工程力學

Exam. # 2 (11/18/2019)

1. (15pts) A light bar AB supports a 15-kg block at its midpoint C (Fig. 1). Rollers at A and B rest against frictionless surfaces, and a horizontal cable AD is attached at A. Determine (a) the tension in cable AD, (b) the reactions at A and B.

2. (25pts) A 100-kg uniform rectangular plate is supported in the position shown by hinges A and B and by cable DCE that passes over a frictionless hook at C (Fig. 2). Assuming that the tension is the same in both parts of the cable, determine (a) the tension in the cable, (b) the reactions at A and B. Assume that the hinge at B does not exert any axial thrust.

3. (20pts) Determine by direct integration the centroid of the area shown in Fig. 3. Express your answer in terms of a and h.

4. (10pts) Determine the reactions at the beam supports for the given loading shown in Fig. 4.

5. (15pts) For the machine element shown in Fig. 5, locate the z coordinate of the center of gravity.

6. (15pts) Locate the centroid of the volume obtained by rotating the shade area about the x-axis shown in Fig. 6.

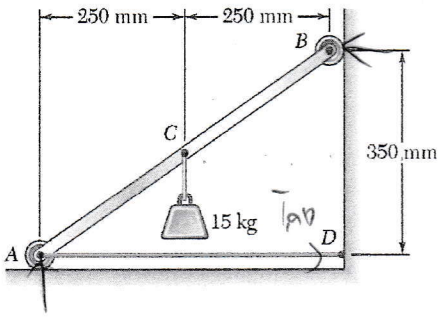

Fig. 1

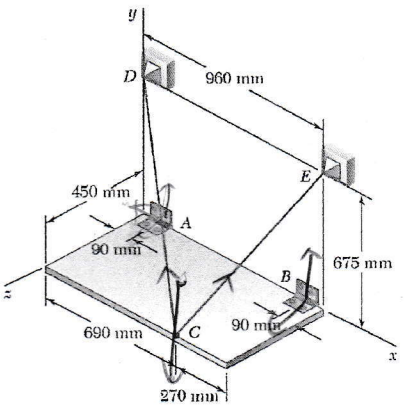

Fig. 2

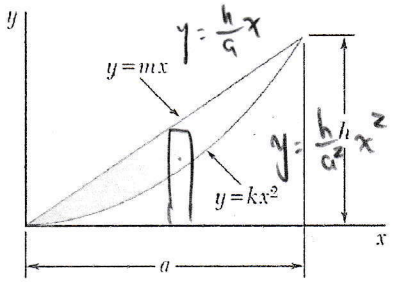

Fig. 3

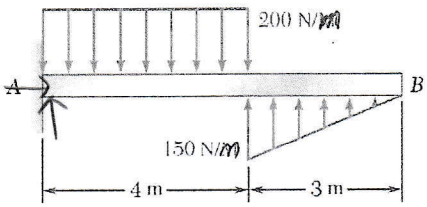

Fig. 4

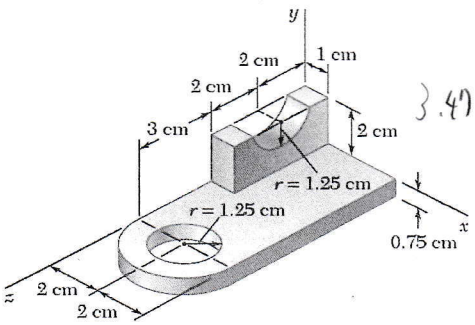

Fig. 5

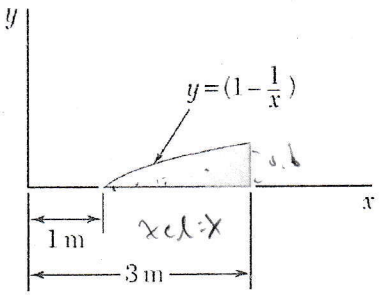

Fig. 6