UNIVERSITY of ARKANSAS
1871 ®

MEEG 2003 **Name:** _____

(Underline your **last name**.)

Final Exam ( ) **ID#:** _____

Circle the correct or nearest item in each of the following: (10% each)

1. A 12-N force **F** acts at the end *D* of a pipeline as shown. The magnitude of the moment of **F** about the *x* axis is

(a) 24 N·m. *(b)* 33 N·m. *(c)* 42 N·m. *(d)* 51 N·m. *(e)* 60 N·m. *(f)* 64 N·m. *(g)* 68 N·m. *(h)* 72 N·m.

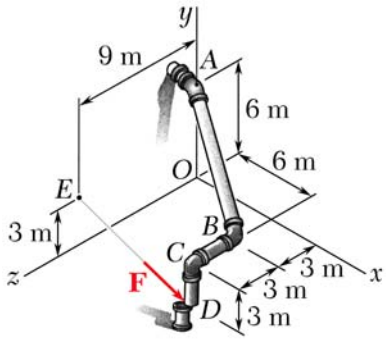

Fig. P1 and P2

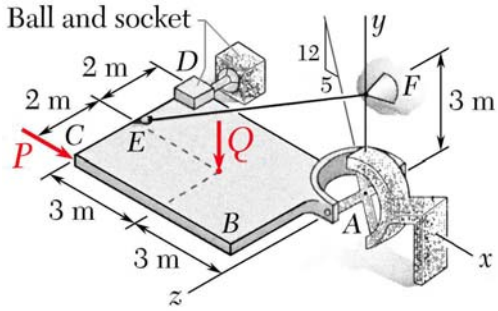

Fig. P3 and P4

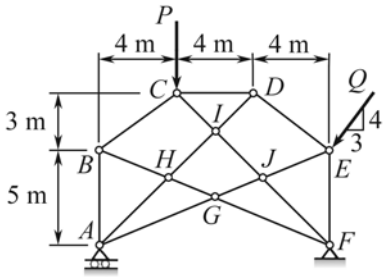

Fig. P5

2. A 12-N force **F** acts at the end *D* of a pipeline as shown. The shortest distance d_s between the line of action of **F** and the *x* axis is

(a) 8.72 m. *(b)* 8.05 m. *(c)* 7.38 m. *(d)* 6.71 m. *(e)* 5.56 m. *(f)* 4.41 m. *(g)* 3.27 m. (*h*) 2.12 m.

3. A rigid body is supported and loaded as shown, where P = 15 kN and Q = 72 kN. The magnitude of the reaction force exerted by the short link at *D* on the rigid body is

(a) 1 kN. *(b)* 3 kN. *(c)* 5 kN. *(d)* 7 kN. *(e)* 9 kN. *(f)* 11 kN. *(g)* 13 kN. *(h)* 15 kN.

4. A rigid body is supported and loaded as shown, where P = 15 kN and Q = 72 kN. The magnitude of the reaction force $\mathbf{A}_z$ exerted, parallel to the *z* axis, by the universal joint at *A* on the rigid body is

(a) 39 kN. *(b)* 37 kN. *(c)* 35 kN. *(d)* 33 kN. *(e)* 31 kN. *(f)* 29 kN. *(g)* 27 kN. *(h)* 25 kN.

5. A compound truss is supported and loaded as shown, where P = 4.2 kN and Q = 3.5 kN. The magnitude of the force in member *AB* of this truss is

(a) 2.8 kN. *(b)* 4.2 kN. *(c)* 5.6 kN. *(d)* 7.0 kN. *(e)* 8.4 kN. *(f)* 9.8 kN.

(Over)

MEEG 2003 **Name:** _____

(Underline your **last name**.)

Final Exam ( ) **ID#:** _____

6. A Gerber beam is shown, where the moment acting at H is $\mathbf{M}_H$ = 610 lb·ft ↻. The magnitude of the vertical component $\mathbf{A}_y$ of the reaction at the fixed support A is

(a) 460 lb. *(b)* 465 lb. *(c)* 470 lb. *(d)* 475 lb. *(e)* 480 lb. *(f)* 485 lb. *(g)* 490 lb. *(h)* 495·lb.

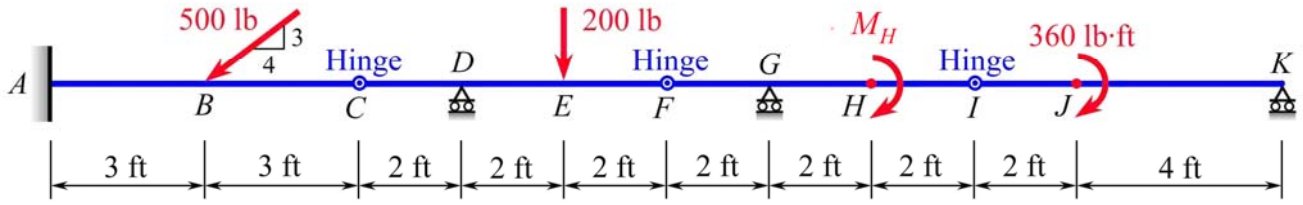

Fig. P6 and P7

7. A Gerber beam is shown, where the moment acting at H is $\mathbf{M}_H$ = 610 lb·ft ↻. The magnitude of the reaction moment $\mathbf{M}_A$ at the fixed support A is

(a) 2.07 kip·ft. *(b)* 2.04 kip·ft. *(c)* 2.01 kip·ft. *(d)* 1.980 kip·ft. *(e)* 1.950 kip·ft. *(f)* 1.920 kip·ft. *(g)* 1.890 kip·ft. *(h)* 1.860 kip·ft.

8. If θ = 32°, $\mu_s = 0.5$ between all surfaces of contact, and the weight of the block is W = 20 lb, the minimum force **P** required to prevent the block from sliding down the incline is

(a) 4.89 lb. *(b)* 4.80 lb. *(c)* 4.72 lb. *(d)* 4.64 lb. *(e)* 4.56 lb. *(f)* 4.48 lb. *(g)* 4.40 lb. (*h*) 4.32 lb.

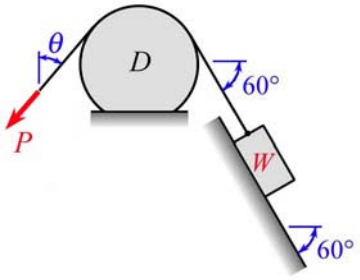

Fig. P8

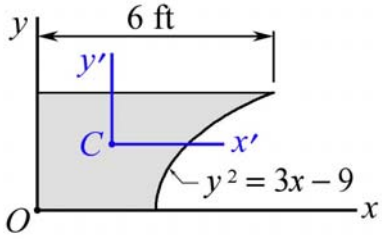

Fig. P9 and P10

9. The centroid of the shaded area is located at $C(\bar{x}, \bar{y})$. The value of $\bar{y}$ + 0.9425 ft is

(a) 2.28 ft. *(b)* 2.42 ft. *(c)* 2.57 ft. *(d)* 2.63 ft. *(e)* 2.74 ft. *(f)* 2.86 ft. *(g)* 2.97 ft.

10. The moment of inertia of the shaded area about the y axis is I_y. The value of I_y + 6.543 ft^4 is

(a) 81.5 ft^4. *(b)* 80.6 ft^4. *(c)* 79.4 ft^4. *(d)* 78.6 ft^4. *(e)* 77.3 ft^4. *(f)* 76.0 ft^4. *(g)* 75.1 ft^4.