CARLETON UNIVERSITY

TEST #2
MAR 13 2014

DURATION: **1 Hour 20 Minutes** No. of Students: 50

Department Name & Course Number: **Mechanical & Aerospace Engineering MECH 4101**
Instructor(s): **SHASHANK PANT**

AUTHORIZED MEMORANDA
Course notes and calculator are permitted.

1. The cantilever shown in Figure 1 is subjected to a uniform shear stress τ_o along its upper surface. Determine if the stress function (ϕ) given below satisfies all the required conditions for the elasticity solution of the problem.

$$\phi = \frac{1}{4}\tau_o\left(xy - \frac{xy^2}{h} - \frac{xy^3}{h^2} + \frac{Ly^2}{h} + \frac{Ly^3}{h^2}\right)$$

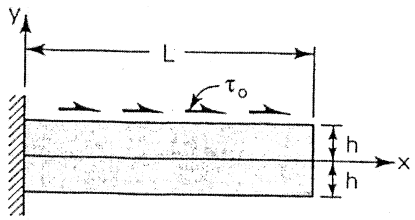

Figure 1

2. Determine the maximum height from which the weight W = 20N may be dropped as shown in Figure 2, if the maximum permissible deflection of the beam is 100mm. The flexural rigidity EI = 18.75x10^3 Nm^2 and L = 1.5m.

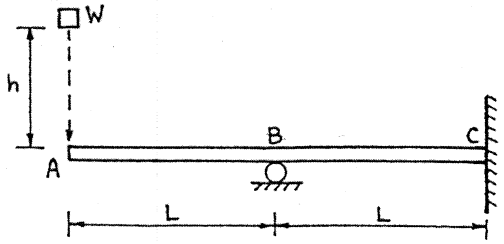

Figure 2