MEEG 2003 **Name:** _____

Test II ( ) **ID#:** _____

1. (30%) For the rigid body carrying the loads shown in Fig. P1, determine (*a*) the tension T_{EF} in the cable *EF*, (*b*) the reaction force **A** and the reaction moment $\mathbf{M}_A$ at the universal joint support *A*.
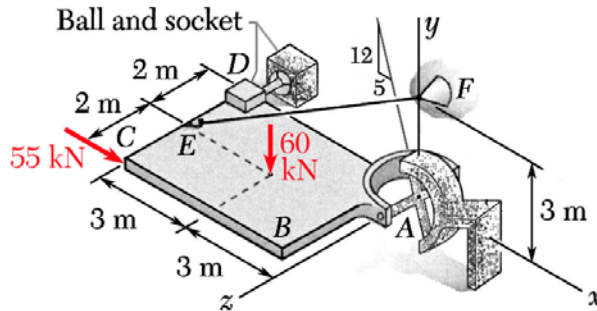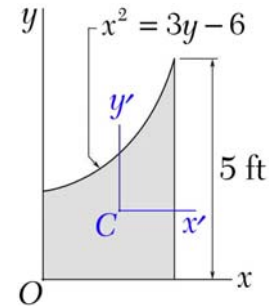

Fig. P1

Fig. P2

2. (30%) The centroid of the shaded area shown in Fig. P2 is at $C(\bar{x}, \bar{y})$. Determine (*a*) the moments of inertia I_y, (*b*) the radius of gyration k_y, (*c*) the abscissa $\bar{x}$ of *C*, (*d*) the centroidal moment of inertia $\bar{I}_{y'}$, (*e*) the moments of inertia I_x.
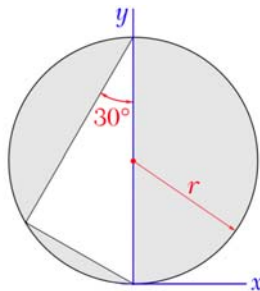

Fig. P3 *A&B*
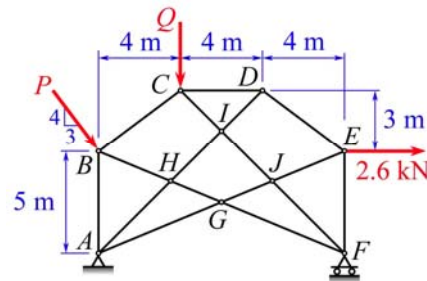

Fig. P3 *C&D*

3. (5% each) *Circle on this test sheet* the correct or nearest item for each of the following:

A. The centroid of the shaded composite area shown is at $C(\bar{x}, \bar{y})$. If $r = 3.4$ m, the value of $\bar{x}$ is
(*a*) 0.461 m. (*b*) 0.439 m. (*c*) 0.417 m. (*d*) 0.396 m. (*e*) 0.374 m. (*f*) 0.352 m. (*g*) 0.330 m.

B. The centroid of the shaded composite area shown is at $C(\bar{x}, \bar{y})$. If $r = 3.4$ m, the value of $\bar{y}$ is
(*a*) 4.89 m. (*b*) 4.68 m. (*c*) 4.47 m. (*d*) 4.25 m. (*e*) 4.04 m. (*f*) 3.83 m. (*g*) 3.62 m.

C. A truss is shown, where $P = 32$ kN and $Q = 3$ kN. The magnitude of F_{AB} in member *AB* is
(*a*) 21.0 kN. (*b*) 22.9 kN. (*c*) 24.8 kN. (*d*) 26.7 kN. (*e*) 28.6 kN. (*f*) 30.5 kN. (*g*) 32.4 kN.

D. A truss is shown, where $P = 32$ kN and $Q = 3$ kN. The magnitude of F_{FG} in member *FG* is
(*a*) 7.61 kN. (*b*) 7.06 kN. (*c*) 6.50 kN. (*d*) 5.94 kN. (*e*) 5.39 kN. (*f*) 4.83 kN. (*g*) 4.27 kN.

4. (5% each) Non-numerical problem.
A. Describe the *parallel-axis theorem* for area moments of inertia and include a sketch to illustrate it.
B. Define a *simple truss* and include a sketch to illustrate such a truss with *loads* and *supports*.
C. Define a *compound truss* and include a sketch to illustrate such a truss with *loads* and *supports*.
D. Define a *complex truss* and include a sketch to illustrate such a truss with *loads* and *supports*.