]



For the beam and loading shown, determine the reaction at the roller support.

[SOLVE using **equation of elastic curve** only].

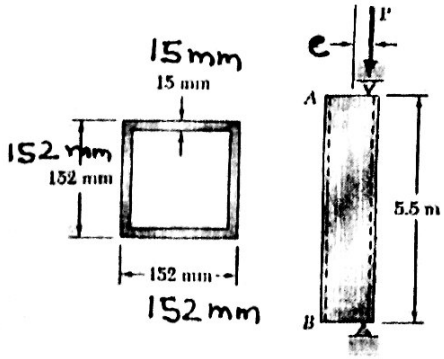
Question 2: [10 marks]



For the uniform cantilever beam and loading shown, determine the slope and deflection at (*a*) point *B*, (*b*) point *C*.

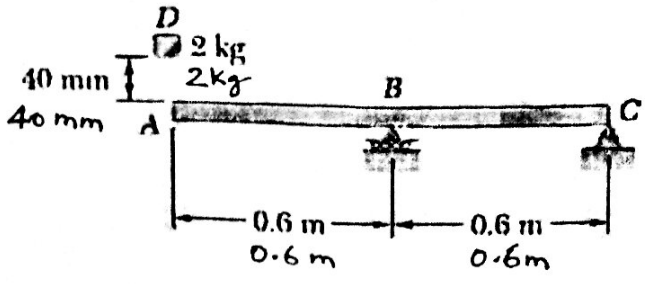
[SOLVE using **moment area theorem** only].

Question 3: [10 marks]



A column of 5.5-m effective length is made of the aluminum alloy 2014-T6, for which the allowable stress in bending is 220 MPa. Using the interaction method, determine the allowable load **P**, knowing that the eccentricity is (*a*) $e = 0$, (*b*) $e = 40$ mm.

Question 4: [10 marks]



The 2-kg block *D* is dropped from the position shown onto the end of a 16-mm-diameter rod. Knowing that E = 200 GPa, determine (*a*) the maximum deflection of end *A*, (*b*) the maximum bending moment in the rod, (*c*) the maximum normal stress in the rod.