

Tutorial -3

ME-101, Division I & IV (2016-2017 Semester-II)

Feb-6, 2017

Time: 8-00 to 8-55.am

Q1.

A rigid beam centered about X-*axis* is under the action of distributed loads and concentrated forces. The figure (**Figure.1**) is to the scale and the grid lines are shown to find the beam dimensions and the line of action of forces. The width of the offshoot from the beam at x = 4m is small. Write shear force and bending moment as a function of x for the beam. Also plot the shear force and bending moment diagrams.



Figure 1.

Q2. The semicircular arch (shown in Figure. 2) is subjected to a uniformly distributed load about its axis of w_0 per unit length. Determine the internal normal force, shear force and moment in the arch at $\theta = 120^\circ$.



Figure 2.

Q3.

Draw the shear and moment diagrams for the compound beam (**shown in Figure. 3**). The beam is pin-connected at *E* and *F*.



Figure 3.

Q4.

A rod *DE* and a small cylinder are placed between two guides as shown (**Figure. 4**). The rod is not to slip downward, however large the force *P* may be. Neglecting the weight of the cylinder, determine the minimum allowable coefficients of static friction at *A*, *B* and *C*. Assume $\theta = 30^{\circ}$.



Figure 4.