1. (25pts) A force and a couple are applied to a beam as shown in **Fig. 1**. Replace this system with a single force **F** applied at point G, and determine the distance d.

2. (25pts) Bar AC supports two 100-lb loads as shown in **Fig. 2**. Rollers A and C rest against frictionless surfaces and a cable BD is attached at B. Determine (a) the tension in cable BD, (b) the reactions at A and C.

3. (25pts) Determine the components of the reactions at A and B when the 240-N load is applied as shown in **Fig. 3**.

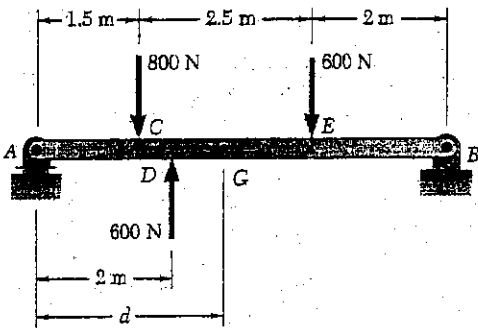4. (25pts) Determine the moment of inertia and the radius of gyration of the shaded area with respect to the x axis (as shown in **Fig. 4**).
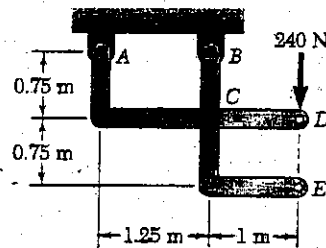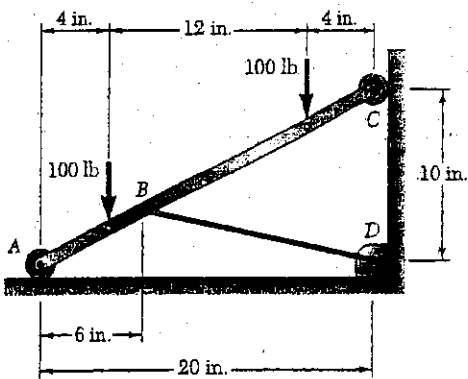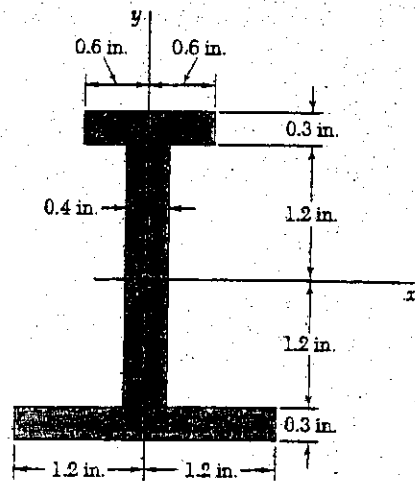
Fig. 1

Fig. 3

Fig. 2

Fig. 4