# 工程力學

**Exam. # 2（11/28/2017）**

1. (10pts) The T-shaped bracket shown in Fig. 1 is supported by a small wheel at $E$ and pegs at $C$ and $D$. Neglecting the effect of friction, determine the reactions at $C$, $D$, and $E$ when $\theta = 30°$.

2. (10pts) Determine the reaction at $B$ and $D$ when $b = 60$ mm (Fig. 2).

3. (20pts) The horizontal platform $ABCD$ weights 60 N and supports a 240-N load at its center as shown in Fig. 3. The platform is normally held in the position by hinges at $A$ and $B$ and braces $CE$ and $DE$. If brace $DE$ is removed, determine the reactions at the hinges and the force exerted by the remaining brace $CE$. The hinge at $A$ does not exert any axial thrust.

4. (15pt) Determine by direct integration the centroid of the area shown in Fig 4. Express your answer in terms of $a$ and $h$.

5. (15pts) Determine (a) the distance $a$ so that the vertical reactions at supports $A$ and $B$ are equal shown in Fig. 5, (b) the corresponding reactions at the supports.

6. (10pts) For the machine element as show in Fig. 6, locate the y coordinate of the center of gravity.

7. (20pts) Locate the centroid of the volume obtained by rotating the shaded area about the x-axis shown in Fig. 7.

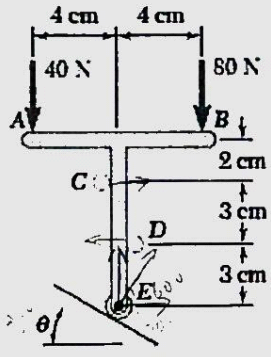


**Fig. 1**

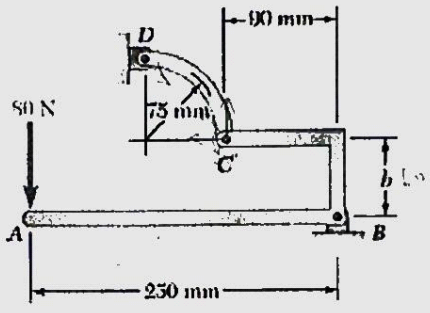


**Fig. 2**

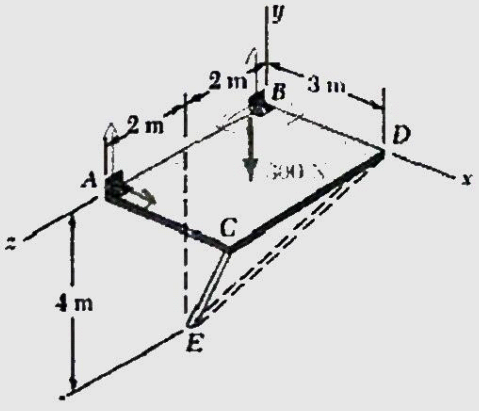


**Fig. 3**

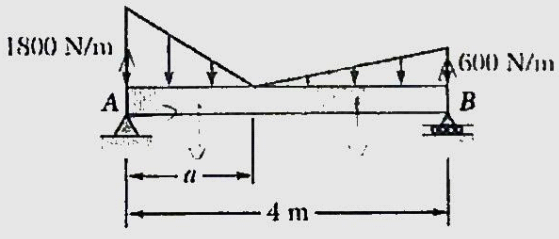


**Fig.5**

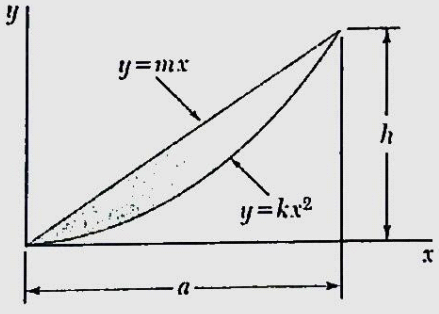


**Fig. 4**

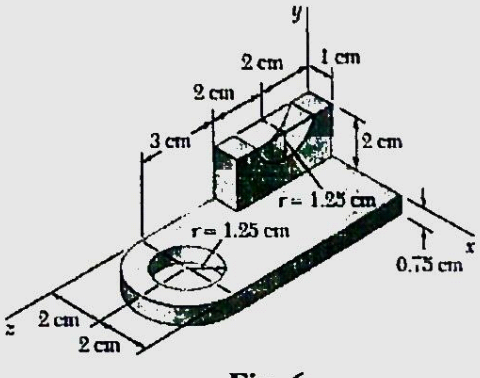


**Fig. 6**

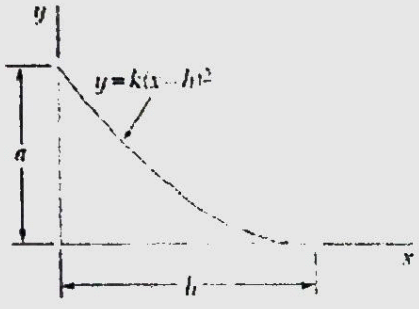


**Fig. 7**