UNIVERSITY OF CALIFORNIA BERKELEY
Department of Civil Engineering
Summer 2015

Structural Engineering,
Mechanics and Materials
Professor: S. Govindjee

CE W30 / ME W85
Midterm Exam 1
July 14, 2015
1.5 hours (download to upload)
No late exams will be accepted

Open Resource Exam

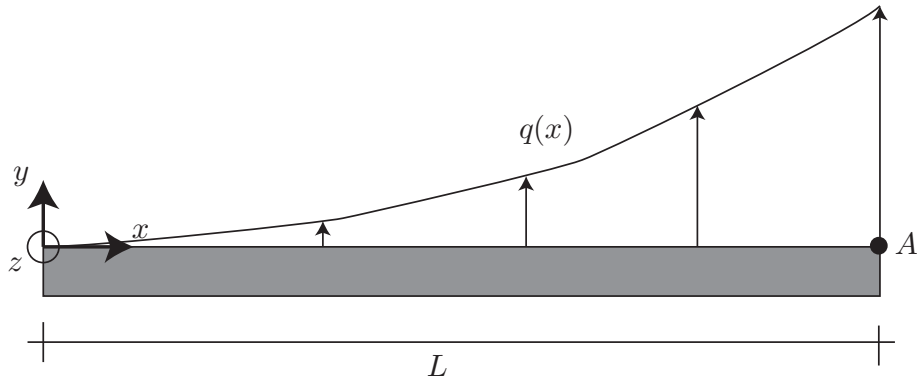
No Collaboration Permitted

Problem	Score
#1	/50
#2	/30
#3	/20
Total	/100

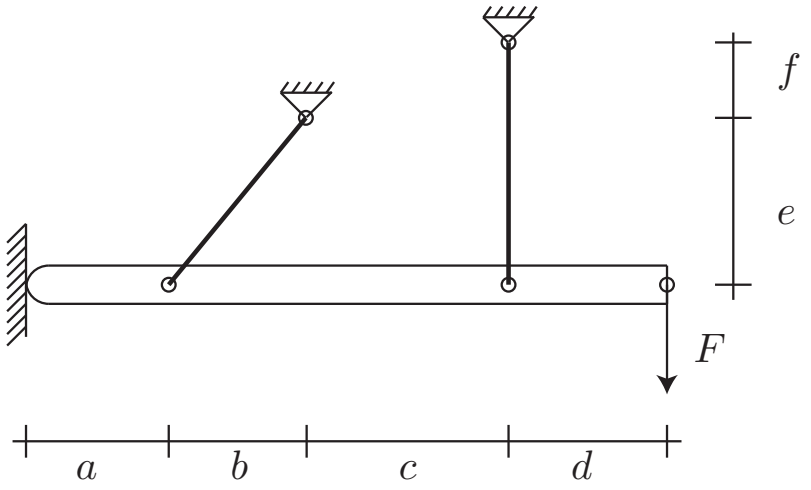
Name

SID

1. Consider a rigid bar subjected to a distributed line load $q(x) = q_o(x/L)^3 \boldsymbol{e}_y$ where q_o is a given constant with dimensions of force per unit length. Find an equivalent characterization of the loading, $\{\boldsymbol{R}, \boldsymbol{M}_R^{(A)}\}$, with respect to point A.



2. The system shown is composed of three rigid bodies that are connected via frictionless pins. The horizontal bar is in frictionless (smooth) contact with a rigid wall. Determine the contact force with the wall.



3. The linear elastic bar shown below has a Young's modulus E and cross-sectional area A. The coefficient of thermal expansion for the material is α. The bar is subjected to a constant distributed load $b(x) = b_o$, as well as to a uniform temperature change ΔT. Find an expression for the reaction force at the wall on the right.