UNIVERSITY of ARKANSAS
1871

MEEG 2003 **Name:** _____

(Underline your **last name**.)

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

1. (30%) The centroid of the shaded area shown is at $C(\bar{x}, \bar{y})$. Determine (*a*) the moments of inertia I_x, (*b*) the radius of gyration k_x, (*c*) the moments of inertia I_y, (*d*) the abscissa $\bar{x}$ of *C*, (*e*) the centroidal moment of inertia $\bar{I}_{y'}$.

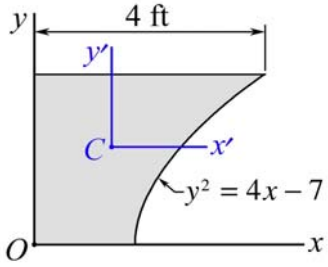

Fig. P1

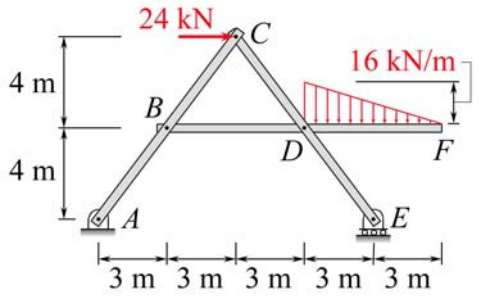

Fig. P2

2. (30%) A frame is loaded as shown. Determine the forces exerted by the pins on member *CDE*.

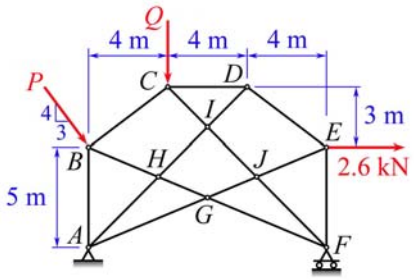

Fig. P3 *A*&*B*

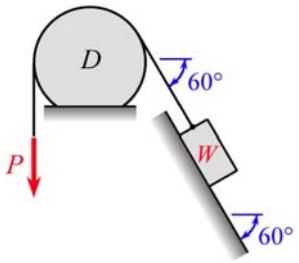

Fig. P3 *C*&*D*

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

A. A truss is shown, where *P* = 14 kN and *Q* = 2.1 kN. The magnitude of F_{AB} in member *AB* is
(*a*) 10.71 kN. (*b*) 12.04 kN. (*c*) 13.37 kN. (*d*) 14.70 kN. (*e*) 16.03 kN. (*f*) 17.36 kN.

B. A truss is shown, where *P* = 14 kN and *Q* = 2.1 kN. The magnitude of F_{FG} in member *FG* is
(*a*) 3.77 kN. (*b*) 3.38 kN. (*c*) 2.99 kN. (*d*) 2.60 kN. (*e*) 2.21 kN. (*f*) 1.820 kN.

C. If $\mu_s = 0.6$ between *all* surfaces of contact and the block has a weight of *W* = 25 lb, the minimum force **P** to pull the block up the incline is
(*a*) 151.4 lb. (*b*) 145.8 lb. (*c*) 140.2 lb. (*d*) 134.6 lb. (*e*) 129.0 lb. (*f*) 123.4 lb.

D. If $\mu_s = 0.6$ between *all* surfaces of contact and the block has a weight of *W* = 25 lb, the minimum force **P** to keep the block from sliding down the incline is
(*a*) 2.59 lb. (*b*) 2.71 lb. (*c*) 2.82 lb. (*d*) 2.94 lb. (*e*) 3.06 lb. (*f*) 3.18 lb.

4. ***A.*** (5 %) Define the **angle of static friction**.
B. (5 %) Draw a sketch to define the **angle of contact** in belt friction.
C. (10 %) Give a brief summary of the **laws of dry friction**.