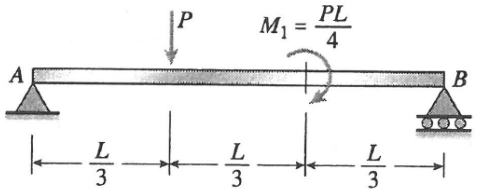
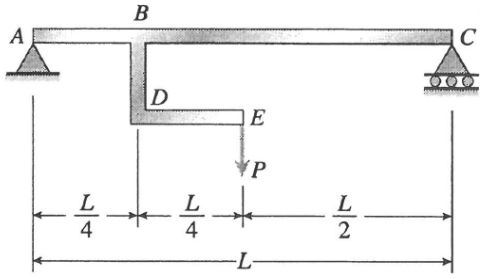
CEE212 – Structural and Solid Mechanics
Winter Semester 2014-2015
Homework #5
(Due March 13, 2015)

Beam Elements

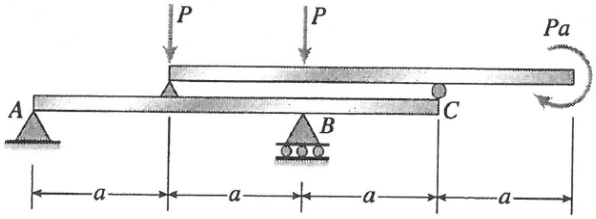
Problem 1: Draw the shear and moment diagram of the following beam.



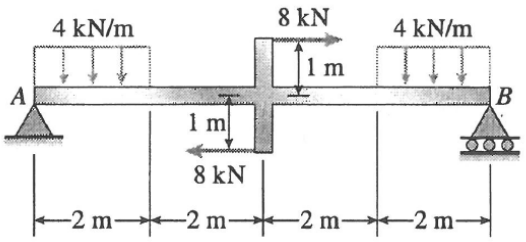
Problem 2: Draw the shear and moment diagram of the following beam.



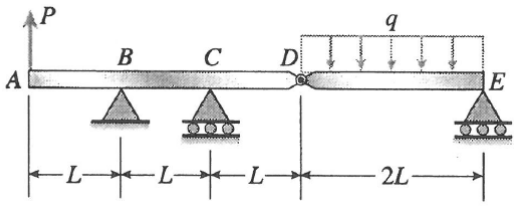
Problem 3: Draw the shear and moment diagram of the following beam.



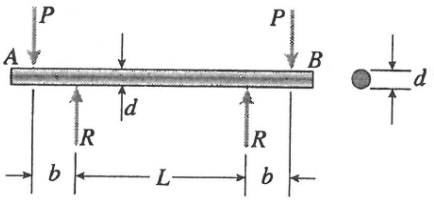
Problem 4: Draw the shear and moment diagram of the following beam.



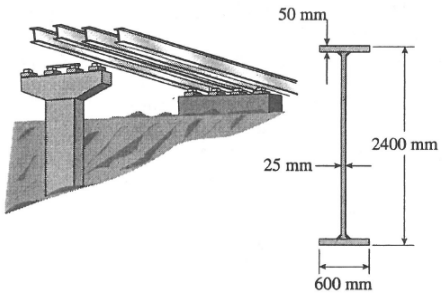
Problem 5: Draw the shear and moment diagram of the following beam.



Problem 6: A shaft is associated with the axle of a vehicle. The weight of the vehicle is denoted by load *P* while the reaction from the wheels is denoted as *R*. If the rod has a 80 mm diameter and the offset between *P* and *R* is 200 mm, what is the maximum bending stress when the vehicle has a load *P* = 47 kN.



Problem 7: During the construction of a highway bridge, the primary girders are cantilevered past a pier toward another pier in close proximity. The total cantilever length is 46 m. Provided the dimensions of the girder section and the fact that each girder is assumed to have a uniformly distributed load of 11 kN/m (which includes the self-weight), what is the maximum bending stress in the girder and where does maximum stress occur?



Problem 8: The beam shown on the right is a channel section with the dimensions shown. The moment of inertia about the z-axis is 5.14 in^4. What is the maximum tensile and compressive stress in the beam?